A-22 PATRIOT ~~SECRET~~ SAR-89-130

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823) ~~(U)~~
PROGRAM: PATRIOT

AS OF DATE: December 31, 1989

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AS AMENDED
CLEARED
FOR OPEN PUBLICATION
MAR 22 1990
21
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

1. ~~(U)~~ Designation and Nomenclature (Popular Name): Guided Missile System, Air Defense (PATRIOT).

2. ~~(U)~~ DoD Component: Department of the Army

3. ~~(U)~~ Responsible Office and Telephone Number:

PATRIOT Project Office
Air Defense Program Executive Office
Redstone Arsenal, AL 35898-5620

PM: COL Bruce Garnett
Assigned: February 12, 1987
AV788-3240; COMM (205) 895-3240

4. ~~(U)~~ Program Elements:

RDTE: 64307A D212, D213, D291 (all sunk)
PROCUREMENT: APPN 2032 SSN C49100, CA0252
MILCON: 1335,1336,1337,1348,1349,1346,1347,0498

Concur in Classification as marked
21 MAR 1990
SECURITY REVIEW, ODCSINT, HQDA

5. ~~(U)~~ Related Programs: Improved HAWK and JTMD Anti-Tactical Missile

6. ~~(U)~~ Mission and Description:

~~(U)~~ PATRIOT is a high-to-medium altitude, long-range Air Defense Missile System which provides air defense of ground combat forces, and high-value assets against the air threat of 1980's and 1990's. PATRIOT is designed to cope with enemy defense suppression tactics which may include saturation, maneuvers, and Electronic Counter Measures (ECM).

CLASSIFIED BY PATRIOT SECURITY CLASSIFICATION GUIDE, dated September 21, 1988 with addendum dated December 9, 1988.
DECLASSIFY: OADR

NOTE: THE PATRIOT SAR WILL NOT BE SEPARATED INTO CONFIDENTIAL AND SECRET DOCUMENTS AT ANY LEVEL, BUT WILL BE STAFFED/DISTRIBUTED AS A SINGLE SECRET DOCUMENT.

(U) Mission and Description (Cont'd):

(U) In the field Army, PATRIOT defenses will be complemented by short range, low altitude forward area defense weapons and will be integrated with other ground and air assets in the overall air defense of the theater of operations. PATRIOT is replacing the NIKE-HERCULES and some HAWK Systems. The system provides a high probability of target kill, multiple simultaneous engagement of high performance air breathing targets in an ECM environment and a rapid rate of fire. PATRIOT unique equipment at HHB includes the information and coordination central (ICC), four communications Relay Groups (CRG), their associating Antenna Mast Groups (AMG), and a trailer mounted power unit. Peculiar equipment associating with a PATRIOT Fire Unit includes the Radar Set (RS), Engagement Control Station (ECS), AMG, Electric Power Plant (EPP), and Launching Station (LS). The PATRIOT Radar Set is multifunction phased array radar which performs a variety of surveillance, acquisition, and guidance tasks in directing a battery of LS each armed with four ready missiles. The number of LS in a Fire Unit is normally eight, however, the number of Launchers may be tailored based on the situation and mission.

7. (U) Program Highlights:

a. (U) Significant Historical Developments--The PATRIOT (formerly SAM-D) Weapon System development program began in 1965 when the Secretary of Defense authorized Concept Definition (CD). In May 1967, CD was completed and a contract for Advanced Development (AD) was awarded to Raytheon Company, the prime contractor. On January 10, 1974, the Deputy Secretary of Defense directed the Army to redirect the SAM-D Program to permit early flight verification of the TVM guidance system and emphasize greater austerity. ARC/DSARC decisions in January 1976 approved the program to resume full-scale gineering Development.

(U) OT II began on November 19, 1979, and was completed on March 10, 1980. During the OT-II testing, some shortfalls were experienced in the areas of reliability, maintainability, target identification, and ECCM performance. As a result of these shortfalls, the September 10, 1980 Secretary of Defense Decision Memorandum (SDDM) approved only limited production and prescribed a series of four test units to demonstrate system performance, reliability and maintainability prior to a full production decision. By October 1981 test units one, two, and three had been completed. Full production authority was granted, but due to maintainability shortfalls, deployment was limited. In September 1984, SDDM Test Unit 4 (Follow-On Evaluation) was successfully completed, and PATRIOT was given authority to fully deploy. The Netherlands Foreign Military Sales (FMS) case was signed in February 1984 for a total of four PATRIOT Fire Units.

(U) During 1985, the first two PATRIOT battalions were successfully deployed in Europe and began performing their NATO mission. In February 1985, the Federal Republic of Germany signed a Foreign Military Sales Case for 14 PATRIOT Fire Units. In addition, on October 4, 1985, a Memorandum of Understanding for the coproduction of 26 Fire Units and attendant Missiles and support equipment was signed with the Government of Japan.

(U) The Netherlands received the first of four PATRIOT units in January 1986. During Septrember 1986, PATRIOT successfully demonstrated the capability to engage and divert an attacking tactical ballistic missile from its intended target.

7. (U) Program Highlights (cont'd):

(U) PATRIOT Anti-Tactical Missile (ATM) capability (PAC-2) was successfully fielded in November 1987. The FY87-FY91 PATRIOT Production Multiyear Contract for 4,491 missiles and 45 fire units was awarded to Raytheon Corporation in the firm-fixed-price amount of $3,550,000,000.

(U) The Anti-Tactical Missile (ATM) program enjoyed significant progress during 1988 with the fielding of the initial ATM capability (PAC-1) in July 1988. On December 19, 1988, the PAC-2 Milestone III Decision IPR approved cut-in to production of the ATM (PAC-2).

(U) A Memorandum of Understanding was signed with Italy in March 1988 whereby the U.S. will provide funding in FY90 and FY91 to provide 20 Radars, 20 ECSs, and 4 ICCs to Italy in exchange for four SPADA air defense missile systems for short range air defense of selected U.S. military bases in Italy and services/ facilities in Italy for other U.S. requirements.

b. Significant Developments since last Report

(U) PATRIOT ATM PAC-2 production cut-in is proceeding as scheduled, and the estimated fielding date remains January 1991.

(U) The Multimode Seeker is an advanced millimeter wave active seeker integrated into current PATRIOT guidance scheme, increasing the number of simultaneous engagements, and improving Electronic Counter Counter Measures (ECCM) capabilities. The Multimode Seeker Demonstration (MMSD) contract with Raytheon was initiated July 1989. Raytheon's efforts and approach were reviewed with Federal Republic Germany (FRG) on October 25, 1989, and a detailed review was held in the U.S. January 17, 1990. This effort is funded with FRG and Nunn funds.

(U) During 1989, 32 flight tests were conducted; of these 1 was successfully conducted against a tactical missile; 1 was fired as a surveillance round and was used as a target for the tactical missile test, and the remaining 30 were against air breathing targets. Search, track, and post deployment software tests were successfully conducted during 1989.

(U) During FY89, the 3d BN 43d Air Defense Artillery (ADA) backfill was fielded to Ft Bliss, TX. Upon completion of collective training, 3d BN 43d ADA became the first complete 6 fire unit PATRIOT Battalion. In Feb 89, the 2nd BN 7th ADA backfill was fielded to Ft Bliss, TX. Upon completion of collective training 2d 7th ADA became the second complete PATRIOT Battalion. Efforts were begun to field 5th Battalion 7th ADA Battalion (Initial Deployment) in FY89. Upon completion of this fielding effort in FY90, this will complete the Battalion (Initial Deployment) fieldings. To date, the deployed system has demonstrated a Meantime-Between-Failure (MTBF) in excess of 60 hours which is more than twice the established requirement. The operational readiness has been the best of any deployed Army system.

(U) During 1989, the countries of Israel and the United Kingdom have continued to exhibit a high level of interest in the PATRIOT System. Both countries have made visits to the U.S. to receive technical briefings and to observe equipment demonstrations. Additional planning meetings and government-to-government discussions are anticipated during 1990. Japan continues to manufacture PATRIOT as a licensed production program.

(U) The system is expected to meet its mission requirement.

(U) Changes since "as of" date: None.

~~(U)~~ Threshold Breaches: There are currently no DAE baseline breaches ated March 1989).

9. ~~(U)~~ Schedule:

a. Milestones --	Development Estimate	Approved Program	Current Estimate
Initiation of ADDEV	May 67	NA	May 67
DCP Thresholds:			
Contract for ED	Mar 72	NA	Mar 72
PATRIOT DCP Milestones (Oct 76/Jan 78):			
First Electronic Countermeasures (ECM) Flight	Aug 76	NA	Dec 76
Delivery of FU-2 to White Sands Missile Range	Jan 77	NA	Jul 77
Completion of Phase II ECM Search/Track Tests	Jun 77	NA	Dec 77
Start of Producibility Engineering and Planning (PEP)	Oct 77	NA	Oct 77
Delivery of FU-3 to White Sands Missile Range	Sep 78	NA	Dec 78
First Modular Digital Airborne Guidance System (MDAGS) Flight	Oct 78	NA	Sep 78
Delivery of FU-5 to White Sands Missile Range	Jan 79	NA	Feb 79
Contractor Flight Tests completed and start of DT/OT II testing	Jul 79	NA	Jan 80
Secretary of Defense Decision Memorandum (SDDM) (Sep 10, 80) Tests:			
Completion of DT/OT II testing	May 80	NA	Dec 80
Completion of SDDM Test Unit 1	Jan 81	Jan 81	Jan 81
Completion of SDDM Test Unit 2	Jun 81	Jul 81	Jul 81
Completion of SDDM Test Unit 3	Oct 81	Oct 81	Oct 81
Completion of Component/System Design Confirmation	Sep 82	Feb 83	Feb 83
Completion of SDDM Test Unit 4	May 83	Sep 84	Sep 84
Contract for Initial Production Facilities (IPF)	Apr 79	NA	Mar 79
Limited Production Decision (DSARC-III [LP])	NA	Sep 80	Sep 80
Full Production Decision	Apr 80	Apr 82	Apr 82
Physical Configuration Audit	NA	Dec 82	Dec 82
Initial Operational Capability (IOC) (CONUS)	Apr 82	Jun 83	Jun 83

(U) Schedule (cont'd.)

(U) a. Milestones (cont'd.)

	Development Estimate	Approved Program	Current Estimate
U.S. of A Milestone I (Collective Training Readiness Review)	NA	Oct 1983	Oct 1983
U.S. of A Milestone II (Readiness for FOE Review)	NA	Jul 1984	Jul 1984
U.S. of A Milestone III (Deployment Readiness) Review	NA	Oct 1984	Oct 1984
U.S. of A Milestone IV (Completion of FOE) Review	NA	Nov 1984	Nov 1984
OCONUS Initial Operational Capability (USAREUR)	NA	Mar 1985	Mar 1985
2nd OCONUS Battalion Initial Deployment	NA	Aug 1985	Aug 1985
3rd OCONUS Battalion Initial Deployment	NA	Oct 1986	Oct 1986
4th OCONUS Battalion Initial Deployment	NA	Apr 1987	Apr 1987
2nd CONUS Battalion Initial Deployment	NA	Mar 1988	Mar 1988
5th OCONUS Battalion Initial Deployment	NA	Dec 1987	Dec 1987
3rd CONUS Battalion Initial Deployment	NA	Sep 1988	Sep 1988
6th OCONUS Battalion Initial Deployment	NA	Jun 1988	Jun 1988
Backfill for Full Deployment of 2nd CONUS Battalion	NA	Sep 1989	Nov 1988 (Ch-1)
Backfill for Full Deployment of 3rd CONUS Battalion	NA	Dec 1989	Apr 1989 (Ch-1)
[redacted] (US owned/GE Manned E-7) OCONUS Battalion Initial Deployment	NA	Jun 1989	Nov 1989 (Ch-1)
[redacted] (E-9) OCONUS Battalion Initial Deployment	NA	Dec 1989	Oct 1989 (Ch-1)
Backfill for Full Deployment of 1st OCONUS Battalion	NA	Sep 1990	Aug 1990 (Ch-1)
Backfill for Full Deployment of 2nd OCONUS Battalion	NA	Dec 1990	Dec 1990
9th (US owned/GE Manned E-8) OCONUS Battalion Initial Deployment	NA	Sep 1991	Sep 1991
Backfill for Full Deployment of 3rd OCONUS Battalion	NA	Sep 1991	May 1991 (Ch-1)
Backfill for Full Deployment of 4th OCONUS Battalion	NA	Mar 1992	Jan 1992 (Ch-1)
Backfill for Full Deployment of 5th OCONUS Battalion	NA	Sep 1992	May 1992 (Ch-1)
Backfill for Full Deployment of 6th OCONUS Battalion	NA	Mar 1993	Jan 1993 (Ch-1)
Backfill for Full Deployment of 7th OCONUS Battalion	NA	Jun 1990	Jun 1990
Backfill for Full Deployment of 8th OCONUS Battalion	NA	Dec 1993	Aug 1993 (Ch-1)
Backfill for Full Deployment of 9th OCONUS Battalion	NA	Jun 1992	Jun 1992
Final Unit Equip - Backfill for Full Deployment of 1st CONUS Battalion	NA	Mar 1994	Mar 1994

9. (U) Schedule (Cont'd):

b. (U) Previous Change Explanations --

The differences reflect delays in initial availability of Fire Units 1, 2, and 3 and interruptions of the flight test program for MDAGS integration. System integration difficulties delayed the completion of contractor flight tests, start and completion of DT/OT II, full production decision, and the IOC date. Additionally, the differences reflect delays in delivery of production hardware. Schedules were adjusted to incorporate additional stress and reliability verification testing prior to the beginning of SDDM Test Unit 4 (Follow-On Evaluation). IOC changed from February 1983 to June 1983 to reflect a change from the TRADOC to the CONUS IOC. New milestones were added to reflect revisions to the DAE Baseline.

c. (U) Current Change Explanations

(Ch-1) The following Milestones changed to reflect the Department of the Army (DA) Deployment Schedules, dated June 1989, and actual deployments:

Backfill for Full Deployment of 2nd CONUS Bn changed from Sep 1989 to Nov 1988.
Backfill for Full Deployment of 3rd CONUS Bn changed from Dec 1989 to Apr 1989.
7th (US owned/GE manned E-7) OCONUS Bn Initial Deployment changed from Jun 1989 to Nov 1989.
8th (E-9) OCONUS Bn Initial Deployment changed from Dec 1989 to Oct 1989.
Backfill for Full Deployment of 1st OCONUS Bn changed from Sep 1990 to Aug 1990.
Backfill for Full Deployment of 3rd OCONUS Bn changed from Sep 1991 to May 1991.
Backfill for Full Deployment of 4th OCONUS Bn changed from Mar 1992 to Jan 1992.
Backfill for Full Deployment of 5th OCONUS Bn changed from Sep 1992 to May 1992.
Backfill for Full Deployment of 6th OCONUS Bn changed from Mar 1993 to Jan 1993.
Backfill for Full Deployment of 8th OCONUS Bn changed from Dec 1993 to Aug 1993.

d. (U) References --

(U) Development Program: Revised DCP #50, approved October 14, 1976, with Cover Sheet No. 1, approved January 20, 1978, and Cover Sheet No. 2, approved November 24, 1978. SDDM, dated September 10, 1980.

(U) Approved Program: DAE Baseline, dated March 1989.

10. (U) Technical/Operational Characteristics:

a. (U) Characteristics

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
(C) Firing Unit Static Inherent Availability	(b)(1)			
(U) Missile Reliability (Launch & Flight)				
(U) Single Shot Kill Probability, P_{ssk} (reliable Missile, MIG-21)				

10. (U) Technical/Operational Characteristics (cont'd.)

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Cur Est
(b)(1)				

c. (U) Previous Change Explanations--

(U) The primary difference in the performance estimates is due to changes in hardware configuration as a result of OSD redirection of the program in January 1974. The current estimate reflects PATRIOT performance for specific conditions of target size, altitude, speed, and maneuver (and time of execution of maneuver). Predicted performance presented is against the system requirement and is projected for the worst case conditions. The system performance should be substantially better when the system is employed against targets in a full tactical environment where the full multiple environment favorable to the enemy is unlikely to be encountered.

1/ (U) The values shown reflect range to intercept for a target not in line from jammer to radar; the numbers shown in parentheses reflect range to intercept for a target in line from jammer to radar.

Technical/Operational Characteristics (cont'd.)

d. (U) Current Change Explanations--None

e. (U) References -- (U) Development Estimate: SDDM, September 10, 1980; DCP #50, approved October 14, 1976.
(U) Approved Program: DAE Baseline, dated March 1989

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. (U) Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	$1106.2	$1554.0	$1554.0
Procurement	3121.2	3286.2	3293.8
Guided Missile	(964.7)	(1245.6)	(1247.4)
HE Warhead	(121.9)	(114.7)	(115.9)
Adaption Kit	(271.7)	(0.0)	(0.0)
Fire Control Section (FCS)	(1141.8)	(887.8)	(889.0)
Launcher	(254.0)	(317.8)	(319.0)
Other (GSE)	(186.0)	(132.3)	(133.5)
Advanced Prod Engr	(56.9)	(0.0)	(0.0)
IPF		(129.2)	(130.2)
Total Flyaway	(2997.0)	(2827.4)	(2835.0)
Peculiar Support	(26.7)	(61.0)	(61.0)
Training Devices		(23.8)	(23.8)
Software Support		(74.0)	(74.0)
ILS		(75.4)	(75.4)
DMPE		(17.1)	(17.1)
Initial Spares	(97.5)	(207.5)	(207.5)
Construction (MILCON)	40.0	65.0	61.7
Total FY 72 Base-Year $	4267.4	4905.2	4909.5
Escalation	973.1	7463.7	7480.1
Development (RDT&E)	(93.8)	(580.5)	(580.5)
Procurement	(848.6)	(6782.6)	(6808.3)
Construction (MILCON)	(30.7)	(100.6)	(91.3)
Total Then-Year $	5240.5	12368.9	12389.6
b. (U) Quantities --			
Development (RDT&E)	6	5	5
Procurement	234	103	103 1/
Total	240	108	108 1/

1/ Does not include the 3 fire units funded by NATO Air Base Defense funds.

(U) Program Acquisition Cost (cont'd.): Current Estimate in Millions of Dollars)

c. (U) Foreign Military Sales --

Quantity	Estimate Cost Then-Year $	Country
4	$306M	Netherlands
14	$1182M	Germany

d. (U) Nuclear Costs - - None

e. (U) References--(U) Development Estimate: SDDM, September 10, 1980; DCP #50, approved October 14, 1976.

(U) Approved Program: DAE Baseline, dated March 1989;

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions)

		Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a.	(U) Program Acquisition	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1)	(U) Cost 2/	12389.6	12368.9	12389.6
(2)	(U) Quantity	103	103 1/	103
(3)	(U) Unit Cost	120.3	120.1	120.3
b.	(U) Current Procurement	(FY 1990)	(FY 1990) APPN	(FY 1991)
(1)	(U) Cost 2/	706.5	706.5	635.0
	Less CY Adv Proc	-0-	-0-	-0-
	Plus PY Adv Proc	20.5	20.5	21.0
	Net Total	727.0	727.0	656.0
(2)	(U) Quantity	3	3	0
(3)	(U) Unit Cost	242.3	242.3	N/A

1/ This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation. Also, does not include the 3 fire units bought with NATO Air Base Defense funds.

2/ Excludes Army funding in FY90/FY91 for Italian agreement to provide 20 radars, 20 ECS, and 4 ICCs.

13. ~~(U)~~ Cost Variance Analysis:

a. ~~(U)~~ Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1200.0	3969.8	70.7	5240.5
Previous Changes				
Economic	+78.3	+2010.1	-35.2	+2053.2
Quantity	-87.8	-649.3	-79.4	-816.5
Schedule	+322.4	+2024.6	+2.7	+2349.7
Engineering	+331.0	-434.2	-	-103.2
Estimating	+132.4	+1927.3	+206.8	+2266.5
Other	+27.6	-	-	+27.6
Support	+130.6	+1220.5	-	+1351.1
Subtotal	+934.5	+6099.0	+94.9	+7128.4
Current Changes				
Economic	-	+68.6	-	+68.6
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-35.3	-12.6	-47.9
Other	-	-	-	-
Support	-		-	
Subtotal	0.0	+33.3	-12.6	+20.7
Total Changes	+934.5	+6132.3	+82.3	+7149.1
Current Estimate	2134.5	10102.1	153.0	12389.6

(FY 1972 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1106.2	3121.2	40.0	4267.4
Previous Changes				
Quantity	-65.1	-989.7	-45.4	-1100.2
Schedule	+231.4	+443.3	-	+674.7
Engineering	+129.4	-419.6	-	-290.2
Estimating	+64.0	+707.9	+70.4	+842.3
Other	+24.5	-	-	+24.5
Support	+63.6	+423.1	-	+486.7
Subtotal	+447.8	+165.0	+25.0	+637.8
Current Changes				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	+7.6	-3.3	+4.3
Other	-	-	-	-
Support	-		-	
Subtotal	0.0	+7.6	-3.3	+4.3
Total Changes	+447.8	+172.6	+21.7	+642.1
Current Estimate	1554.0	3293.8	61.7	4909.5

(U) Cost Variance Analysis (Cont'd):

b. (U) Previous Change Explanations --

RDT&E

Economic:	revised escalation rates
Quantity:	reduction in test hardware and missiles
Schedule:	program stretchout/redirection and acceleration of deployment
Engineering:	improvements in Electronic Counter - Counter Measures (ECCM) to accommodate state-of-the-art changes
Estimating :	changes of Producibility, Engineering and Planning (PEP), redefined estimating procedures, add RSI an increased development tasks
Other:	reflects a negotiated overrun
Support:	changes in training, maintenance concept and support equipment

Procurement

Economic:	revised escalation rates
Quantity:	reduction of 131 fire units and reconfiguration of a fire unit to 8 launchers vice 5
Schedule:	change from 24 to 12 fire units per year and stretchout caused by program redirection and funding cuts
Engineering:	elimination of nuclear warhead, change missile guidance, computer memory, antenna mast set, Anti-Radiation Missile (ARM) decoy, fuze, radar side lobe cancellers, and ATM
Estimating:	reflects refined estimating techniques, deletion of non-peculiar GFE, Navy transfer, and savings due to FMS and multiyear procurement (FY87-FY91).
Support:	Reduction to Initial Spares, increase to Training Devices

Construction

Quantity:	deletion of CONUS fire units and reduced two European sites based on U.S./German agreement
Estimating:	change in reporting requirements, revised estimate to defer construction of facilities.

c. (U) Current Change Explanations --

			(Dollars in Millions) Base-Year	Then-Year
(1)	(U)	RDT&E		
		None		
(2)	(U)	Procurement		
		Revised Dec 89 escalation rates (Economic)	N/A	+68.6
		Revised estimate. (Estimating)	+7.6	-35.3
		Revised estimate based on Aug 89 BCE	(+1.8)	(-8.2)
		NAMSA scope reduction (PATRIOT Maintenance	(+5.8)	(-27.1)
		Facility four del[illegible]		

(U) Cost Variance Analysis (Cont'd):

(3) (U) MILCON

Revised Estimate to delete requirement for construction of Fort Lewis facilities.	-3.3	-12.6

14. (U) Program Acquisition Unit Cost (PAUC History): (Millions of then-year dollars)

a. (U) Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
7.215	+6.899	+4.077	+0.441	+1.411	+2.352	-	-	+15.180	1/ 22.395

b. (U) Development Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
22.395	+20.600	+20.556	+22.813	-1.002	+21.540	+.268	+13.117	+97.892	1/ 120.287

1/ This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation. Also, does not include the 3 fire units bought with NATO Air Base Defense funds.

15. ~~(U)~~ Contract Information: (Then-Year Dollars in Millions)

a. ~~(U)~~ RDT&E

Engineering Development	Initial Contract Price		
	Target	Ceiling	Qty
Raytheon Company, Boston, MA DAAH01-89-C-A0458 CPIF Award: April 10, 1989 Definitized: April 10, 1989	$14.5	N/A	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$14.5	N/A	N/A	$14.7	$14.7

	Cost Variance	Schedule Variance
Previous Cumulative Variance (no prior submission)	N/A	N/A
Cumulative Variances to Date (October 29, 1989)	$-0.5	$-2.0
Net Change	$-0.5	$-2.0

~~(U)~~ Explanation of Change: The cost and schedule variances are attributable to concept design effort being more extensive than originally planned for the pulse doppler processor. While changes were being incorporated contractually (added effort), only those activities which were independent of the new work were done. Once the changes are incorporated, the effort should quickly recover to schedule and planned cost.

15. (U) Contract Information (cont'd): (Then-Year Dollars in Millions)

b. (U) Procurement

IPF (Buy 7)

Raytheon Company, Boston, MA
DAAH01-85-C-A066, CPIF
Award: May 31, 1985
Definitized: May 31, 1985

Initial Contract Price		
Target	Ceiling	Qty
$63.6	N/A	1/

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$74.3	N/A	N/A	$68.5	$68.5

	Cost Variance	Schedule Variance
Previous Cumulative Variance (October 30, 1988)	$ 6.4	$-0.8
Cumulative Variances to Date (October 29, 1989)	$ 5.2	$-1.0
Net Change	$-1.2	$-0.2

(U) Explanation of Change: The unfavorable changes in the cost and schedule variances are due primarily to the sum of several decreases. The total program estimate and schedule are not affected by these changes.

FOOTNOTE:

1/ The quantities of Special Tools (ST) and Special Test Equipment (STE) are too numerous to list.

15. ~~(U)~~ Contract Information (Cont'd): (Then-Year Dollars in Millions)

b. ~~(U)~~ Procurement (Cont'd)

Production Contract (FY87-91)

	Initial Contract Price				
	Target	Ceiling	Qty		
Raytheon Company, Boston, MA DAAH01-86-C-A025, FPP Award: March 31, 1987 Definitized: March 31, 1987	$3550.0	N/A	45	1/	2/

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$3954.1	N/A	45 2/	$3954.1	$3954.1

Variances: Not required on FFP contracts.

~~(U)~~ Explanation of Change: Not required on FFP contracts.

FOOTNOTES:

1/ Quantity = Fire Unit

2/ 34 U.S./11 FMS. Previous SAR showed 48 units which included 3 U.S. fire units that are option quantities and not contained in the basic multiyear contract.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status --

(1) (U) Percent Program Completed: 92.9% (26 yrs/28 yrs)

(2) (U) Percent Program Cost Appropriated: 90.3% ($11188.7/$12389.6)

b. (U) Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY65-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92)	Total
RDT&E	2134.5	0	0	0	2134.5
Procurement	8198.3	706.5	635.0	562.3	10102.1
MILCON	146.6	2.8	0	3.6	153.0
Total	10479.4	709.3	635.0	565.9	12389.6

c. (U) Annual Summary--

Fiscal Year	Qty FU/Msl	FY 72 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway Nonrec	Flyaway Rec	Total	Program	Obligated	Expended	
Appropriation: RDT&E								
1965				17.8	13.6	13.6	13.6	1.8
1966				18.8	15.0	15.0	15.0	2.7
1967				14.7	12.0	12.0	12.0	3.2
1968				33.0	28.0	28.0	28.0	3.6
1969				67.1	59.9	59.9	59.9	4.7
1970				63.2	59.4	59.4	59.4	5.5
1971				84.2	83.1	83.1	83.1	5.1
1972				110.9	115.3	115.3	115.3	4.6
1973				153.9	170.9	170.9	170.9	4.4
1974				164.5	193.8	193.8	193.8	8.0
1975				81.4	104.2	104.2	104.2	10.9
1976				95.8	129.9	129.9	129.9	6.6
FY7T				28.5	40.0	40.0	40.0	2.9
1977				126.1	182.0	182.0	182.0	2.6
1978				136.6	214.3	214.3	214.3	6.8
1979				132.1	228.1	228.1	228.1	8.4
1980				69.9	128.5	128.5	128.5	10.6
1981				36.6	74.5	74.5	72.9	10.6
1982				23.4	51.2	51.2	49.8	7.6
1983				19.5	44.6	44.6	43.1	4.9
1984				32.9	78.4	78.4	76.1	3.8
1985				24.5	60.4	60.4	60.1	3.4
1986				18.6	47.4	47.4	46.6	2.8
btotal	5/126			1554.0	2134.5	2134.5	2126.6	

16. ~~(U)~~ Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. ~~(U)~~ Annual Summary --

Fiscal Year	Qty FU/Msl	FY 72 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway Nonrec	Flyaway Rec	Total	Program	Obligated	Expended	
Appropriation: MIPA								
1979	0/0	33.8	0	37.1	67.1	67.1	67.1	8.9
1980	5/117	41.6	136.0	204.4	413.8	397.0	395.2	11.8
1981	5/130	5.6	165.3	214.9	485.6	440.4	437.4	11.6
1982	9/176	14.4	225.7	284.1	733.7	674.6	665.9	14.3
1983	12/287	11.2	248.9	301.6	848.8	774.8	761.9	9.0
1984	12/440 1/	14.7	270.4	314.9	957.0	849.1	834.8	8.0
1985	12/440	7.3	271.7	326.3	1025.4	907.2	870.5	3.4
1986	12/560		259.9	292.5	945.2	869.3	821.1	2.8
1987	12/700		244.9	286.4	957.6	917.8	917.8	2.7
1988	12/715		220.0	264.6	917.6	834.9	266.1	3.0
1989	9/815		219.1	236.8	846.5	782.4	102.0	4.2
1990	3/815		174.4	192.5	706.5	396.0		2/ 4.0
1991	0/817		155.8	168.6	635.0			2/ 4.2
1992	0/440		114.3	169.1	562.3			4.0
Subtotal	103/6452 1/	128.6	2706.4	3293.8	10102.1	7910.6	6139.8	

1/ Does not include the 3 fire units and 40 missiles procured with NATO Air Base Defense funds ($185.0M)

2/ Excludes Army funding in FY90/91 for Italian agreement to provide 20 Radars, 20 ECSs, and 4 ICCs.

Appropriation: MILCON								
1972				1.4	1.4	1.4	1.4	5.9
1973								5.6
1974								11.8
1975								16.1
1976								3.0
FY7T								1.6
1977								2.8
1978								7.7
1979								9.3
1980				1.9	3.8	3.8	3.8	10.6
1981								10.6
1982				14.1	31.2	31.2	31.2	7.6
1983				19.2	48.1	48.1	48.1	4.9
1984				5.9	15.4	15.4	15.4	3.8
1985								3.4
1986				6.9	19.1	19.1	19.1	2.8
1987				7.0	19.9	19.9	19.9	2.7
1988				2.2	6.6	6.6	6.6	3.0
1989				0.4	1.1	1.1	1.1	4.2
1990				1.6	2.8			4.0
1991				0.0	0.0			4.2
1992				1.1	3.6			4.0
Subtotal				[illegible]	[illegible]	146.6	146.6	
Total	108/6578	128.6	2698.8	4909.5	12389.6	10191.7	8413.0	

~~(U)~~ Production Rate Data:

a. ~~(U)~~ Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current 1/ Estimate	Maximum 2/ Economic
Missiles				
1978	34	NA		
1979	524	NA		
1980	960	117	117	220
1981	1080	130	130	220
1982	1440	176	176	220
1983	1440	287	287	440
1984	1440	525	440	440
1985	1080	815	440	660
1986	1080	815	560	800
1987	607	816	700	840
1988		830	715	880
1989		891	815	880
1990		815	815	880
1991		NA	817	
1992			817	
Fire Units				
1978	4	NA		
1979	18	NA		
1980	36	5	5	5
1981	36	5	5	5
1982	36	9	9	9
1983	36	12	12	12
1984	36	15	12	12
1985	32	17	12	15
1986		17	12	15
1987		17	12	15
1988		6	12	15
1989		NA	12	
1990			12	
1991				

1/ US production requirements.

2/ Includes capability to produce both FMS and U.S. requirements.

17. ~~(U)~~ Production Rate Data Cont'd:

b. ~~(U)~~ Cost Variance -- Dollars in Millions

ITEM	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	3/ Maximum Economic
Prog Acq Cost (BY $)	4690.2	+219.3	4909.5	0.0	4909.5
(TY $)	11312.2	+1077.4	12389.6	0.0	12389.6
PAUC (BY $)	43.4	+4.3	47.7	0.0	47.7
(TY $)	104.7	+15.6	120.3	0.0	120.3

c. ~~(U)~~ Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	9/80	0	9/80	0	9/80
Duration (in Months)	123	15	138	+15	123
End Date (Mo/Yr)	12/90	15	03/92	+15	12/90

d. ~~(U)~~ Deliveries (Plan/Actual) --

	To Date
RDT&E	
Fire Units	5/5
Missiles	126/126
Procurement	
Fire Units	79/79
Missiles	2850/2932

e. ~~(U)~~ Approved Design to Cost Goal --

	Development Est 1/		Approved PGM		Current Est Flyaway Cost	
	Qty/Rate Per Mo.	Cost	Qty/Rate Per Mo.	Cost	Qty/Rate Per Mo.	Cost
Missile Round						
FY 72 Base-Year $	6250/120	.090 2/	6452/80	.204	6452/80	.193
Then-Year $		.113 2/		.635		.634
Radar						
FY 72 Base-Year $	125/3	2.828	104/1.25	5.902	104/1.25	5.871
Then-Year $		3.585		18.392		18.358
Engagement Control Station						
FY 72 Base-Year $	125/3	.887	105/1.25	1.611	105/1.25	1.603
Then-Year $		1.125		5.019		4.843
Launching Station						
FY 72 Base-Year $	625/15	.250	704/11	.432	727/11	.426
Then-Year $		.316		1.346		1.357

1/ The Mar 72 DCP reflected contractor Design-to-Unit Production Cost Goals.

2/ Missile Round without Warhead and Canister.

PATRIOT productions for FY87-FY91 is under a five year Multiyear Production contract at a maximum economic rate of production for missiles and fire units. Maximum economic rate includes quantities for FMS cases.

18. ~~(U)~~ Operating and Support Costs:

a. Assumptions and Ground rules--The concept of operation is 72 tactical units with each USAREUR fire unit operating on an average of 3909 hours/year. The costs are the direct cost to support the primary personnel and to operate the fire units. The O&S consumables are replenishment spares, repair parts, and POL. The Direct Depot Maintenance are the labor, materials, and transportation for repair of major Fire Unit component parts, and software support. The sustaining investment consists of modification kits, and support operations. Other Direct Support costs include maintenance civilian labor, and other direct support for mod kit installation. The Indirect Costs are for indirect support operations, MOS training cost, Quarters Maintenance and Utilities, Post Production Engineering, Central Supply, Unit Operations, Base Operations, and training activities. The O&S assumptions and cost are based on PATRIOT operating Tempo, Fire Unit MTBF, and the PATRIOT Baseline Cost Estimate, dated August 1989.

b. Costs -- (FY1972 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per Tactical Fire Unit
Personnel	0.830
O&S Consumables	0.313
Direct Depot Maintenance	0.988
Sustaining Investment	0.158
Other Direct Costs	0.023
Indirect Costs	0.638
Total	2.950

c. Contractor Support Cost--

(Then-Year Dollars in Millions)

Funding	1/ FY1989 $ Prior	FY1990 Year	FY1991 Year	Balance to Complete	Total
O&M (Army)	15.2	6.6	7.0	-0-	28.8
Industrial Fund	-0-	-0-	-0-	-0-	-0-
Total	15.2	6.6	7.0	-0-	28.8

1/ This represents cost for FY1988 and FY1989.

SAR-89-122

A-14 HELLFIRE ~~CONFIDENTIAL~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: HELLFIRE

AS OF DATE: December 31, 1989

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1. ~~TOP~~ **Designation and Nomenclature (Popular Name):** Not applicable - subsystem of the AH-64 APACHE Weapon System

2. ~~TOP~~ **DoD Component:** ARMY

~~TOP~~ **Responsible Office and Telephone Number:**
HELLFIRE/GLD PM Office
Redstone Arsenal
RSA, AL 35898-5610
COL R. E. Huston
Assigned: February 1,1988
AV 746-1365 COMM 205 876-1365

4. ~~TOP~~ **Program Elements/Procurement Line Items:**
RDT&E:
PE 064310A Project D074
PE 023747A Project D045
PE 023802A Project D045
PROCUREMENT:
APPN 2032 ICN SSN C70100 (Army)
APPN 2032 ICN SSN C70200 (Army)

CLEARED AS AMENDED
FOR OPEN PUBLICATION
MAR 22 1990 21
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

5. ~~TOP~~ **Related Programs:** AH-64 APACHE Helicopter; Ground/Vehicular Laser Locator Designator; High Mobility Multipurpose Wheeled Vehicle (HMMWV); Improved TOW Vehicle (ITV); Navy AH-1J and AH-1T Helicopters.

(THIS PAGE IS [redacted])

CLASSIFIED BY: HF SCG, dtd 25 Jul 89
DECLASSIFY ON: OADR

Concur in Classification as marked
21 MAR 1990
SECURITY REVIEW, ODCSINT, HQDA

~~CONFIDENTIAL~~

OASD(PA) DFOISR 90-T-0703

[redacted] **Mission and Description**: HELLFIRE is an air-to-ground missile system designed to defeat individual hardpoint targets and to minimize exposure of the delivery vehicle to enemy fire. HELLFIRE utilizes semi-active laser terminal homing guidance and is designed to accept various other guidance packages. HELLFIRE can be employed in a wide variety of modes including autonomous, ground remote, airborne remote, direct or indirect fire, and rapid or ripple fire. HELLFIRE can be employed from helicopters against heavy armored vehicles at longer standoff ranges than other missiles currently in the inventory. In addition, HELLFIRE is being considered for a surface-to-surface role as a candidate to satisfy the close combat anti-armor mission element need. Improvements which have been incorporated into the HELLFIRE Missile System are an improved low visibility (ILV) missile autopilot, which enhances performance in periods of low cloud cover, and a minimum smoke motor which improves helicopter survivability by reducing primary missile smoke. Additional improvements are planned to enable the missile to counter evolving hardened armor and improved countermeasures. A warhead development to improve warhead lethality against near-term threat armor is nearing completion and additional developments are being initiated which include hardening of the laser seeker against countermeasures, further warhead improvements, replacement of the mechanical fuze with an electronics fuze, and optimization of the missile to accept these design changes. HELLFIRE does not replace another missile system in the air-to-ground role.

7. [redacted] **Program Highlights**:

a. (U) Significant Historical Developments -- In 1972, the Army [redacted]tiated an Advanced Development (AD) Program to demonstrate critical [redacted]systems of the HELLFIRE Missile System. The AD Program included competitive contractor development of a modular missile, launcher, and control and display systems, including prototype hardware. It also included extensive technical and operational tests of the laser guided HELLFIRE Missile System, warhead development tests, and countermeasures tests. On 30 Mar 76, OSD approved entry into full-scale engineering development (ED) of HELLFIRE with fielding to be concurrent with the Advanced Attack Helicopter (AH-64). The ASARC directed that development of the Fire-and Forget seeker applicable to the HELLFIRE Modular Missile be continued. Operational testing of HELLFIRE as a subsystem of the AH-64 Weapon System was completed in Aug 81. After successfully completing the ASARC III milestone decision review in Nov 81, the Army was delegated authority by the DOD to approve production. The Vice Chief of Staff, Army granted approval for full scale production on 30 Mar 82 and FY 82 production contracts were awarded to Rockwell International Corporation and Martin Marietta Corporation. During the first and second production buys, sole source procurement was the acquisition strategy for seekers and missiles except for a limited quantity of all-up-rounds (AUR). Seekers were procured from Martin Marietta Orlando Aerospace (MMOA) and provided to Rockwell International Corporation (RIC) as government furnished equipment (GFE) for assembly into all-up-rounds. A competitive dual source AUR acquisition strategy was implemented starting with the third buy. This acquisition strategy introduced competition into the program.

~~(U)~~ **Program Highlights (Cont'd):**

The Government also implemented a fly-to-buy testing and acceptance program to provide added assurance that missiles accepted conform to contractual and user requirements. Dual source competition with a split of the award quantity, has been the acquisition strategy from FY 84 through FY 89. Beginning in FY 84, the Navy began procurement of the HELLFIRE system for their AH-1J and AH-1T aircraft.

b. ~~(U)~~ Significant Developments Since Last Report -- A total of 8,190 missiles were delivered in CY 89.

Development tests have demonstrated that the HELLFIRE missile with the improved warhead is effective in meeting requirements against near-term threat armor.

Since the procurement quantities for FY 90 and subsequent fiscal years have been reduced and an improved optimized missile is planned to be introduced into production in FY 93, the acquisition strategy has been revised to more effectively address FY 90 and subsequent fiscal year requirements. In FY 90 competition between the two sources is being conducted to determine the low overall offeror for the FY 90 procurement plus options for FY 91 and FY 92. Prices are also being obtained for a proposed split of the award quantity in FY 90. If the total cost for splitting the award quantity in FY 90 does not exceed the low overall offeror's price for the total quantity in FY 90 by an established amount, the award quantity will be split between the two sources. Otherwise, the total quantity in FY 90 will be awarded to the low overall offeror, with firm-fixed-price options for FY 91 and FY 92. If the award is split in FY 90, competition will be conducted between the sources in FY 91 for a winner take all award of FY 91 with an option for FY 92. Proposals were solicited from the two sources for development of the optimized missile, to be introduced into production in FY 93, and for firm-fixed-price not-to-exceed production options for FY 93-96. Rockwell International did not bid; Martin Marietta submitted a proposal on 15 Dec 89. The optimized missile will improve the laser seeker's performance against countermeasures, combine digital autopilot and improved seeker functions, and provide a more robust warhead for effectiveness against the long term threat. The acqusition strategy will continue to be reviewed, and will be altered as required to stay abreast of program requirements.

A congressionally directed program to test the HELLFIRE missile mounted on the HMMWV continued through the reporting period. There were three ballistic missile launches successfully conducted at Redstone Arsenal, AL. System level durability and other environmental testing was also performed.

The HELLFIRE Missile System satisfies all mission requirements except missile weight. Weight reduction from the current nominal weight of 99.8

7. ~~(U)~~ **Program Highlights (Cont'd):**

pounds to the required 95 pounds is not considered feasible without degrading system performance.

c. ~~(U)~~ Changes Since As Of Date -- None.

8. ~~(U)~~ **Threshold Breaches:** There are currently DAE baseline (dtd 20 Apr 89) breaches.

9. ~~(U)~~ **Schedule:**

a. ~~(U)~~ Milestones --

		Development Estimate	Approved Program	Current Estimate	
Advanced Development					
Start		DEC 72	N/A	DEC 72	
Complete		OCT 75	N/A	OCT 75	
Operational Test (OT) (COBRA)					
Start		AUG 79	N/A	AUG 79	
Complete		DEC 79	N/A	DEC 79	
TRADOC FUE			DEC 85	DEC 85	
FORSCOM FUE			MAY 86	MAY 86	
Initial Operational Capability (IOC) (on AH-64)		MAY 83	JUL 86	JUL 86	
USAREUR FUE			JAN 87	JAN 87	
National Guard FUE			NOV 87	NOV 87	
Contract Award - Interim Warhead			MAY 88	MAY 88	
FY 89 Missile Contract Award			APR 89	APR 89	
First Delivery (FY 88 Buy)			AUG 89	JUN 89	Ch-1
Contract Awd Optimized Msl			DEC 89	JUL 89	Ch-1
ECP Available - Interim Warhead			JAN 90	JAN 90	
FY 90 Missile Contract Award			APR 90	APR 90	
First Delivery (FY 89 Buy)			AUG 90	AUG 90	
FY 91 Missile Contract Award			APR 91	APR 91	
First Delivery (FY 90 Buy)	*		AUG 91	FEB 92	Ch-2
ECP Available - Optimized Msl	*		MAR 92	AUG 92	Ch-3
FY 92 Missile Contract Award			APR 92	APR 92	
First Delivery (FY 91 Buy)	*		AUG 92	NOV 92	(b)(1)
FY 93 Missile Contract Awd			APR 93	DEC 92	
First Delivery (FY 92 Buy)			AUG 93	SEP 93	
FY 94 Missile Contract Awd			APR 94	DEC 93	
First Delivery (FY 93 Buy)	*		AUG 94	DEC 94	
FY 95 Missile Contract Award			APR 95	APR 95	
First Delivery (FY 94 Buy)	*		AUG 95	FEB 96	Ch-5
FY 96 Missile Contract Award			APR 96	APR 96	
First Delivery (FY 95 Buy)	*		AUG 96	FEB 97	Ch-5
First Delivery (FY 96 Buy)	*		AUG 97	FEB 98	Ch-5

(U) Schedule (Cont'd):

a. (U) Milestones -- Continued

	Development Estimate	Approved Program	Current Estimate
Milestone II	FEB 76	N/A	FEB 76
Milestone III	FEB 80	MAR 82	MAR 82
Milestone IIIA	NOV 81	N/A	NOV 81

b. (U) Previous Change Explanations --

The program experienced an accumulation of approximately 2 years in schedule slippage during full-scale development. Schedule changes resulted from reduction of RDT&E funding, delays in procurement funding and delays in testing caused by late delivery of hardware and correction of deficiencies revealed in earlier test. The completion of production validation testing was delayed 6 months because of problems that occurred in production start-up. The current estimate for initial operating capability (IOC) was changed to Jul 86 to reflect the actual date that IOC was achieved on AH-64. The following historical milestones are no longer applicable and were deleted: Competitive AD Contracts - Start/Complete, ED Contract Award, PQT-C (Contractor) - Start/Complete, Production Contract Award, Prod Val Tests Complete, Full-Scale Production, and Missile Fly-to-Buy(FTB) Lot Acceptance Test Start (FY 84 Buy). DAE Baseline, Apr 89, elements have been added: TRADOC/FORSCOM/USAREUR/National Guard FUE, Contract Award - Interim Warhead/Optimized Msl, ECP Avail - Interim Warhead/Optimized Msl, FY 89-96 Contract Award, First Del FY 88-96.

c. (U) Current Change Explanations --

(Ch-1) Reflects date of actual accomplishment.
(Ch-2) Delay in completion of the interim warhead development program (2 mos) and introduction of the interim warhead into FY 90 production requires first article tests (4 mos) which will delay the FY 90 first delivery by 6 months. Three months is recovered for the FY 91 first delivery utilizing a 9-month delivery period for FY 90, and a cumulative total of 4 months is recovered for the FY 92 first delivery utilizing an 11-month delivery period for FY 91.
(Ch-3) Delays in preparation of procurement package to incorporate changes in acquisition strategy will cause late award and completion of development (5 mos).
(Ch-4) Availability of firm-fixed-price not-to-exceed options will reduce adminstrative lead time for award of FY 93 and FY 94 contracts.
(Ch-5) Decision to introduce optimized missile into FY 93 production was made after approved program milestones were established. Introduction of optimized missile requires first article tests which delays first delivery (FY 93 Buy) by 4 months. Build-up to rate production requires 14 months for

~~(U)~~ Schedule (Cont'd):

delivery of the FY 93 quantity, which causes an additional 2 month delay (total of 6 months) for first delivery of the FY 94, FY 95, and FY 96 buys.

* These parameters will be changed when a new baseline incorporating technical/operational parameters and schedule milestones associated with the missile improvements is approved.

d. ~~(U)~~ References --

Development Estimate: DCP #118, 12 Nov 76.

Approved Program: DAE Baseline, Apr 89.

10. ~~(U)~~ **Technical/Operational Characteristics:**

a. ~~(U)~~ Technical --	Dev Est	Approved Program Goal/Threshold		Demon-strated Perf	Current Estimate
Msl Weight Max (lbs) 3/	.95	99.8	100.0	99.8	99.8
b. ~~(U)~~ Operational --					
Missile Range (Km)					
Min (Direct Fire) 3/	0.50	0.59	0.59	0.59	0.59
Max (Direct Fire)	5.0	5.0	5.0	7.0	7.0
Max (Indirect Fire)	N/A	8.0	6.5	8.0	8.0
Footprint (Degrees) 3/	15	+17.5	+17.5	+17.5	+17.5
		-18.1	-18.1	-18.1	-18.1
Time of Flight (Sec)					
3 Km	13	10-13	13	9.6	13
5 Km	20	22	22	18.1	18.1
Reliability					
Missile (in-flight) 2/	.92 -.95	0.95	0.89	.97	.92 -.95
Launcher	.95 -.99	0.99	0.95	1.0	.95 -.99
Prob of Hit (PH/R) 1/	(b)(1)				
Stat Tgts					
Moving Tgts					

c. ~~(U)~~ Previous Change Explanations --

The current estimate for missile weight was raised to 99.8 pounds when it became evident that the 95 pound weight requirement could not be achieved. The current estimate for minimum range was changed to 0.59 km and the current estimate for maximum range was

. ~~TOP~~ Technical/Operational Characteristics (Cont'd):

c. ~~(U)~~ Previous Change Explanations (Cont'd) --

changed to 7.0 km after completion of engineering development testing. Missile Range Max (Indirect Fire) added, DAE Baseline, Apr 89, element.

d. ~~(U)~~ Current Change Explanations -- None

Notes:
Classified in accordance with SCG for production missile.
1/ Probability of hit in the direct fire mode, given reliability.
2/ Demonstrated perf for reliabilty reflects perf of last 50 rounds fired during the period ending 31 Dec 89.
3/ These parameters will be changed when a new baseline incorporating technical/operational parameters and schedule milestones associated with the missile improvements is approved.

e. ~~(U)~~ References --

Development Estimate: DCP #118, 12 Nov 76.

Approved Program: DAE Baseline, Apr 89.

- ~~TOP~~ Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. ~~(U)~~ Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	211.9	288.9	286.6
Procurement	276.7	821.7	806.6
Missile Bus	(143.1)	(444.5)	(449.5)
Laser Seeker	(109.4)	(346.2)	(336.3)
Total Flyaway	(252.5)	(790.7)	(785.8)
Other Wpn Sys Cost 1/	(4.0)	(27.9)	(17.7)
Peculiar Support	(0.0)	(0.0)	(0.0)
Initial Spares	(20.2)	(3.1)	(3.1)
Construction	0.0	0.0	0.0
Ops. and Maint. (O&M)	0.0	0.0	0.0
Total FY 75 Base-Year $	488.6	1110.6	1093.2

- Program Acquisition Cost (Cont'd):

a. Cost -- (Cont'd)	Development Estimate	Approved Program	Current Estimate
Escalation	214.8	1567.8	1598.9
Development (RDT&E)	(54.3)	(163.8)	(162.6)
Procurement	(160.5)	(1404.0)	(1436.3)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Ops. and Maint. (O&M)	(0.0)	(0.0)	(0.0)
Total Then-Year $	703.4	2678.4	2692.1
b. Quantities --			
Development (RDT&E)	241	333	333
Procurement	24600	56716	56716
Construction (MILCON)	0	0	0
Ops. and Maint. (O&M)	0	0	0
Total	24841	57049	57049

Quantities breakout as follows:

	Development Estimate	Approved Program	Current Estimate
Development			
Missiles	241	333	333
Laser Seeker	241	381	381
Launcher	74	74	74
Total	241	333	333
Procurement			
Missile	24,600	56,716	56,716
Laser Seeker 2/	24,600	N/A	N/A
Launcher 3/	2,000	N/A	N/A
Total	24,600	56,716	56,716
Total Missiles	24,841	57,049	57,049

Notes:
The Army will procure the maximum number of supportable systems consistent with the dollars appropriated.
1/ Other includes data, training, support and test equipment.
2/ Missiles are being procured as all-up-rounds. Seekers were not procured as a GFE item after the second buy.
3/ Launcher procurement funds were transferred from missile procurement to aircraft procurement in FY 84.

Program Acquisition Cost (Cont'd)

c. Foreign Military Sales -- None.

d. Nuclear Costs -- None.

e. References --

Development Estimate: Material Need (MN) for Advanced Antitank Missile, Air-to-Ground (HELLFIRE), Dec 72; Material Need (MN) for Advanced Attack Helicopter; DCP #118, 12 Nov 76.

Approved Program: DAE Baseline, Apr 89.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1) Cost	2692.1	2678.4	2692.1
(2) Quantity	56716.0	56716.0	56716.0
(3) Unit Cost	0.047	0.047	0.047
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	98.9	98.9	123.3
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	98.9	98.9	123.3
(2) Quantity	2304.0	2304.0	3002.0
(3) Unit Cost	0.043	0.043	0.041

Note:
These values have been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully configured end items for the purposes of this calculation.

. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	266.2	437.2	0.0	703.4
Previous Changes:				
Economic	+8.0	+130.2	-0.4	+137.8
Quantity	-3.5	+800.6	-	+797.1
Schedule	+14.6	+503.5	+0.4	+518.5
Engineering	+150.3	+452.9	-	+603.2
Estimating	+13.0	-129.0	-	-116.0
Other	-	-	-	-
Support	+4.1	+30.3	-	+34.4
Subtotal	+186.5	+1788.5	-	+1975.0
Current Changes:				
Economic	+0.2	+36.1	-	+36.3
Quantity	-	-	-	-
Schedule	-	-151.0	-	-151.0
Engineering	-	-	-	-
Estimating	-3.7	+147.6	-	+143.9
Other	-	-	-	-
Support	-	-15.5	-	-15.5
Subtotal	-3.5	+17.2	-	+13.7
Total Changes	+183.0	+1805.7	-	+1988.7
Current Estimate	449.2	2242.9	-	2692.1

Cost Variance Analysis (Cont'd):

(FY 1975 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	211.9	276.7	0.0	488.6
Previous Changes:				
Quantity	-2.7	+258.7	-	+256.0
Schedule	+9.1	+74.8	-	+83.9
Engineering	+67.8	+164.8	-	+232.6
Estimating	+0.8	+39.9	-	+40.7
Other	-	-	-	-
Support	+2.0	+6.8	-	+8.8
Subtotal	+77.0	+545.0	-	+622.0
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-48.2	-	-48.2
Engineering	-	-	-	-
Estimating	-2.3	+38.2	-	+35.9
Other	-	-	-	-
Support	-	-5.1	-	-5.1
Subtotal	-2.3	-15.1	-	-17.4
Total Changes	+74.7	+529.9	-	+604.6
Current Estimate	286.6	806.6	-	1093.2

. **Cost Variance Analysis (Cont'd):**

b. Previous Change Explanations --

RDT&E

Economic:	Revised escalation indices.
Quantity:	Decrease due to deletion of 12 practice missiles; changes in seeker quantity.
Schedule:	Increase due to budget reduction in FY 78; slips in validation test.
Engineering:	Increase due to addition of competitive low cost seeker program, autopilot improvements, and inclusion of improvement program.
Estimating:	Increase due to exercise of the metric option in the contract, additional effort for shelf life surveillance, CM/CCM analysis, and hardware improvements. Decreases due to reduction of FY 81 RDTE funding, and FY 83 Congressional decrement to TRACE. Updated prior year program to actuals.
Support:	Decrease due to reduction in missile test requirement and FY 78 budget adjustment. Increase due to addition of two Airborne Target Acquisition and Fire Control System (ATAFCS) for use in DT/OT with Cobra, requirement for battlefield obscuration test, and requirement for use of AN/USM-410 test set.

Cost Variance Analysis (Cont'd):

b. Previous Change Explanations -- (Cont'd)

PROCUREMENT

Economic:	Revised escalation indices.
Quantity:	Addition of 32,116 missiles.
Schedule:	Increase due to delays in start of production and impact of RDTE funding constraints. Program stretchout resulting from zeroing FY 87 procurement funds precipitated by production delays. Reprofiling of missile procurement schedule.
Engineering:	Increase due to requirement changes in missile bus, warhead and seeker; incorporation of minimum smoke motor in FY 84. Provision for hardware improvements planned for cut in during FY 90 and subsequent buys. Change in improvement program to reflect optimized missile.
Estimating:	Revised production cost estimates. The major increases occurred prior to FY 84. Cost estimates decreased with introduction of competitive procurement strategy in FY 84. Revised estimates for outyear production costs based on actuals to date. Decrease due to Navy proration. Shortfall FY 92-96.
Support:	Increase due to addition of training hardware, depot capital equipment, and changes in support hardware. Decreases due to reduction in test set quantity. Addition of 10,000 deicing kits, 100 dummy missiles, and 30 training missiles to support APACHE program, and refinement of costs based on actuals. Increase due to change in spares requirements. Decrease in initial spares. Increase in training equipment, de-icing kits, test program sets.

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Dec 89 economic escalation rates. (Economic)	N/A	+.2
Updated prior year program to actuals. (Estimating)	-2.3	-3.7
(2) PROCUREMENT		
Revised Dec 89 economic escalation rates. (Economic)	N/A	+36.1
Stretch in Army missile procurement schedule coupled with increase in Navy quantity results in decrease in Army cost. (Schedule)	-48.2	-151.0

. [redacted] **Cost Variance Analysis (Cont'd):**

c. ([redacted]) Current Change Explanations -- (Cont'd)

	(Dollars in Millions) Base-Year	Then-Year
Updated prior year program to actuals.	+38.2	+147.6
Shortfall FY 95-98.	(-7.5)	(-18.9)
Change in estimating methodology. (Estimating)	(-115.8)	(-428.9)
	(+161.5)	(+595.4)
Decrease for training equipment and de-icing kits. (Support)	-5.1	-15.5

14. [redacted] **Program Acquisition Unit Cost (PAUC) History:** (Then-Year Dollars in Millions)

a. ([redacted]) Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
0.029	--	--	--	--	--	--	--	--	0.029

b. ([redacted]) Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
0.029	+0.003	-0.002	+0.006	+0.011	+0.000	--	+0.000	+0.018	0.047

. (U) **Contract Information:** (Then-Year Dollars in Millions)

a. (U) RDT&E

HELLFIRE:	Initial Contract Price Target	Ceiling	Qty
Rockwell Int. Corp. Duluth, GA DAAH01-86-C-0588, CPIF Award: April 30, 1986 Definitized: April 30, 1986	$26.6	$0.0	0.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$41.1	$0.0	0.0	$43.0	$43.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.7	$-1.8
Cumulative Variances To Date	$-0.9	$-0.5
Net Change	$-1.6	$1.3

Explanation of Change: The unfavorable schedule variance is associated with the forward warhead subcontractor being approximately five weeks behind in the conduct of pre-qual testing and test failures encountered with the delay subsystem. Corrective actions were identified and implemented. The contractor was able to partially recover and no significant milestones are expected to be impacted. The unfavorable cost variance is also attributed to the forward warhead subcontractor. Principle areas of cost growth are in systems engineering, project management, test hardware fabrication, test conduct and overhead rates.

Note: The improved warhead letter contract DAAH01-88-C-0477, was merged with the improved HELLFIRE contract DAAH01-86-C-0588, Feb 89 and formally definitized Mar 89. Contractor performance data as of 18 Apr 89 is used for the baseline SAR cost/schedule variance values which shows the completed performance measurement baseline for the merged contracts.

. Contract Information (Cont'd): (Then-Year Dollars in Millions)

b. (U) Procurement

Fifth Prod. Buy:	Initial Contract Price Target	Ceiling	Qty
Rockwell Int. Corp. Duluth, GA DAAH01-86-C-0494, FFP Award: March 17, 1986 Definitized: March 17, 1986	$129.9	$0.0	4500.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$133.2	$0.0	4500.0	$133.2	$133.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: For FFP contracts, cost and schedule variance information is not required.

Sixth Prod. Buy:	Initial Contract Price Target	Ceiling	Qty
Martin Marietta Orlando, FL [redacted]AH01-88-C-0109, FFP [redacted]ard: December 23, 1987 [redacted]finitized: December 23, 1987	$121.5	$0.0	3750.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$126.4	$0.0	3750.0	$126.4	$126.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: For FFP contracts, cost and schedule variance information is not required.

HELLFIRE, December 31, 1989

(U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

b. (U) Procurement (Cont'd)

In

HELLFIRE:	Target	Ceiling	Qty
Rockwell Int. Corp. Duluth, GA DAAH01-88-C-0249, FFP Award: February 29, 1988 Definitized: February 29, 1988	$54.4	$0.0	1250.0

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$54.3	$0.0	1250.0	$54.3	$54.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: For FFP contracts, cost and schedule variance information is not required.

HELLFIRE:	Initial Contract Price		
	Target	Ceiling	Qty
Martin Marietta [redacted]lando, FL [redacted]AH01-89-C-0147, FFP [redacted]ard: January 31, 1989 Definitized: January 31, 1989	$113.8	$0.0	3600.0

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$115.2	$0.0	3600.0	$115.2	$115.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: For FFP contracts, cost and schedule variance information is not required.

15. (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

b. (U) Procurement (Cont'd)

HELLFIRE:	Target	Ceiling	Qty
Rockwell Int. Corp. Duluth, GA DAAH01-89-C-0478, FFP Award: April 17, 1989 Definitized: July 31, 1989	$59.3	$0.0	1938.0

In

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$77.0	$0.0	1938.0	$77.0	$77.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: For FFP contracts, cost and schedule variance information is not required.

16. (U) Program Funding Summary:

a. (U) Program Status --

(1) Percent Program Completed: 70.4% (19 yrs/27 yrs)

(2) Percent Program Cost Appropriated: 70.4% ($1896.0 / $2692.1)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY72-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-98)	Total
RDT&E	362.4	28.6	30.5	27.7	449.2
Procurement	1406.1	98.9	123.3	614.6	2242.9
MILCON	-	-	-	-	-
O&M	-	-	-	-	-
Total	1768.5	127.5	153.8	642.3	2692.1

11. (U) Program Funding Summary (Cont'd):

c. (U) Annual Summary --

Fiscal Year	Qty	Flyaway FY75 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2040 Research, Development, Test & Eval, Army								
1972				5.9	4.9	4.9	4.9	4.6
1973				5.7	5.0	5.0	5.0	4.3
1974				6.5	6.1	6.1	6.1	8.0
1975				13.6	14.0	14.0	14.0	10.9
1976				3.6	4.0	4.0	4.0	6.6
197T				0.6	0.7	0.7	0.7	2.9
1977				16.4	19.1	19.1	19.1	2.6
1978				41.0	51.4	51.4	51.4	6.8
1979				48.1	66.2	66.2	65.7	8.4
1980				38.1	57.8	57.8	57.5	10.6
1981				26.5	43.9	43.9	43.6	10.6
1982				12.6	22.2	22.2	20.0	7.6
1983				8.3	15.2	15.2	14.3	4.9
1984				0.8	1.5	1.5	1.5	3.8
1985				0.2	0.5	0.5	0.5	3.4
1986				2.3	4.7	4.7	4.6	2.8
1987				4.4	9.2	9.2	6.4	2.7
1988				9.8	21.1	21.1	20.9	3.0
1989				6.7	14.9	14.7	9.4	4.2

. (U) Program Funding Summary (Cont'd):

c. (U) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY75 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2040 Research, Development, Test & Eval, Army (Cont'd)								
1990				12.2	28.6	1.2	0.2	4.0
1991				12.5	30.5			4.2
1992				7.3	18.4			4.0
1993				2.2	5.7			3.7
1994				1.3	3.6			3.4
Subtot	333			286.6	449.2	363.4	349.8	
Appropriation: 2032 Missile Procurement, Army								
1981		9.9	1.7	11.6	23.3	25.0	25.0	11.6
1982	680	9.5	37.9	49.3	109.0	123.5	121.1	14.3
1983	3971	3.3	98.6	103.5	243.3	256.4	252.9	9.0
1984	4651		86.1	88.4	214.9	214.0	214.0	8.0
1985	5780		83.9	87.1	219.3	215.4	212.3	3.4
1986	6000		70.6	73.9	192.1	192.0	176.2	2.8
1987								2.7
1988	6000		71.6	71.6	199.6	162.4	121.9	3.0
1989	6000		70.2	70.7	204.6	162.5	38.4	4.2
1990	2304	0.5	31.3	32.8	98.9			4.0
1991	3002		38.4	39.4	123.3			4.2
1992	2790		45.2	45.6	147.4			4.0

16. (U) Program Funding Summary (Cont'd):

c. (U) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY75 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2032 Missile Procurement, Army (Cont'd)								
1993	2330	3.9	38.2	42.8	142.9			3.7
1994	1660		28.6	31.0	106.6			3.4
1995	3150		14.2	16.6	58.8			3.1
1996	3150		16.0	16.1	58.8			3.1
1997	3150		15.6	15.6	58.8			3.1
1998	2098		10.6	10.6	41.3			3.1
Subtot	56716	27.1	758.7	806.6	2242.9	1351.2	1161.8	
Appropriation: 2050 Military Construction, Army								
1980								
Subtot	0							
Total	57049	27.1	758.7	1093.2	2692.1	1714.6	1511.6	

NOTES:
1) Subtotal for Missile Procurement does not include $1.9M FY92; $24.0M FY 93; $52.7M FY94, which is AAWWS resources. AAWWS will have a separate Baseline and SAR.
2) For 1981 and 1982 entries, the following funds for HF launcher are contained in APACHE SAR - FY 81 $2.4M; FY 82 $12.8M.
3) FY 1983 local reprogramming of $13.1M for cost growth on contract (refers to Missile Procurement).

II. (U) **Production Rate Data:**

a. (U) Annualized Production Rates --

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1980	346	0	0	0
1981	1050	0	0	0
1982	5225	742	408	408
1983	6000	3971	1986	1986
1984	6000	6218	1744	1538
1985	4462	5683	2569	2764
1986	0	6853	4000	4869
1987	0	6351	0	0
1988	0	6000	2667	3286
1989	0	0	2571	3000
1990	0	0	3072	6300
1991	0	0	3275	6300
1992	0	0	3044	6300
1993	0	0	1997	6300
1994	0	0	1660	6300
1995	0	0	3150	6300
1996	0	0	3150	6319
1997	0	0	3150	
1998	0	0	5035	

(U) **Production Rate Data (Cont'd):**

b. (U) Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Acq. Cost (BY $)	882.0	+211.2	1093.2	+12.2	1081.0
(TY $)	1953.4	+738.7	2692.1	+69.0	2623.1
PAUC Cost (BY $)	.025	-.006	0.019	0.000	0.019
(TY $)	.054	-.007	0.047	0.001	0.046

c. (U) Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	FEB 82	NA	FEB 82	NA	FEB 82
Duration (in mon)	+103	+117	+220	+48	+172
End Date (Mo/Yr)	SEP 90	+117	JUN 00	+48	JUN 96

d. (U) Deliveries (Plan/Actual) --

	To Date
RDT&E	259/241
Procurement	20616/23140
MILCON	0/0
O & M	0/0

e. (U) Approved Design-to-Cost Goal --

(Average Unit Flyaway Cost)

	Development Estimate	Current Estimate	Latest Approved Threshold
@ Qty 24600 - @ Peak Rate: 500/mo			
FY 75 Base-Year $	10264.0	18680.0	0.0
Then Year $	16224.0	44249.0	0.0

. (U) Production Rate Data (Cont'd):

NOTES:
1) The funded delivery periods (current estimate) are: FY82 - 20 mos; 83 - 24 mos; 84 - 32 mos; 85 - 27 mos; 86 - 18 mos; 88 - 27 mos; 89 - 28 mos; 90 - 9 mos; FY 91-92 - 11 mos; 93 - 14 mos; FY 94-97 - 12 mos; and 98 - 5 mos. FY 84 - 89 contracts were dual source. Funded delivery period for FY 84 - 89 begins with start of earliest contractor delivery period and ends with last unit from contractor with latest delivery period. FY 90 is costed as dual source. FY 91 out currently costed as sole source. Schedule associated with maximum economic includes Navy quantities and cost assumes Navy shares support costs. (Refers to 17.a and 7.b)
2) The production estimate tracks to the 31 Dec 81 SAR which was the first SAR after Milestone III production decision review. HELLFIRE launcher costs are excluded from the production estimate, because these costs were transferred to the APACHE program. Cost associated with maximum economic production assumes Navy participation. (Refers to 17.a and 17.b)
3) DCP Flyaway Cost, computed in accordance with DODI 5000.33, dated Aug 77, is revised from $9,977 to $10,264 for consistency with revision of HELLFIRE DE in Jun 84 SAR. (Refers to 17e)

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules --

Assumptions and Ground Rules - Operation and support costs for HELLFIRE are further categorized into fielding and sustainment costs. Fielding costs include training services and equipment, transportation, initial repair parts, and TDY costs to support fielding. Under the philosophy of a "certified round" concept, laser HELLFIRE sustainment costs should be minimized. The sustainment phase will continue 20 years beyond full deployment of APACHE (thru FY 15). The following efforts are considered applicable:

- Replenishment spares for training missile and support equipment.
- Annual overhaul of laser HELLFIRE equipment - ten percent of missiles in storage will be checked annually. Of the items checked, those that fail will be shipped to the depot for overhaul and return. Costs are based on predicted failure rate and average cost to repair.
- Transportation costs associated with annual overhaul.
- Modification and material
- System Project Management

10. (U) Operating and Support Costs (Cont'd):

a. (U) Assumptions and Ground Rules (Cont'd) --

o Data - (DATM's, DMWR's, M&E Publications, PSN Intro & Maint, surveillance program software, etc.)

o Surveillance Program.

b. (U) Costs -- (FY 1990 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per fielded quantity	Avg Annual Cost Per (Antecedent)
Fielding	0.0	0.0
Training	0.1	0.0
Transportation	0.2	0.0
Initial Rpr Parts (ASF	0.1	0.0
Total Package Fielding	0.0	0.0
Sustainment	0.0	0.0
Replenishment	0.1	0.0
Depot Maintenance	5.7	0.0
Transportation	0.1	0.0
System Project Mgmt	0.7	0.0
Modification/Kits	1.0	0.0
Data	3.6	0.0
Total	11.6	0.0

18. (U) Operating and Support Costs (Cont'd):

c. (U) Contractor Support Costs -- (Current (Then-Year) Dollars in Millions)

Funding	FY1990 & Prior	FY1991	FY1992	Balance To Complete	Total
O&M	2.2	2.4	---	---	4.6
Industrial Fund	---	---	---	---	---
Total	2.2	2.4	---	---	4.6

Note:
Reflects Baseline Estimate,dtd Aug 89, for fielding and sustaining.

A-7 CH-47D

SAR-89-109

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)

Program: CH-47D

AS OF DATE: December 31, 1989

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CLEARED
FOR OPEN PUBLICATION
MAR 22 1990 21
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

1. Designation and Nomenclature (Popular Name): CH-47D/Medium Lift Helicopter (CHINOOK).

2. DoD Component: Department of the Army.

3. Responsible Office and Telephone Number:

Project Manager's Office
CH-47D/Army V-22 Aircraft Programs
St. Louis, MO 63120-1798

PM: Colonel Ronald N. Williams
Assigned: August 3, 1987
AUTOVON: 693-1411

No SECURITY Objection to PUBLIC RELEASE
21 MAR 1990
SECURITY REVIEW, OSDCSINT, HQDA

4. Program Elements/Procurement Line Items:

RDT&E: PE 64213A
PROCUREMENT: APPN 2031

Project DC37 (Sunk)
SSN AA0250 (Shared Funding)
AA0960

5. Related Programs: None.

6. Mission and Description: The CH-47 is a transport helicopter used for artillery movement, missile transport, personnel movement, aircraft recovery, medical evacuation, transport of liquid and dry bulk cargo, etc. It has the capability of carrying cargo internally or externally depending on cargo configuration. Employment of 1950 technology and the age of current CH-47 fleet dictated modernization to sustain Army fleet capability. Modernization provides substantial improvements in reliability, availability and maintainability (RAM), productivity, flight safety and survivability. CH-47A, B, and C model airframes are updated and improved with seven newly designed and developed components. These systems include the Fiberglass Rotor Blades, Drive System, Hydraulic

OASD(PA) DFOISR 90-T-0703/1

6. Mission and Description (Cont'd):

System, Auxiliary Power Unit (APU), Electrical System, Advanced Flight Control System (AFCS), and the Multi-Cargo Hook Load Suspension System. The modernized aircraft have a lift capability of 15,000 lbs at design conditions of 4,000 feet/95°F. Fleet compatibility is improved, logistics support enhanced, maintenance support simplified, and operational costs reduced. The modernized CH-47 replaces the current CH-47 fleet on a one-for-one basis.

7. Program Highlights:

a. Significant Historical Developments--ASARC III, held at DA on August 19, 1980, directed that the program enter production to modernize the current available fleet. The Council directed the aircraft be type classified standard. The SECDEF Decision Memorandum (SDDM) was signed October 20, 1980.

b. Significant Developments Since Last Report--Fielding for Korea was completed in November 1989. Aircraft were shipped in December 1989 to Italy for fielding. A 3-year Multiyear II Contract with Boeing Helicopter was signed on January 13, 1989. At an annual rate of 48 aircraft per year for a total of 144 aircraft, this multiyear contract will complete modernization of the CH-47 fleet with the last induction in FY 92. The Program has met or exceeded all key technical and operational characteristics, schedule milestones and acquisition cost parameters. The CH-47 Modernization Program is a stable program with predictable events since remaining production is included in the existing multiyear contract.

The CH-47D system satisfies the mission requirement.

c. Changes Since the "As of Date"--None.

8. Threshold Breaches: There are currently no breaches to the Approved DAE Baseline dated March 2, 1989.

9. Schedule:

a. Milestones --

	Development Estimate	Approved Program	Current Estimate
Milestone III (DSARC)	Sep 80	Oct 80	Oct 80
Initial Production Contract Award (Single Year)	Sep 80	Oct 80	Oct 80
Second Production Contract Award (Single Year)	NA	Dec 81	Dec 81
Production Validation Testing			
(1) Start	Oct 81	May 82	May 82
(2) Complete	Mar 83	Aug 83	Aug 83
First Delivery, Initial Production Contract	May 82	May 82	May 82
First Aircraft Deployed, FORSCOM	NA	Feb 83	Feb 83
First Unit Equipped	NA	Feb 83	Feb 83
First Delivery, Second Production Contract	NA	May 83	May 83
Third Production Contract Award (Single Year)	NA	Sep 83	Sep 83
IOC (24th Aircraft 1st Unit)	Aug 83	Feb 84	Feb 84
Fourth Production Contract Award (Single Year)	NA	Mar 84	Mar 84

9. Schedule (Cont'd):

a. Milestones --

	Development Estimate	Approved Program	Current Estimate
First Delivery, Third Production Contract	NA	Mar 84	Mar 84
First Delivery, Fourth Production Contract	NA	Jan 85	Jan 85
Fifth Production Contract Award (Multiyear)	NA	Apr 85	Apr 85
First Delivery, Fifth Production Contract	NA	Nov 85	Nov 85
First Aircraft Deployed, Europe	NA	Oct 87	Oct 87
First Aircraft Deployed, NGB	NA	Sep 88	Sep 88
Sixth Production Contract Award (Multiyear)	NA	Jan 89	Jan 89
First Aircraft Deployed, Korea	NA	Jan 89	Feb 89(Ch-1)
First Aircraft Deployed, WESTCOM	NA	Jul 90	Apr 90(Ch-2)
First Delivery, Sixth Production Contract	NA	Nov 90	Nov 90
First Aircraft Deployed, SOUTHCOM	NA	Jan 90	Jan 90
First Aircraft Deployed, USAR	NA	Jan 91	Feb 91(Ch-3)

b. Previous Change Explanations -- Initial Production Contract Award was changed to October, 1980, because of ASARC III decision scheduled in late FY 80. The IOC slipped under the present production buildup due to the restructuring of company TOE from 16 to 24 aircraft as changed by Aviation Requirements for Combat [illegible]tructure of the Army (ARCSA) III and initial allocation of four CH-47D aircraft to [illegible]est and training base TDA requirement. Current estimate for DSARC III changed from [illegible]eptember, 1980, as the SECDEF Decision Memorandum (SDDM) was signed October 20, 1980. Milestones added in accordance with DAE Baseline dated March 2, 1989.

c. Current Change Explanations --

(Ch-1) The milestone for the First Aircraft Deployed, Korea, slipped from January 1989 to February 1989 due to scheduling problems with the C5A -- no impact.

(Ch-2) The milestone for First Aircraft Deployed, WESTCOM, has been accelerated
from July 1990 to April 1990.

(Ch-3) The milestone for First Aircraft Deployed, USAR, has been moved from January 1991 to February 1991 due to Special Operations Aircraft (SOA) airframe requirements -- no impact.

d. References --

Development Estimate: DCP, number 139, as revised January 5, 1977.

Approved Program: Approved DAE Baseline March 2, 1989.

10. Technical/Operational Characteristics:

a. Technical --	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
System Operational Reliability (SOR) (MTBF)				
(1) DSARC III Objective	.96	.96/1.10	1.38 1/	1.33
(2) Maturity Objective (100k hrs)	1.4	1.33/1.33	1.6 2/	1.6 (Ch-1)
Hardware System Reliability (HSR)(MTBF)				
(1) DSARC III Objective	2.06	2.06/2.20	3.14 3/	3.41
(2) Maturity Objective (100K hrs)	3.0	3.0/3.58	6.3 2/	6.3 (Ch-2)
Maintenance Man-Hour/Flight Hour	17.66	15.10/16.24	9.73 2/	9.73(Ch-3)
Vertical Rate of Climb (fpm)	200	200/200	200 1/	200
Hover-Out-of-Ground Effect (lbs)	NA	50,000/50,000	50,000	53,950
Crashworthiness (Vertical Impact Velocity, FPS)	NA	8.2/8.2	8.2	8.2
Engine Size, Intermediate Rated Power at Sea Level Standard	NA	3400/3400	3400	3400
Empty Weight	NA	23,401/23,401	23,401	23,401
b. Operational --				
Mission Radius (NM)	30	30/30	30 1/	30
Mission Payload (lb) 4/	15,775	15,775/15,000	15,360 1/	15,360
Maximum Cruise Speed at Design Gross Weight (kt)	155	162/155	160 1/	160
Service Ceiling at Design Gross Weight (ft) (1 engine inoperative)	10,000	13,200/10,000	13,400	13,400
Mission III Payload (lbs) (Outbound;Inbound)	NA	13000;6500/ 13000;6500	13907;6953	13907;6953
Air Transportability in C-5 (Time to Load/Unload) (hrs)	NA	7.5/12	7.5	7.5
Self-Deployable (NM)	NA	1260/422	1058/	1058/(Ch-4)

10. Technical/Operational Characteristics (Cont'd):

Footnotes:

1/ Demonstrated performance reflects production testing.

2/ Sample field data collection as of December, 1989.

3/ Demonstrated performance reflects prototype testing.

4/ Four-thousand feet pressure altitude, 95 degrees Fahrenheit.

c. Previous Change Explanations -- Reflects results of production testing vice prototype testing. Changes resulting from demonstrated performance, approved engineering changes, rating of transmission from 100 to 101 percent for true instrument reading of torque meter.

d. Current Change Explanations --

(Ch-1) Change from 1.33 to 1.6 reflects results of sample field data collection and production testing.

(Ch-2) Change from 3.0/3.58 to 6.3 reflects results of sample field data collection and production testing.

(Ch-3) Change from 15.10/16.24 to 9.73 reflects results of sample field data collection and production testing.

(Ch-4) 1058 Nautical Miles Letter Requirement (LR) using four 600-gallon fuel fuel demonstrated during operational test.

e. References --

Development Estimate: DCP, number 139, as revised January 5, 1977.

Approved Program: Approved DAE Baseline March 2, 1989.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars):

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	$ 76.1	$ 86.3	$ 86.3
Procurement	806.4	1317.7	1288.0
(Initial Spares)	(26.0)	(61.7)	(56.2)
Total FY 75 Base -Year$	$ 882.5	$1404.0	$ 1374.3
Escalation	680.3	1917.8	1914.7
Development (RDT&E)	(22.5)	(27.2)	(27.2)
Procurement	(657.8)	(1890.6)	(1887.5)
Total Then-Year$	$ 1562.8	3321.8	$ 3289.0
b. Quantities --			
Development (RDT&E)	3	3	3
Procurement	361	472	472
Total	364	475	475

c. Foreign Military Sales -- None.

d. Nuclear Costs -- None.

e. References --

Development Estimate: DCP, number 139, as revised January 5, 1977.

Approved Program: Approved DAE Baseline March 2, 1989.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition--	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	3289.0	3321.8	3289.0
(2) Quantity	472	472 1/	472
(3) Unit Cost	6.97	7.04	6.97
b. Current Procurement--	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	275.8	275.8	280.0
Less CY Adv Proc	94.9	94.9	56.4
Plus PY Adv Proc	69.1	69.1	75.8
Net Total	250.0	250.0	299.4
(2) Quantity	48	48	48
(3) Unit Cost	5.21	5.21	6.24

1/ This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. R&D units are not considered fully configured end items for the purpose of this calculation.

13. Cost Variance Analysis: CH-47D, December 31, 1989

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	98.6	1464.2	-	1562.8
Previous Changes:				
Economic	-	+ 165.3	-	+ 165.3
Quantity	-	+ 749.0	-	+ 749.0
Schedule	-	- 7.6	-	- 7.6
Engineering	-	-	-	-
Estimating	+ 14.9	+ 713.1	-	+ 728.0
Other	-	-	-	-
Support	-	+ 124.3	-	+ 124.3
Subtotal	+ 14.9	+1744.1	-	+ 1759.0
Current Changes:				
Economic	-	+ 45.7	-	+ 45.7
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	- 47.4	-	- 47.4
Other	-	-	-	-
Support	-	- 31.1	-	- 31.1
Subtotal	-	- 32.8	-	- 32.8
Total Changes	+ 14.9	+1711.3	-	+ 1726.2
Current Estimate	113.5	3175.5	-	3289.0

(FY 1975 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	76.1	806.4	-	882.5
Previous Changes:				
Quantity	-	+ 226.3	-	+ 226.3
Schedule	-	+ 41.4	-	+ 41.4
Engineering	-	-	-	-
Estimating	+ 10.2	+ 189.0	-	+ 199.2
Other	-	-	-	-
Support	-	+ 54.6	-	+ 54.6
Subtotal	+ 10.2	+ 511.3	-	+ 521.5
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	- 18.5	-	- 18.5
Other	-	-	-	-
Support	-	- 11.2	-	- 11.2
Subtotal	-	- 29.7	-	- 29.7
Total Changes	+ 10.2	+ 481.6	-	+ 491.8
Current Estimate	86.3	1288.0	-	1374.3

13. Cost Variance Analysis (Cont'd):

b. Previous Change Explanations --

RDT&E

Reflects actual RDT&E program. (Estimating)

Procurement

Application of CH-47D historical and OSD inflation guidance. (Economic)

Program increased 111 aircraft from 361 to 472. (Quantity)

Increase in production rate from 3 to 4 aircraft per month. (Schedule)

Refinement of estimate for production costs. Elimination of multiyear contingency funds for EPA and airframe preparation/ Materiel Requirements List; elimination of small business set aside and ECPs. Increase in Long Lead Time Items for follow-on multiyear contract. (Estimating)

Refinement of prior estimate. Revised spares policy definition. (Support)

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E	NA	NA
(2) Procurement		
Revised OSD December 28, 1989, escalation rates and CH-47 System Unique December 6, 1989 procurement indices (Economic).	NA	+ 45.7
Congressional Actions resulting in program decrements and redirection of funds to high priority safety improvements (Estimating).	- 18.5	- 47.4
Spares and trainer requirements reduced (Support).	- 11.2	- 31.1

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year dollars). 1/

a. Development Estimate to Current Estimate --

PAUC (Dev Estimate)	Changes (Then-Year Dollars in Millions)								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
4.33	+.45	+.57	-.02	-	+1.44	+.20	-	+2.64	6.97

1/ This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. R&D units are not considered fully configured end items for the purpose of this calculation.

15. Contract Information (Then-Year Dollars in Millions)

a. Procurement --

Airframe

Boeing Helicopters, Ridley Park, PA,
DAAK50-85-C-A005, FFP,
5-year Multiyear Contract,
Award: April 8, 1985
Definitized: April 8, 1985

Initial Contract Price		
Target Price	Ceiling	Qty
$1,172.7	NA	240

Current Contract Price		
Target	Ceiling	Qty
$1,184.3	NA	240

Estimated Price at Completion	
Contractor	Program Manager
$1,184.3	$1,184.3

NOTE: For FFP contracts, cost and schedule variances information is not required.

AIRFRAME

Boeing Helicopters, Ridley Park, PA
DAAJ09-89-C-A010
3-year Multiyear Contract
Award: January 13, 1989
Definitized: January 13, 1989

Initial Contract Price		
Target Price	Ceiling	Qty
$773.1	NA	144

Current Contract Price		
Target	Ceiling	Qty
$775.4	NA	144

Estimated Price at Completion	
Contractor	Program Manager
$775.4	$775.4

NOTE: For FFP contracts, cost and schedule variances information is not required.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program completed: 79.0 % (15 yrs/19 yrs)

(2) Percent Program Cost Appropriated: 84.6 % (2781.3/3289.0)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY76-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-94)	Total
RDT&E	113.5	-	-	-	113.5
Procurement	2392.0	275.8	280.0	227.7	3175.5
MILCON	-	-	-	-	-
Total	2505.5	275.8	280.0	227.7	3289.0

16. Program Funding Summary (Cont'd):

(Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY 75 Dollars		Total Base Year	Total Then-Year $			Escl* Rate %
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1976				10.1	11.3	11.3	11.3	8.7
197T				2.1	2.4	2.4	2.4	2.2
1977				19.9	25.8	25.8	25.8	8.1
1978				24.2	32.0	32.0	32.0	8.5
1979				13.9	19.1	19.1	19.1	7.7
1980				15.7	22.4	22.4	22.4	7.7
1981				0.4	0.5	0.5	0.5	7.7
Subtotal	3			86.3	113.5	113.5	113.5	
Appropriation: Procurement								
1980		6.3	7.7	15.5	28.6	28.6	28.6	13.4
1981	9	8.1	55.9	79.0	159.3	159.3	159.3	10.8
1982	19	1.6	91.9	104.2	219.0	219.0	219.0	7.9
1983	24	1.4	99.0	107.4	247.5	247.5	247.5	2.8
1984	36	1.3	129.0	137.7	320.1	320.1	320.1	3.4
1985	48	1.0	137.6	155.4	369.0	369.0	369.0	0.8
1986	48		113.0	114.8	273.3	273.3	266.3	0.0
1987	48		96.5	102.6	247.8	247.8	217.9	0.8
1988	48		91.5	99.7	244.0	240.4	207.6	6.7
1989	48		89.4	103.9	283.4	279.1	49.5	4.2
1990	48		96.4	97.5	275.8	255.3	0.5	4.0
1991	48		90.8	95.4	280.0			4.2
1992	48		70.9	74.1	225.1			4.0
1993				0.3	0.9			3.7
1994				0.5	1.7			3.4
Subtotal	472	19.7	1169.6	1288.0	3175.5	2639.4	2085.3	
Total	475	19.7	1169.6	1374.3	3289.0	2752.9	2198.8	

1/ System Unique Indicies 1975 thru 1988

17. Production Rate Data:

a. Annual Production Rates -- (The maximum economic production rate shown below is not attainable because the long lead material could not be delivered before the end of the current program.)

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1980	N/A	N/A	N/A	N/A
1981	9	9	9	9
1982	19	19	19	19
1983	24	24	24	24
1984	36	36	36	36
1985	36	48	48	48
1986	36	48	48	60
1987	36	48	48	60
1988	36	48	48	60
1989	36	48	48	60
1990	36	48	48	60
1991	36	48	48	60
1992	21	12	48	-

b. Cost Variance -- Dollars in Millions

	Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max Econ)	Maximum Economic
Prog Acq Cost (BY $)	1325.1	+ 49.2	1374.3	+ 14.5	1359.8
(TY $)	3224.4	+ 64.6	3289.0	+ 11.1	3277.9
PAUC (BY $)	3.02	- .11	2.91	+ .05	2.86
(TY $)	7.35	- .38	6.97	+ .07	6.90

17. Production Rate Data (Cont'd)

c. Schedule Variance --

	Development Estimate	Variance (CE vs. DE)	Current Estimate	Variance (CE vs. Max Econ)	Maximum Economic
Start Date	10/81	--	10/81	--	10/81
Duration	156	-20	136	-21	115
End Date	09/94	-20	01/93	-21	04/91

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	3/3
Procurement	288/281

e. Approved Design-to-Cost Goal --

	(Average Unit Flyaway Cost) Development Estimate	Current Estimate	Latest Approved Threshold
CH-47A			
Qty: 104			
Peak Rate: NA			
FY 75 Base-Year$	2.764	NA	NA
Then-Year$	4.600	NA	NA
CH-47B			
Qty: 74			
Peak Rate: NA			
FY 75 Base-Year$	2.357	NA	NA
Then-Year$	4.195	NA	NA
CH-47C			
Qty: 183			
Peak Rate: NA			
FY 75 Base-Year$	1.567	NA	NA
Then-Year$	2.900	NA	NA
CH-47D			
Qty: 436			
Peak Rate: NA			
FY 75 Base-Year$	NA	2.52	2.63
Then-Year$	NA	6.22	

18. Operating and Support Costs:

a. Assumptions and Ground Rules - -

Sustainment costs are based on 472 CH-47D aircraft operating at a tempo of 180 peacetime flying hours per year with each aircraft operating 20 years. Replenishment costs include aircraft spares and repair parts. Depot maintenance includes the cost of labor, material and transportation for maintenance performed at the depot level. Military personnel includes costs for the aircraft flight crews, Aviation Unit Maintenance (AVUM) personnel, Aviation Intermediate Maintenance (AVIM) personnel and AVUM and AVIM indirect support personnel. Sustainment costs are based on the CH-47 Modernization Program Baseline Cost Estimate (BCE), August 1989.

b. Costs - -

(FY 75 Constant (Base-Year) in Dollars)

Cost Element	*Cost Per Flying Hour*
Replenishment	$ 268
Petroleum, Oil and Lubricants (POL)	112
Depot Maintenance	180
Field Maintenance	35
Transportation	7
System Specific Replacement Training	89
Military Personnel	824
System Project Management	10
Modification Kits	73
Other Sustainment	185
Total	$ 1783

c. Contractor Support Costs - -

(Then-Year Dollars in Millions)

	FY 1989 & Prior	FY 1990 Year	FY 1991 Year	Balance To Complete	Total
O&M	28.6	12.7	8.1	- -	49.4

N-7 C/MH-53E ~~CONFIDENTIAL~~ SAR-89-010

(1)

SELECTED ACQUITISION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: C/MH-53E

AS OF DATE: DECEMBER 31, 1989

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1. Designation and Nomenclature (Popular Name): CH-53E Heavy Transport/Assualt Helicopter (Super Stallion); MH-53E Airborne Mine Countermeasures/Vertical Onboard Delivery (Sea Dragon)

2. DoD Component: U.S. Navy

3. Responsible Office and Telephone Number:

H-53E Program Office
Naval Air Systems Command
Washington, DC 20361-1261

Col W.C.E. Wolfe
Assigned July 21, 1989
AV 222-3151; Comm (202) 692-3151

4. Program Elements/Procurement Line Items:

RDT&E: 0604260N
0640714N

Procurement: APPN: 1506 ICN 0148
0204453N, 0206122N, 0204303N, 0204156N

MILCON: 0206496N

5. Related Programs: SH-60B LAMPS MK III Sea Hawk; SH-60F CV Helo; Army UH-60A Black Hawk; Air Force MH-60D Night Hawk.

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6. Mission and Description: The CH-53E is a shipboard-compatible helicopter configured for the lift and movement of cargo and troops/passengers internally, tactical recovery of downed or damaged aircraft, including self-retrieval, the lift of heavy bulky equipment and supplies by external suspension from the aircraft, and the towing of craft, vehicles and mine countermeaaurs devices. The CH-53E is similar to the basic CH-53D with the following exceptions: three T-64-GE-416A turbine engines versus two T-64-GE-413 turbine engines; 79 ft. versus 72 ft. main rotor diameter;7 titanium spar versus 6 aluminum spar main rotor baldes; 20 ft. versus 16 ft. tail rotor diameter and canted 20 degrees; 13,140 SHP versus 7,560 SHP main gearbox and 40 inch extension in the transition section of the fuselage. Pull provisions (weight, space and plumbing) for external auxiliary fuel tanks, fuel jettison, air-to-air refueling, and ship-to-air refueling are included.

7. Program Highlights:

a. Significant Historical Developments -- SOR 14-20 of 1967 established the requirement for a heavy lift helicopter (HLH). In May 1973, a DSARC I decision approved the fabrication and test of two development prototypes (YCH-53E). First flight of the YCH-53E occurred in March 1974. DSARC IIA decision of 14 May 1975 approved the engineering development phase to include fabrication and test of two production prototypes and one static test article. First flight of the production prototype was in December 1975. A DSARC III was held in January 1978 which approved procurement of the first twenty-nine CH-53E production aircraft. The contract delivery schedule to provide the initial aircraft in May 1980 was not met; the Navy provisionally accepted the first production model in December 1980. The FY 82 President's Budget increased total procurement from 49 to 126 aircraft including seven CH-53E Airborne Mine Countermeasure capable aircraft that would replace the RH-53D losses. The FY 83 President's Budget increased production aircraft from 126 to 160 which included 25 additional AMCM capable aircraft designated MH-53E. Mulityear procurement for C/MH-53E was approved for FY 86 through FY 89 in the FY 85 DOD Appropriations Act and includes 56 C/MH-53E's. First flight of the MH-53E development prototype occurred in September 1983, DT-IIB testing was completed June 1984, and OT-IIA testing was 1985. The MH-53E was approved for limited production (ALP) in March 1985. TECHEVAL was completed for the MH-53E 8 November 1985. OPEVAL completed in April 1986 and a second Limited Production (ALP) was obtained in November 1986. The C/MH-53E multiyear procurement contract was definitized in September 1986 for the period FY 86 through FY 89. Estimated savings to the Government are $92.8M. On 24 October 1988 the MH-53E received Approval from Assistant Secretary of the Navy (Shipbuilding & Logistics) for Full Rate Production. On 1 August 1988 the west coast MH-53E squadron HM-15 stood up at NAS Alameda. RDT&E efforts during FY 89 included Helicopter Night Vision System development and development of an upgraded T-64-416 engine for the CH-MH-53. Increase of 225 CH-53E aircraft per FY 1990/1991 Amended Biennial Budget was due to the Secretary of Defense decision to procure CH-53's in lieu of V-22.

b. Significant Developments Since Last Report --

7. Program Highlights: (Cont'd)

(1) The CH-53E is expected to meet all mission requirements approved in Decision Coordinating Paper #94.

c. Changes Since "As of Date": None

8. Threshold Breaches: The program has been resurected increasing program quantities, subsequently extending the period of time before the procurement objective can be obtained, therefore causing a breach of DAE Baseline Procurement Objective Attained. (DAE Baseline dated June 1989.)

9. Schedule:

a. Milestones --	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
CH-53E			
Program Initiation	N/A	N/A	Jun 69
Milestone I (DSARC I) Concept Val	N/A	May 73	May 73
First Navy Flight Dev Proto. #1	Mar 74	N/A	Mar 74
Milestone II (DSARC II)	Oct 74	Apr 75	Apr 75
IOT&E Complete	Feb 76	N/A	May 79
BIS Initial Report	Mar 76	N/A	Jul 77
Milestone III (DSARC III)	Mar 76	Jan 78	Jan 78
Navy Technical Evaluation	N/A	N/A	Jan 78
Approval for Service Use (ASU)	N/A	Apr 80	Apr 80
Acceptance First Production A/C	Jun 77	N/A	Dec 80
Fleet Introduction	Jul 77	N/A	Jun 81
FOT&E	N/A	N/A	Apr 83
BIS-FTP	N/A	N/A	Dec 82
IOC/First Detachment Deployable	N/A	Jun 82	Jun 82
Navy Support Date	N/A	N/A	Oct 83
Procurement Objective Attained	Sep 90	Sep 90	Sep 98\1
MH-53E			
Milestone I DCP #94, Feb 78	N/A	Feb 78	Feb 78
Milestone II FSED	N/A	Feb 81	Feb 81
First Flt Devlopment Prototype	N/A	N/A	Sep 83
Milestone IIIA Ltd. Production	N/A	Mar 85	Mar 85
OPEVAL	N/A	Mar 85	Apr 86
AFP	N/A	N/A	Oct 88
Acceptance 1st Production A/C	N/A	N/A	Jun 86
Milestone IIIB Con. Ltd. Prod.	N/A	Nov 87	Nov 87
Milestone IIIC Full Scale Prod.	N/A	Nov 87	Oct 88
FOT&E	N/A	N/A	Dec 87
MH-53E			
IOC	N/A	Aug 88	Aug 88
FOC	N/A	Apr 89	Apr 89
Procurement Objective Attained	N/A	Sep 90	Sep 94

b. Previous Change Explanations -- DSARC II was delayed due to loss of one of the first two prototypes in ground accident. IOT&E, BIS Initial Report, and DSARC III were delayed due to restructured program to evaluate all RDT&E improvements and rescheduling testing. Naval Technical Evaluation was delayed due to change in completion. Approval for Service Use (ASU) was delayed due to additional testing requirements and a delay in administrative ASU processing. Acceptance First Production Aircraft and Fleet Introduction were initially delayed due to a change in aircraft procurement and delivery schedule. FOT&E was delayed due to various flight restrictions imposed on the aircraft which precluded testing. BIS-FTP was delayed due to change in completion date of a flight test expansion to resolve YAW oscillation anamaly. Acceptance of First Production Aircraft, Fleet Introduction, FOT&E, BIS-FTP, and IOC were further delayed based on a new production schedule reflecting a long-term labor strike in the aerospace bearing and forging industry and restructuring of initial aircraft utilization. OPEVAL extended because of weather, unplanned maintenance delays, and administrative problems with the contractor. Accepted aircraft 5 months early to reflect revised development schedule. Approval for Full Production was delayed because of extended OPEVAL. The program quantities were increased, extending the time the new procurement objective could be obtained.

c. Current Change Explanation -- "Procurement Objective Obtained" changed from Sep 05 to Sep 98 due to an error in the June 89 SAR.

d. References --

Development Estimate: Development Concept Paper (DCP) #94, dated 25 April 1973, subject "CH-53E Prototype Development Approval" as amended by Decision Coordinating Paper (DCP) #94, dated 14 February 1978, subject "Ch-53E Production Approval".

Approved Program: DAE baseline dated 30 June 1989

10. Technical/Operational Characteristics:

	Dev Estimate	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
a. Technical --				
Weight Empty (lbs)				
Maximum gross weight (lbs)				
Weight Empty (lbs)	34,000	33,326/33,326	33,226	33,226
w/Ext Payload,	73,500	73,500/73,500	73,500	73,500
HIGE SL/90 deg F				

10. Technical/Operational Characteristics: (Cont'd)

	Dev Estimate	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
a. Technical				
Dimensions (Spread/Folded configuration)				
Length	*99.0	60.5/60.5	99.5/60.5	99.5/60.5
Width	*79.0	28.5/28.5	79.0/28.5	79.0/28.5
Height	*28.4	18.7/18.7	28.4/18.7	28.4/18.7
Engine Maximum SHP, Sea Level Static (10 min)	4380	4380	4380	4380
b. Operational				
Speed (KTS) VMAX (KTS Level FLT, MAX continuous power S.L.)				
1. 46.5K lbs GW (Internal Load)	170	176/170	170	170
2. 56K lbs GW (Internal Load)	140	170/140	140	140
3. 70K lbs GW (External Load)	100	125/100	100	100
Rate of Climb (One Engine Inop @ 69,750 lbs GW)	150	200/200	200	200
Radius/Range (NM)				
Range (NM)	550	550/500	500	500
Internal Payload (1000 cu. ft. cargo, not to exceed gross weight limits) with full internal and full external aux fuel tanks (10% reserve)				
Payload (lbs)				
Rxternal (50 NM radius S/L90 F, HIGE 20 min fuel reserve	32,000	32,000/32,000	32,000	32,000
Internal (500 NM Range 3000' MSL 91.5 F, HOGE	20,000	16000/16000	20,000	20,000 CH-1
Reliability (%)				
Mission (1 hr mission @ 90% confidence)	.93	.93/.93	.93	.93
Aircraft MFHBA (1 hr mission)	13.7	13.7/13.7	13.8	13.8
Aircraft MFHBF	.77	.77/.70	.70	.70
Maintainability				
Aircraft MMH/FH (Org. corrective)	8.0	8.0/9.50	7.72	9.50
Availability	.85	.93/.93	.93	.93
AMCM (MH-53E)				
Tow Tension (x1000 lbs.)	N/A	30.0/30.0	30.0	30.0
Time on Station (hrs.)	N/A	3.2/3.2	3.2	3.2

c. Previous Change Explanations -- Based on demonstrated performance the folloving technical/operational characteristics have been changed: rate of climb, mission reliability, MFHBA, availability, and weight empty, tow tension and time on station. Demonstrated performance during DT-II A through D OT-IIB. Demonstrated Performance reflects current achievements to date.

10. Technical/Operational Characteristics (Cont'd):

d. Current Change Explanations - (CH-1) Payload internal changed from 16,000 to 20,000 based on demonstrated performance.

e. References --

Development Estimate: Development Concept Paper (DCP) #94 dated April 25, 1973, subject "CH-53E Prototype Development Approval" as amended by Decision Coordinating Paper (DCP) #94, dated February 14, 1978, subject "CH-53E Production Approval".

Approved Program: DAE baseline dated 30 June 1989

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development	93.3	182.4	202.4
Procurement	371.1	2434.9	2268.1
Airframe	(250.2)	(1558.4)	(1559.2)
Engine	(46.9)	(315.1)	(294.1)
Avionics	(5.4)	(68.7)	(58.2)
Other GFE	(1.9)	(37.0)	(30.5)
Total Flyaway	(304.4)	(1979.2)	(1942.0)
Other Wpn Sys Cost	(29.4)	(243.2)	(169.8)
Initial Spares	(37.3)	(212.2)	(156.3)
Construction (MILCON)	-	2.8	2.8
Total FY 73 Base-Year $	464.4	2620.1	2473.3
Escalation	114.0	5228.6	5219.2
Development (RDT&E)	(7.0)	(101.2)	(142.2)
Procurement	(107.0)	(5122.8)	(5072.4)
Construction (MILCON)	-	(4.6)	(4.6)
Total Then-Year $	578.4	7848.7	7692.5
b. Quantities --			
Development	4	4	4
Procurement	70	377	377
Total	74	381	381

c. Foreign Military Sales -- N/A

d. Nuclear Cost -- None

11. Program Acquisition Cost: (Con't) [redacted]

. References --

Development Estimate: Development Concept Paper (DCP) #94 dated April 25, 1973, subject "CH-53E Prototype Development Approval" as amended by Decision Coordinating Paper (DCP) #94, dated February 14, 1978, subject "CH-53E Production Approval".

Approved Program: DAE baseline dated 30 June 1989

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Est (Dec 89 SAR)	Current Year UCR Baseline (Dec 88 SAR)	Budget Year UCR Baseline (Dec 89 SAR)
a. Program Acquisition --			
(1) Cost	7692.5	2,965.6	7,692.5
*(2) Quantity	(b)(1)	156	(b)(1)
(3) Unit Cost		19.0	
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	230.0	230.0	459.5
Less CY Adv Proc	-51.7	-51.7	-57.8
Plus PY Adv Proc	+46.0	+46.0	+51.7
Net Total	224.3	224.3	453.4
(2) Quantity	10	10	23
(3) Unit Cost	22.4	22.4	19.7

* R&D units put into inventory

[redacted]

13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	100.3	478.1	0.0	578.4
Previous Changes:				
Economic	+5.8	-165.6	-	-159.8
Quantity	-	+6023.7	-	+6023.7
Schedule	+1.5	+294.0	-	+295.5
Engineering	+162.7	+294.2	-	+456.9
Estimating	-8.3	-624.8	+0.2	-632.9
Other	+3.0	-	-	+3.0
Support	+18.6	+1258.1	+7.2	+1283.9
Subtotal	+183.3	+7079.6	+7.4	+7270.3
Current Changes:				
Economic	-	+479.4	-	+479.4
Quantity	-	-290.7	-	-290.7
Schedule	-	-322.3	-	-322.3
Engineering	-	+63.1	-	+63.1
Estimating	+61.0	+368.2	-	+429.2
Other	-	-	-	-
Support	-	-514.9	-	-514.9
Subtotal	61.0	-217.2	-	-156.2
Total Changes	+244.3	+6862.4	+7.4	+7114.1
Current Estimate	344.6	7340.5	7.4	7692.5

(FY 1973 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	93.3	371.1	-	464.4
Previous Changes:				
Quantity	-	+1668.8	-	+1668.8
Schedule	+1.6	+103.7	-	+105.3
Engineering	+77.1	+96.0	-	+173.1
Estimating	-2.5	-193.7	+0.2	-196.0
Other	+2.4	-	-	+2.4
Support	+10.5	+389.0	+2.6	+402.1
Subtotal	+89.1	+2063.8	+2.8	+2155.7
Current Changes:				
Quantity	-	-72.8	-	-72.8
Schedule	-	-88.0	-	-88.0
Engineering	-	+16.8	-	+16.8
Estimating	+20.0	+106.8	-	+126.8
Other	-	-	-	-
Support	-	-129.6	-	-129.6
Subtotal	+20.0	-166.8	-	-146.8
Total Changes	+109.1	+1897.0	+2.8	+2008.9
Current Estimate	202.4	2268.1	2.8	2473.3

b. Previous Change Explanations --

RDT&E

Economic:	Revised escalation rates.
Schedule:	Extend RDT&E beyond FY 76 and restructure development effort.
Engineering:	Increased requirement for Transmission Development Program, development of Digital Automatic Flight Control System, completion of developmental derived improvements, completion of design improvements, and design and development of AMCM configurations, development of all composite main rotor blades to replace titanium spar blades.
Estimating:	Refinement of R&D estimates and revised estimates for development of Composite Main Rotor Blade.
Other:	Cost overrun and award of contract incentive.
Support:	Increase in BIS and OPEVAL support, first article of OFT visual system and peculiar training equipment, and support of AMCM design, development and test and evaluation.

Procurement

Economic:	Revised escalation rates.
Quantity:	Reduction of 70 to 49 aircraft, increase from 49 to 126 aircraft, increase from 126 to 160 aircraft, decrease from 160 to 153 aircraft, decrease from 153 to 149 aircraft, increase from 149 to 152 aircraft, increase from 152 to [redacted] aircraft.
Schedule:	Production delay resulting from development stretchout and numerous production changes with net result of stretchout of procurement.
Engineering:	Design changes to airframe, increase in production non-recurring costs, AMCM configuration changes and tooling refurbishment, configuration change for Helicopter Night Vision Systems.
Estimating:	Revised production estimates based on past experience and new data from contractors, revised estimates in flyaway to reflect multiyear procurement new vendor airframe estimates, and adjustments for changes in prior year escalation rates, as well as replacement and refurbishment of aircraft tooling.
Support:	Increased support requirements for PGSE, training and other support and spares due to aircraft quantity changes, revised estimates in support and spares for Helicopter Night Vision Systems.

MILCON

Support:	Construction of composite trainer buildings.

c. Current Change Explanations --

	(Dollars in Millions) Base Year $	Then Year $
Correction of previous catagorizations in June 1989 SAR for addition of 225 aircraft		
Reverse:	(-1360.0)	(-4883.1)
Quantity	-1033.2	-3728.5
Schedule	-70.5	-230.1
Estimating	-27.5	-103.0
Support	-228.8	-821.5
Addition of Corrected Entries:	(+1360.0)	(+4883.1)
Quantity	+960.4	+3437.8
Engineering	+16.8	+63.1
Estimating	+154.0	+560.7
Support	+228.8	+821.5
(1) RDT&E		
RDT&E increased due to additional requirements for configuration enhancements including system safety (Estimating)	+20.0	+61.0
(2) Procurement		
Revised Escalation Indices (Economic)	-	+479.4
Adjustment for current and prior inflation offset (Estimating)	-0.9	-3.3
Decrease costs due to program acceleration and revised schedule (Schedule)	-17.5	-92.2
Adjustment of non-recurring costs to decrease out-year requirements and add costs for additional tooling for production acceleration (Estimating)	-18.8	-86.2
Decrease other weapons support costs to reflect program acceleration and revised schedule (Support)	-73.7	-271.9
Decreased initial spares cost to adjust for prior year actuals, deletion of FY-99 and schedule changes (Support)	-55.9	-243.0
(3) MILCON		
No Changes	-	-

14. Program Acquisition Unit Cost (PAUC) History: (Millions of then-year dollars)

a. Initial/Development Estimate to Current Estimate --

(b)(1) [redacted]

15. Contract Information: (Then-Year Dollars in Millions)

a. Procurement--

	Initial Contract Price Target	Ceiling	Qty
Sikorsky Aircraft, Stratford, CT.			
N00019-85-C-0066/MYP/FFP	$644.2	N/A	56.0
Award: April 30, 1985			
Definitized: September 30, 1986			

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$644.2	N/A	56.0	$644.2	$644.2

	Initial Contract Price Target	Ceiling	Qty
General Electric Co., West Lynn, MA			
(1) N00019-84-C-0158/FFP	(1) $81.6	N/A	121
Award: July 31, 1986	90% Obligated	N/A	90% Delivered
Definitized: December 31, 1986			
(2) N00019-86-C-0214/FFP	(2) $72.3	N/A	90
Award: September 1987			
Definitized: September 1987 (Exercised basic and 1st option year)			

	Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
(1)	$81.6	N/A	121.0	$81.6	$81.6
(2)	$72.3	N/A	99.0	$72.3	$72.3

FFP Contracts - no variance analysis required

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 69.2% (18 yrs/26 yrs)

(2) Percent Program Cost Appropriated: 40.8% ($3,138.2/$7,692.5)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY 73-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY 92-98)	Total
RDT&E	275.1	7.8	19.9	41.8	344.6
Procurement	2,617.9	230.0	459.5	4,033.1	7,340.5
MILCON	7.4	-	-	-	7.4
Total	2,900.4	237.8	479.4	4,074.9	7,692.5

c. Annual Summary --

Fiscal Year	Qty	Nonrec	Flyaway FY 73 Dollars Rec	Base Year	Total Then-Year Dollars Program	Obligated	Expended	Escl Rate
Appropriation: RDT&E								
73				14.0	14.6	14.6	14.6	4.3
1974	2			26.8	30.3	30.3	30.3	8.0
1975	2			38.2	47.0	47.0	47.0	10.9
1976				9.6	12.5	12.5	12.5	6.6
197T				16.0	21.7	21.7	21.7	2.9
1977				8.5	11.9	11.9	11.9	2.6
1978				13.6	20.4	20.4	20.4	6.8
1979				0.2	0.4	0.4	0.4	8.4
1980				7.9	14.5	14.5	14.5	10.5
1981				4.7	9.4	9.4	9.4	10.6
1982				5.8	12.1	12.1	12.1	7.6
1983				6.9	15.2	15.2	15.2	4.9
1984				12.6	28.7	28.7	28.7	3.8
1985				4.9	11.5	11.5	11.5	3.4
1986				0.8	1.9	1.9	1.9	2.8
1987				1.5	3.7	3.7	3.7	2.7
1988				4.2	10.9	10.9	6.8	3.0
1989				3.1	8.4	6.0	2.0	4.2
1990				2.8	7.8	0.5	-	4.0
1991				6.9	19.9	-	-	4.2
1992				4.0	12.0	-	-	4.0
1993				4.5	14.0	-	-	3.7
1994				4.9	15.8	-	-	3.4
Subtotal 4				202.4	344.6	273.2	264.6	-

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY 73 Dollars Nonrec	Rec	Base Year	Total Then-Year Dollars Program	Obligated	Expended	Escl Rate
Appropriation: Procurement								
1977	6	23.6	47.8	82.0	120.8	120.8	120.8	3.7
1978	0	0.0	0.0	0.0	0.0	0.0	0.0	6.8
1979	14	1.9	76.0	105.4	190.4	190.4	190.4	8.7
1980	13	0.0	82.6	104.7	211.0	211.0	211.0	11.8
1981	14	0.0	80.7	99.2	222.6	222.6	222.6	11.6
1982	14	0.0	71.8	93.5	227.9	227.9	227.9	14.3
1983	11	5.3	56.4	85.9	222.9	222.9	222.9	9.0
1984	11	2.2	51.7	72.8	196.4	196.4	196.4	8.0
1985	10	11.9	47.8	91.5	254.0	254.0	254.0	3.4
1986	14	1.0	69.1	89.4	255.8	255.8	255.8	2.8
1987	14	0.0	63.6	74.9	221.9	221.9	209.8	2.7
1988	14	2.9	69.6	83.7	258.7	236.3	171.4	3.0
1989	14	0.7	64.7	73.2	235.5	215.7	85.7	4.2
1990	10	0.0	57.8	68.7	230.0	1.8	-	4.0
1991	23	0.0	122.1	132.3	459.5	-	-	4.2
1992	[redacted]	0.0	116.5	128.7	462.9	-	-	4.0
1993		0.0	112.0	121.5	451.3	-	-	3.7
4		0.0	110.1	116.2	445.0	-	-	3.4
5		7.1	160.4	182.8	724.3	-	-	3.1
1996		0.0	154.5	169.9	696.1	-	-	3.1
1997		0.0	152.6	167.9	711.0	-	-	3.1
1998		0.0	117.6	123.9	542.5	-	-	3.1
Subtot		56.6	1885.4	2268.1	7340.5	2577.5	2368.7	-
Appropriation: MILCON								
1983				0.4	0.8	0.8	0.8	4.9
1984				-	-	-	-	3.8
1985				-	-	-	-	3.4
1986				1.3	3.4	3.4	3.4	2.8
1987				-	-	-	-	2.7
1988				1.1	3.2	3.2	3.2	3.0
Subtotal				2.8	7.4	7.4	7.4	-
Total				2473.3	7692.5	2858.1	2640.7	-

(b)(1)

17. **Production Rate Data:**

a. Annualized Production Rates -- (NOTE: The maximum economic production rate of two per month was not attainable until August 1978. It is expected to increase to three per month for the FY95-98 buys. The attainment of the maximum rate is limited by other customer buys.

Fiscal Year	Production Rates (Quantity/Year) Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1977	5		6	-
1978	10	6	0	10
1979	18	0	14	24
1980	20	14	13	24
1981	17	15	14	24
1982		14	14	24
1983			11	24
1984			11	24
1985			11	24
1986			10	24
1987			14	24
1988			14	24
1989			14	24
1990			10	24
1991			23	24
1992			[redacted] (b)(1)	24
1993				24
1994				24
1995				36
1996				36
1997				36
1998				36

b. Cost Variance -- Dollars in Millions (NOTE: Subject to limitations on production rates above.)

Item		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY $)	476.0	+1997.3	2473.3	+1286.0	1187.3
	(TY $)	768.5	+6924.0	7692.5	+5256.2	2436.4
PAUC	(BY $)	[redacted] (b)(1)				3.1
	(TY $)					6.4

c. Schedule Variance -- (NOTE: Subject to limitations on production rates above.)

	Production Estimate	Variance (CE vs PdE)	Current Estimate	Variance (CE vs Max)	Maximum Economic
tart Date (Mo/Yr)	2/78	N/A	2/78	N/A	2/78
uration (in months)	43	257	300	81	219
nd Date (Mo/Yr)	9/81	N/A	5/00	N/A	9/96

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	4/3*
Procurement	135/135

R&D prototype #1 lost in accident prior to delivery.

e. Approved Design to Cost Goal --

(Average Unit Flyaway Cost)

	Dev Estimate/ DAB Baseline	Current Estimate	Latest Approved Threshold
@ Qty: 49 Peak Rate: 2/Mo			
Y 78 Base-Year $	(1)/8.4	6.4(2)	9.3
hen-Year $	(1)/9.9	12.3(2)	-

1) D.S. established as 4.4 FY 73 $ and 5.6 TY $ at DSARC II for 70 aircraft but not approved until DSARC III, which established approved program and threshold in FY 78 $.

8. Operating and Support Costs:

a. Assumptions and Ground Rules --

The concept of operation is a 16 heavy lift helicopter squadron flying each helicopter 420 hours per year. The costs are the direct costs to support the primary personnel and to operate the aircraft. The depot cost is a summary cost which includes airframe and engine overhaul and component maintenance and repair. The sustaining investment consists primarily of replenishment spares and repair parts. Indirect costs consists of personnel support and the acquisition and training of program personnel. No antecedant system exists for use in comparing O&S costs.

(b) Costs -- (FY 1973 Constant (Base-Year) Dollars in Millions)

Cost Element	CH/MH-53 Squadron	Avg Cost Per Squadron (Antecedant)
Personnel	3.3	N/A
O&S Consumables	1.2	N/A
Depot Maintenance	1.9	N/A
Sustaining Investment	0.5	N/A
Indirect Costs	1.5	N/A

(c) Contractor Support Costs --

(Then-Year Dollars in Millions)

	FY 1989 & Prior	FY1990 Year	FY1991 Year	Balance To Complete	Total
O&MN	22.4	8.3	8.5	-	39.2

SAR-89-075

AF-9 DSCS III

(1)

~~SECRET~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: DSCS III (SPACE SEGMENT)

AS OF DATE: December 31, 1989

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1.(U) Designation and Nomenclature (Popular Name): Defense Satellite Communications System Phase III/Super High Frequency (SHF) Space Segment (DSCS III)

2.(U) DoD Component: U.S. Air Force

3.(U) Responsible Office and Telephone Number:

SATCOM Program Office
Space Systems Division
Los Angeles AFB, CA 90009-2960

Colonel Stephen Purdy
Assigned: March 31, 1989
AV 833-2096; COMM (213) 643-2096

4.(U) Program Elements/Procurement Line Items:

RDT&E: PE 0303110F, APPN 3600

PROCUREMENT: PE 0303110F, APPN 3020 LCN MS0777

5.(U) Related Programs: Air Force Satellite Communications Program (AFSATCOM), Space Boosters Program, Communication Security Program.

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6.(U) Mission and Description: The Defense Satellite Communications System Phase III (DSCS III) provides Super High Frequency (SHF) satellite communications for secure voice and high data rate transmissions. DSCS supports unique and vital national security requirements for worldwide military command and control, crisis management, wideband data relay, treaty monitoring and surveillance information, diplomatic and Presidential traffic. Operational DSCS III satellites will replenish DSCS II satellites as the DSCS II satellites reach the end of their orbital lifetimes. DSCS III satellites operate in the 7/8 GHz frequency band from synchronous equatorial orbital positions. Five active satellites and two on-orbit reserves will maintain the DSCS Space Segment at near 100% availability.

7.(U) Program Highlights:

a.(U) Significant Historical Developments -- Planning was initiated in 1973 for the third generation of SHF defense communications satellites. The December 1974 DSARC I recommended a competitive DSCS III development program. DSARC II in December 1976 led to OSD approval for the Full Scale Development (FSD) of DSCS III. An FSD contract was awarded to General Electric (GE) in February 1977. Critical Design Review (CDR) was accomplished in May 1978. In March 1979 a special DSCS Air Force Systems Acquisition Review Council (AFSARC) recommended revision of the DCP cost and schedule thresholds due to increased production costs and the impact of production delays caused by the extended development schedule. The qualification satellite (A3) completed system level testing in February 1981 and the first development flight satellite (A1) was accepted in June 1981 and placed in storage by JCS direction. DSARC III in Dec 1981 approved the acquisition of DSCS III production satellites. A contract was awarded for two satellites (B4/B5) in January 1982 and for two additional satellites (B6/B7) in December 1982. The first development flight satellite (A1) was launched October 1982, completed Independent Joint Operational Test and Evaluation (IJOT&E), and was turned over to operational use in May 1983. In October 1980, a contract was awarded to refurbish qualification satellite (A3), and to integrate it to the shuttle. JCS directed the launch delay of the A2 spacecraft because of schedule conflicts with higher priority programs. An advance procurement contract for economic order parts and materials was awarded in January 1984, with the award of the multiyear contract (B8-B14) in November 1984. The first DSCS III production satellites (B4/B5) are now in orbit. In August 85 the DRB decision to stretch the DSCS launch schedule increased storage requirements. Storage and reactivation requirements continued due to Shuttle and Titan 34D launch vehicle failures. Attainment of a compatible launch configuration with the Titan IV as a back up launch vehicle was directed. In Oct 1987, the DSCS program was identified as part of the Shuttle offload effort and was directed to plan for procurement of a DSCS III compatible Integrated Apogee Boost Subsystem (IABS). This would permit single launching of DSCS III satellites with an Atlas II launch vehicle. DSCS III has completed all on-orbit development and operational testing. In May 1988, three contracts were awarded to study a more affordable and flexible DSCS III Follow-On satellite utilizing a hardened bus and a standard payload interface. In July 1988,

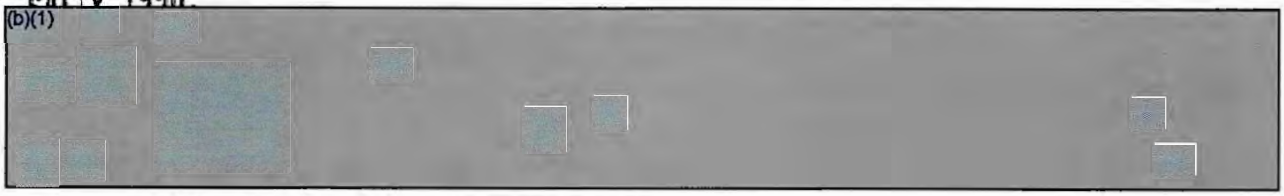
(U) Program Highlights (cont):

a. (U) Significant Historical Developments (cont) --

a development contract was awarded for the first of 10 IABS units. In November 1988, negotiations were completed for IABS units 2-4.

b. (U) Significant Developments Since Last Report -- In March 1989, the three DSCS Follow-On Study Contracts were extended 10 months to examine revised EHF and crosslink payload configurations. Also in March, production of IABS 2-4 was begun, with completion of the three units scheduled for 1991. In December 1989, the three study contracts were extended another 9 months to permit delayed delivery of the final report. The Critical Design Review (CDR) for the basic IABS system was held in July 1989; the CDR for the IABS Ground Control Software was held in October 1989. The first two spacecraft were reactivated from storage in December 1989 to begin the IABS retrofit. The proposal for IABS 5-10 has been received and the contract modification will be awarded in early 1990.

(b)(1)



c. (U) Changes Since "As Of" Date -- None.

(U) Threshold Breaches: There are currently no DAE baseline (dated 31 Dec 88) breaches.

9. (U) Schedule:

a. (U) Milestones --

	Development Estimate	Approved Program	Current Estimate
(U) DSARC II (JRMB II, Full Scale Dev)	N/A	DEC 76	DEC 76
(U) Full-Scale Development (Phase 2) Contract Award	N/A	N/A	FEB 77
(U) Critical Design Review (CDR)	N/A	N/A	MAY 78
(U) DSARC III (JRMB III, Production Dec)	N/A	DEC 81	DEC 81
(U) DSCS Delivery:			
DSCS II-F16/III-A1	JUL 79	AUG 82	AUG 82
DSCS II-F15/III-A2	JUN 80	DEC 86	DEC 86
DSCS III-B4/III-B5	MAR 82	JUN 85	JUN 85
DSCS III-A3		JAN 87	JAN 87
DSCS III-B6		NOV 86	NOV 86
DSCS III-B7		MAY 88	MAY 88
DSCS III-B8		FEB 88	FEB 88
(U) First Production Satellite Delivery	N/A	APR 85	APR 85

9. (U) Schedule (cont):

a. (U) Milestones (cont) --

	Development Estimate	Approved Program	Current Estimate
(U) DSCS Delivery (cont):			
DSCS III-B9	N/A	MAY 88	MAY 88
DSCS III-B10	N/A	DEC 88	DEC 88
DSCS III-B11	N/A	FEB 89	APR 89
DSCS III-B12	N/A	JUL 89	OCT 89(Ch-1)
DSCS III-B13	N/A	DEC 89	DEC 89
DSCS III-B14	N/A	NOV 90	DEC 90(Ch-2)
DSCS III-B15	N/A	DEC 97	1997
(U) Tentative Launch:			
( ) DSCS II-F16/III-AI	N/A	N/A	OCT 82
( ) DSCS II-E15/III-A2	N/A	N/A	(b)(1)
( ) DSCS III-B4/III-B5	N/A	N/A	
( ) DSCS III-A3	N/A	N/A	MAY 97
( ) DSCS III-B6	N/A	N/A	OCT 92
( ) DSCS III-B7	N/A	N/A	MAY 94
( ) DSCS III-B8	N/A	N/A	MAY 93
( ) DSCS III-B9	N/A	N/A	DEC 91(Ch-3)
( ) DSCS III-B10	N/A	N/A	MAY 92
( ) DSCS III-B11	N/A	N/A	MAY 95
( ) DSCS III-B12	N/A	N/A	AUG 91(Ch-4)
( ) DSCS III-B13	N/A	N/A	MAY 96(Ch-5)
( ) DSCS III-B14	N/A	N/A	MAY 91
( ) DSCS III-B15	N/A	N/A	1998
(U) DSCS IABS Milestones			
Contract Award	N/A	N/A	JUL 88
Preliminary Design Review	N/A	N/A	DEC 88
Critical Design Review	N/A	N/A	OCT 89(Ch-6)
Initial Launch Capability	N/A	N/A	MAY 91
(U) DSCS Follow-on Milestones			
Concept Definition Contract Award	N/A	N/A	MAY 88
Systems Review	N/A	N/A	FEB 89

b. (U) Previous Change Explanations -- Satellite System level CDR was delayed one month to allow collection and analysis of test data from the Integrated Satellite Development Test Model. Delay in the delivery of AI until June 1981 was caused by delays in design definition, parts and materials, and shared test equipment. A September 1982 launch was directed with an additional month delay due to nonavailability of an upper stage. The extended FSD program delayed DSARC III until December 1981 which approved the acquisition of two satellites (B4/B5) in FY82 and planned for two additional satellites in FY83 (B6/B7). The A1 delays impacted A2 availability. Contractual delivery dates were realigned to match Initial Launch Capability (ILC) of the Inertial Upper Stage (IUS). First Production satellite (B4) delivery delayed due to slip in the FSD program, revised production schedules, and a slip in DSARC III. By JCS

~~(U)~~ Schedule (cont):

b. ~~(U)~~ Previous Change Explanations (cont) --

direction, the second FSD launch was delayed due to nonavailability of boosters. The second FSD launch was delayed twice more due to launch vehicle failures. DAE Baseline Milestones were incorporated.

c. ~~(U)~~ Current Change Explanations --

(Ch-1) Delivery slipped from Jul to Oct 89.
(Ch-2) Delivery slipped from Nov to Dec 90.
(Ch-3) Launch slipped from Nov to Dec 91
(Ch-4) Launch moved up from May 96 to Aug 91.
(Ch-5) Launch changed from Aug 91 to May 96 (B12 and B13 launch dates swapped).
(Ch-6) CDR held in 2 sessions, July and Oct 89.

d. ~~(U)~~ References --

Development Estimate:
Decision Coordinating Paper (DCP) #144, Revision 2, 17 Nov 1976.
Program Management Directive (PMD) R-S 2146-(6)/PE 33110F, 24 May 77

Approved Program
DAE Baseline approved Dec 31, 1988.

10. ~~(C)~~ Technical/Operational Characteristics:

a. ~~(C)~~ Technical --

	Dev Estimate	Approved Program Goal/Threshold*	Demonstrated Performance/A	Current Estimate
( ) Frequency (GHz)	7.25-8.4	7.25-8.4	7.25-8.4	7.25-8.4
( ) Bandwidth (MHz) per chnl	50-85	50-85	50-85	50-85
( ) Nulling Receive MBA B/	(b)(1)			
( ) Effective Isotropic Radiated Power (EIRP) (dBW) C/				
Channels				
1 & 2 (EC:Spot:AC)	29:39:43	N/A	29:40:44	29:40:44
3 (EC:EC:Spot)	24:23:33	N/A	25:23:34	25:23:34
4 (EC:EC:Spot:AC)	24:23:33:37	N/A	25:23:35:38	25:23:35:38
5 & 6 (EC)	24	N/A	25	25
Beacons (EC)	11	N/A	12	12

*Goals and thresholds for DSCS III satellites are identical because the spacecraft has completed development and is currently in production.

[redacted].(U) Technical/Operational Characteristics (cont):

b.(U) Technical(cont)-	Dev Estimate	Approved Program Goal/Threshold*	Demonstrated Performance/A	Current Estimate
(U) Signal Gain to System Noise Temp Ratio (G/T) (dB/degrees K)				
EC Horn	-15	-15	-13	-14
EC MBA	-16	-16	-15	-16
Spot MBA	-1	-1	-0.5	-1
b.(U) Operational --				
(U) Quantities (per satellite)				
40 Watt Channels (1&2)	2	2	2	2
10 Watt Channels (3-6)	4	4	4	4
SHF Command Links	2	2	2	2
Protected Beacons	2	2	2	2
(U) Mean Mission Duration (years)	N/A	7	7	7
(U) Satellite Reliability D/	.7	.7	N/A	.7
(U) Weight (lbs) E/	1650	1989	N/A	1989
(U) Launch Vehicles (types)				
	Titan IIIC	N/A	N/A	T34D:Trnstg
	Titan IIID:IUS	N/A	N/A	T34D:IUS
	STS:IUS	N/A	N/A	STS:IUS
	N/A	N/A	N/A	Titan IV:IUS
	N/A	N/A	N/A	Atlas II:IABS

A/ (U) Actual values observed during Qualification Test. (Maximum)
B/ (U) Based on single null anywhere in the satellite field of view created within a Multi-Beam Antenna (MBA) earth coverage pattern (db below EC reference)
C/ (U) EC - Earth Coverage: Spot - 1.0 degree minimum diameter; AC - Area Coverage (Dish) - 3.0 degree beam diameter switchable on orbit to desired channel
D/ (U) Probability of survival at 7 years
E/ (U) Satellite weight less expendables (dry weight)

*Goals and thresholds for DSCS III satellites are identical because the spacecraft has completed development and is currently in production.

0.(U) Technical/Operational Characteristics (cont):

c.(U) Previous Change Explanation -- EIRP, Signal Gain to Signal Noise, and Nulling characteristics revised based upon AI acceptance test data. Beacon EIRP reflects DCA requested specification change to the SHF beacon power output. Launch vehicle types revised due to nonavailability. Net increases in satellite dry weight as a result of actual weight measurements superseding estimates of the weight of satellite components. Signal Gain to Signal Noise current estimate revised based upon analysis of the B4/B5 CDR data and resulting specification change. EC Horn improved from -13 to -14, EC MBA from -15 to -16, and the Spot MBA from -.5 to -1. The DSCS program has been directed to have a compatible launch configuration with the Titan IV, as well as the Atlas II with an orbit transfer subsystem. The weight of the DSCS III satellite was again revised. The name of the booster to be used with IABS, previously referred to as the MLV II, was identified as the Atlas II.

d.(U) Current Change Explanations -- None

e.(U) References --

Development Estimate:
Decision Coordinating Paper (DCP) #144, Revision 2, 17 Nov 1976.
DSCS III Space Segment Specification 07868 DSCS III-1, Rev 1, 1 Aug 1975

Approved Program:
DAE Baseline approved 31 Dec 1989.

11.(U) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a.(U) Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	$134.3	$339.2	$337.3
Procurement	496.8	720.1	717.9
Satellites	(313.1)	(616.7)	(613.3)
Launch Vehicles	(183.7)	(103.4)	(104.6)
Construction (MILCON)	---	---	---
Total FY77 Base-Year $	$631.1	$1059.3	$1055.2
Escalation	262.5	935.1	960.8
Development (RDT&E)	(17.5)	(185.5)	(186.4)
Procurement	(245.0)	(749.6)	(774.4)
Construction (MILCON)	---	---	---
Total Then-Year $	$893.6	$1994.4	$2016.0
b.(U) Quantities --			
Development (RDT&E)	2	2	2
Procurement	12	13	13
Total	14	15	15

11.(U) Program Acquisition Cost (cont):

c.(U) Foreign Military Sales -- None

d.(U) Nuclear Costs -- None

e.(U) References --

Development Estimate:
Decision Coordinating Paper (DCP) #144, Revision 2, 17 Nov 1976.
Program Management Directive (PMD) R-S 2146-(6)/PE 33110F, 24 May 77

Approved Program:

31 Dec 88 DAE Baseline.

12.(U) Program Acquisition/Current Procurement Unit Cost Summary:

(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a.(U) Program Acquisition	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	2016.0	1994.4	2016.0
(2) Quantity	15	15	15
(3) Unit Cost	134.400	132.960	134.400
b.(U) Current Procurement --	(FY 1990)	*(FY 1990 APPN)	(FY 1991)
(1) Cost	48.2	48.2	63.9
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	48.2	48.2	63.9
(2) Quantity	0	0	0
(3) Unit Cost	N/A	N/A	N/A

* Differs from the December 88 SAR to reflect the FY 1990 Appropriations Act.

13.(U) Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	151.8	741.8	--	893.6
Previous Changes:				
Economic	-1.8	+87.8	--	+86.0
Quantity	-	+55.3	--	+55.3
Schedule	+30.2	+99.4	--	+129.6
Engineering	+280.9	+271.9	--	+552.8
Estimating	+63.6	+136.1	--	+199.7
Other	-	+77.4	--	+77.4
Support	-	-	--	-
Subtotal	+372.9	+727.9	--	+1100.8
Current Changes:				
Economic	+3.5	+28.2	--	+31.7
Quantity	-	-	--	-
Schedule	-	-	--	-
Engineering	-14.2	-8.9	--	-23.1
Estimating	+9.7	+3.3	--	+13.0
Other	-	-	--	-
Support	-	-	--	-
Subtotal	-1.0	+22.6	--	+21.6
Total Changes	+371.9	+750.5	--	+1122.4
Current Estimate	523.7	1492.3	--	2016.0

(FY 77 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	134.3	496.8	--	631.1
Previous Changes:				
Quantity	-	+21.3	--	+21.3
Schedule	+16.5	+36.1	--	+52.6
Engineering	+148.4	+112.6	--	+261.0
Estimating	+40.0	+14.9	--	+54.9
Other	-	+38.4	--	+38.4
Support	-	-	--	-
Subtotal	+204.9	+223.3	--	+428.2
Current Changes:				
Quantity	-	-	--	-
Schedule	-	-	--	-
Engineering	-6.3	-3.4	--	-9.7
Estimating	+4.4	+1.2	--	+5.6
Other	-	-	--	-
Support	-	-	--	-
Subtotal	-1.9	-2.2	--	-4.1
Total Changes	+203.0	+221.1	--	+424.1
Current Estimate	337.3	717.9	--	1055.2

13.(U) Cost Variance Analysis (cont):

b. Previous Change Explanations --

RDT&E
Economic: Revised economic escalation indices
Schedule: Production extension, Launch delays, III-A1 Storage, Storage/reactivation costs associated with revised launch schedule
Engineering: Jammer Location Electronics (JLE) upgrade, Traveling Wave Tube Amplifier (TWTA), Solid State Amplifier (SSA), Launch Vehicle (LV) Integration costs, Transitional satellite and upper stage development, Removal of Block C development costs, IABS development & integration, SHF development of Yaw Rate Gyro, Follow-On study contracts, Wartime effectiveness improvements, Deletion of SHF development costs
Estimating: Revised production costs, First time integration, 1987 Balanced Budget Amendment impacts, III-A2 launch delay costs, Removal of Block C development costs, IABS development support, Adjustment to prior years actual costs, Testing/program risk, Adjust IABS development estimates to actuals

PROCUREMENT
Economic: Revised economic escalation indices
Quantity: Addition of one satellite, Removal of one satellite
Schedule: Revised buy strategy, One year production delay, Three year transitional satellite delay, Multiyear launch deferment and associated storage/reactivation
Engineering: 10 Watt SSA, Generic TWTA, III-A3 STS compatibility, Removal of one satellite, Procurement of IABS, Addition of one satellite, Product improvements: Yaw Rate Gyro, and TLS Retrofit, Modifications and repairs
Estimating: FCRC requirements, LV integration, Production costs, Gramm-Rudman-Hollings Bill, Non-awarded contingent liabilities, Launch delay costs, Removal of one satellite, Procurement of IABS, Addition of one satellite, Re-estimation of storage/reactivation costs, Re-estimation of ATLAS II conversion, Adjustment to current/prior years escalation, Risk resulting from Congressional cuts, Aerospace Mission Technical Support (MTS) and engineering change orders
Other: Single Channel Transponder (SCT) hardware funding transfer, DSARC III (JRMB III) adjustment.

13.(U) Cost Variance Analysis (cont):

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised economic escalation indices (Economic)	N/A	+3.5
Adjustment to current/prior years escalation (Estimating)	+0.1	+0.1
Increase in IABS development/integration cost estimates to reflect projected overrun (Estimating)	+0.5	+1.2
Reduction in Follow-On development cost estimates to reflect contractually negotiated amounts (Estimating)	-0.8	-1.6
Decrease in scope of planned wartime effectiveness improvements to DSCS satellites (Engineering)	-6.3	-14.2
Increase in DSCS telemetry simulator software cost estimates to reflect contractually negotiated amounts (Estimating)	+2.2	+4.5
Program adjustments for studies, testing, program risk (Estimating)	+2.4	+5.5
(2) Procurement		
Revised economic escalation indices (Economic)	N/A	+28.2
Adjustment to current/prior years escalation (Estimating)	-0.1	-0.2
Increased storage/reactivation based on revised cost estimates (Estimating)	+2.1	+6.4
Decreased technical support costs due to reduction in Aerospace Mission Technical Support (MTS) requirements (Estimating)	-3.1	-8.5

13. (U) Cost Variance Analysis (cont):

c. Current Change Explanations (cont) --

(2) Procurement (cont)

Decreased telemetry gathering/archiving costs based on revised cost estimates (Estimating)	-0.9	-2.0
Increased IABS procurement costs based on revised cost estimates (Estimating)	+3.2	+7.6
Decreased costs associated with modification/ repairs of DSCS III satellites: Telemetry Link Survivability, Product Improvements, Linear Solid State Amplifier (LSSA), Attitude Control Electronics (ACE) Augmented Nuller (Engineering)	-3.4	-8.9

14. (U) Program Acquisition Unit Cost (PAUC) History:
(Millions of Then-Year Dollars)

a. Initial SAR/Development Estimate to Current Estimate --

PAUC (Initial SAR/ Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
63.829	+7.847	-0.569	+8.640	+35.313	+14.180	+5.160	-	+70.571	134.400

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. RDT&E --

IABS Development:
General Electric Co, Space Systems Division
Philadelphia, PA
F04071-84-C-0072, FPIF
Award: July 22, 1988
Definitized: July 22, 1988

Initial Target	Contract Ceiling	Price Qty
$53.6	$57.6	1.0

Current Contract Price

Target	Ceiling	Qty
$45.6	$48.9	1.0

Estimated Price at Completion

Contractor	Program Manager
$46.2	$47.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$-0.4
Cumulative Variances to Date (12/03/89)	-1.2	$-2.3
Net Change	-1.2	-1.9
Cumulative Variance Change Percent	N/A	-475%

15. (U) Contract Information (cont): (Then-Year Dollars in Millions)

a. RDT&E (cont) --

IABS Development (cont):

Explanation of Change: Unfavorable cost variance is due to overruns in mechanical engineering and drafting caused by numerous redesigns of the Integrated Apogee Boost Subsystem (IABS). Schedule variance: Unfavorable schedule variance is due largely to difficulties with the IABS propulsion assembly, particularly the producibility of propellant tanks. Impact: Due to variances to date the SPO has budgeted to ceiling price for this effort. No impact to launch schedule is anticipated at this time.

b. Procurement --

DSCS III Production B8-14:	Initial Target	Contract Ceiling	Price Qty
General Electric Co., King of Prussia, PA F04701-84-C-0072, FFP Award: November 16, 1984 Definitized: September 14, 1984	$423.0	N/A	7

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$465.8	N/A	7	$465.8	$465.8

CPR reporting is not required on this contract. (FFP)

IABS Flights 2-4:*	Initial Target	Contract Ceiling	Price Qty
General Electric Co, Space Systems Division Philadelphia, PA F04071-84-C-0072, FPIF Award: March 30, 1989 Definitized: March 30, 1989	$41.9	$45.0	3.0

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$41.9	$45.0	3.0	$42.3	$43.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (12/03/89)	$0.0	$-3.2
Net Change	N/A	N/A
Cumulative Variance Change Percent	N/A	N/A

*This is the first SAR entry for this contract.

15. (U) Contract Information (cont): (Then-Year Dollars in Millions)

c. MILCON -- None.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 68.2% (15yrs/22yrs)
(2) Percent Program Cost Appropriated: 77.6% ($1564.9/$2016.0)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY76-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To-Complete (FY92-97)	Total
RDT&E	423.0	25.1	16.5	59.1	523.7
Procurement	1068.6	48.2	63.9	311.6	1492.3
MILCON	-	-	-	-	-
Total	1491.6	73.3	80.4	370.7	2016.0

16. (U) Program Funding Summary (cont):

c. Annual Summary --

Fiscal Year	Qty	FY 77 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Program	Obligated/1	Expended/1	
		Nonrec	Rec					
Appropriation: RDT&E								
1976	-	-	-	11.3	10.5	10.5	10.5	7.0
197T	-	-	-	2.8	2.8	2.8	2.8	3.6
1977	-	-	-	28.1	28.7	28.7	28.7	4.7
1978	-	-	-	54.5	59.5	59.5	59.5	7.0
1979	-	-	-	24.3	29.3	29.3	29.3	8.4
1980	-	-	-	14.8	19.8	19.8	19.8	9.4
1981	-	-	-	19.6	29.0	29.0	29.0	11.9
1982	-	-	-	32.8	52.0	52.0	52.0	9.2
1983	-	-	-	23.9	39.7	39.7	39.7	4.9
1984	-	-	-	17.9	30.8	30.8	30.8	3.7
1985	-	-	-	14.0	24.8	24.8	24.8	3.4
1986	-	-	-	3.1	5.6	5.6	5.6	2.8
1987	-	-	-	7.9	14.8	14.5	11.7	2.7
1988	-	-	-	22.1	43.1	42.9	37.5	3.1
1989	-	-	-	16.0	32.6	32.0	24.5	4.2
1990	-	-	-	11.9	25.1	1.9	0.1	4.0
1991	-	-	-	7.5	16.5	-	-	4.2
1992	-	-	-	7.1	16.2	-	-	4.0
1993	-	-	-	8.0	19.0	-	-	3.7
1994	-	-	-	6.5	15.8	-	-	3.4
1995	-	-	-	1.2	2.9	-	-	3.1
1996	-	-	-	1.1	2.9	-	-	3.1
1997	-	-	-	0.9	2.3	-	-	3.1
Subtotal	2	-	-	337.3	523.7	423.8	406.3	

/1 Reflects program office records as of 31 Dec 89

(U) Program Funding Summary (cont):

c. Annual Summary (cont) --

Fiscal Year	Qty	FY 77 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway Nonrec	Flyaway Rec	Total	Program	Obligated/1	Expended/1	
Appropriation: Procurement								
1978	-	35.7	-	35.7	43.0	43.0	43.0	7.0
1979	-	.3	-	4.7	6.2	6.2	6.2	8.7
1980	-	.4	-	7.4	11.1	11.1	11.1	9.7
1981	1	.6	41.4	47.2	77.9	77.9	77.9	11.9
1982	2	.5	78.1	63.6	112.4	112.4	112.4	9.6
1983	2	.1	109.9	74.5	139.3	139.3	139.3	9.0
1984	-	5.4	-	50.2	98.0	98.0	98.0	8.0
1985	2	11.7	102.8	112.5	224.8	224.8	224.8	3.4
1986	2	5.2	90.0	61.4	127.3	127.0	108.2	2.8
1987	2	3.9	88.8	49.2	105.9	105.4	46.8	2.7
1988	1	5.2	36.4	30.8	69.0	64.5	26.8	3.1
1989	-	2.8	-	22.8	53.7	47.7	4.9	4.2
1990	-	3.6	-	19.7	48.2	6.6	-	4.0
1991	-	6.3	-	25.2	63.9	-	-	4.2
1992	-	4.4	-	21.2	55.7	-	-	4.0
1993	-	5.9	-	18.8	50.9	-	-	3.7
1994	1	9.1	65.9	66.2	184.8	-	-	3.4
1995	-	1.4	-	3.2	9.2	-	-	3.1
1996	-	1.2	-	2.6	7.8	-	-	3.1
1997		0.9	-	1.0	3.2	-	-	3.1
Subtotal	13	104.6	613.3	717.9	1492.3	1063.9	899.4	
Total	15	104.6	613.3	1055.2	2016.0	1487.7	1305.7	

/1 Reflects program office records as of 31 Dec 89

17. (U) Production Rate Data: No report. Production less than 6 per year.

18. (U) Operating and Support Costs:

a. Not Available
b. Not Available
c. Contractor Support Costs N/A

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SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823) SAR-89-018
PROGRAM: F-14D

N-15 F-14D

AS OF DATE: DECEMBER 30, 1989

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1. Designation/Nomenclature (Popular Name): F-14D (TOMCAT)

2. DOD Component: U.S. Navy

3. Responsible Office and Telephone Number:

Naval Air Systems Command
PMA-241
Washington, D.C.

PM: CAPT J. W. Snyder
Assigned: November 9, 1987
COMM (202) 692-8284
AUTOVON 222-8284

4. Program Elements/Procurement Line Items:

RDT&E: PE 0205667N
PROCUREMENT: PE 24144N APPN 1506 ICN 0140
ICN 0141
MILCON: PE 24144N

5. Related Programs: F-14A, A-6, EA-6B, E-2C, C-2 (All Grumman Aero Corp produced aircraft), ASPJ, JTIDS and AIM-54A/C PHOENIX Missile.

(This Page Is ~~Unclassified~~)

~~CLASSIFIED BY:~~
~~OPNAVINST 5513.2A-87~~
~~DECLASSIFY BY: OADR~~

MAR 21 1990

90-C-1638
No Security Objection to Open Publication
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Office of the Chief of Naval Operations
Dept. of the Navy

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6. MISSION AND DESCRIPTION: The F-14D is an all-weather, carrier-based, airborne weapon system capable of performing fleet air defense and air-to-ground missions. Air-to-ground capability is secondary and has never been fully developed. The F-14D is a twin-engine, two-place, tandem seat, variable-sweep-wing, supersonic fighter capable of engaging multiple targets simultaneously at altitudes from sea level to over 80,000 feet. The APG-71/PHOENIX missile combination gives the F-14D the unique ability to prosecute the long-range, multiple- target, Outer Air Battle mission. The F-14D replaces the F-14A/A(PLUS) aircraft. It is a major upgrade to the F-14A weapon system in three areas: new engine, new digitized avionics and a new digital radar. Existing TF30 engines will be replaced by a General Electric F110-GE-400 increased thrust digitally controlled engine for improved reliability and operability throughout the entire operating envelope. In the area of avionics, the F-14D program will utilize a modern digital multiplex bus architecture and incorporate highly reliable, state-of-the-art avionics equipment such as JTIDS, ASPJ, and IRST. The upgraded radar, the APG-71, will retain the high peak power output of the AWG-9 radar and provide significant improvements in ECCM capability, reliability and maintainability. In addition, the F-14D will carry AIM-54C PHOENIX missile as well as the Sparrow, Sidewinder, AMRAAM, and HARM missiles.

7. Program Highlights:

a. Significant Historical Developments -- On December 9, 1982, the Navy Decision Resource Board (DRB) determined an upgrade to the F-14A, later designated the F-14D, to be the most cost effective solution for the Navy's anti-air warfare operational requirement. The decision was confirmed by a SECNAV memorandum of July 6, 1983, which delineated required capabilities for the upgraded F-14. The full scale development effort, which began on 31 July 1984, is being conducted under a firm-fixed price contract with Grumman Corporation. This program called for production to commence on the F-14D in late FY88. On 17 September 1986 the Secretary of the Navy directed that the procurement of new production F-14D's would be supplemented with the procurement of F-14A's remanufactured into F-14D's. The current program procures 37 new production F-14D's and 400 remanufactured F-14D's. The remanufacture program will have multiple sources with effort competed between Grumman and the Naval Aviation Depot.

Avionics and radar development and operational testing began in August 1987. The TA-3B, APG-71 radar test bed commenced flight testing in August and concluded Navy "quicklook" evaluation on 12 December. The first F-14D prototype aircraft was delivered to the Navy 23 November 1987 and completed 12 test flights assessing the avionics systems. Navy "Quicklook" evaluation of the avionics system was also completed in December 1987. Results of T&E were favorable. The Navy and Grumman definitized the settlement of Grumman's request for equitable adjustment on 1 February 1988. A Navy decision to proceed into FY-88 production was made at the Navy program decision meeting (NPDM) in March of 1988. Pre-deployment update (PDU) was initiated and contracted for in 1988. PDU includes integration of AMRAAM, HARM, fighter-to-fighter data link and radar improvements prior to the first F-14D deployment. A second NPDM was held in October 1988. FY-89 production, long lead authorization for FY-90 and the continuation of infrared search and track (IRST) full scale development was approved. Developmental and operational tests (DT-IIA, OT-IIA) were successfully conducted. OPTEVFOR endorsed the continuation and further development of the F-14D.

7. Program Highlights: (Con't)

b. Significant Developments Since Last Report --

Development and Operational testing was continued in 1989 and DT-IIB/OTIIB were completed in July and August respectively. The results of the tests were favorable and OPTEVFOR recommended approval of limited rate production. Termination of F-14D new production after FY90, per Congressional direction, has been negotiated into the FY90 contract.

The F-14D is expected to satisfy the mission requirement.

c. Changes Since "As Of" Date -- None.

8. Threshold Breaches: There have been no DAE Baseline (dated 30 June 1989) threshold breaches.

9. Schedule

a. Milestones --

	Production Estimate	Approved Program	Current Estimate	
( ) SECNAV Direction for F-14D	N/A	Jul 83	Jul 83	
( ) FSD Contract Award	Jul 84	Jul 84	Jul 84	
( ) DNSARC Review Milestone II	Mar 85	Mar 85	Mar 85	
( ) Critical Design Review (HDWR)	Jun 85	Jun 85	Jun 85	
( ) Critical Design Review (SFTWR)	Aug 85	Aug 85	Aug 85	
( ) First F110 Test Flight	Aug 86	Sep 86	Sep 86	
( ) F-14D Advance Acquisition Contract Award	Dec 86	Apr 87	Apr 87	
( ) First Avionics/Radar Flight	Mar 87	Jan 88	Jan 88	
( ) Pilot Production Long Lead Funding Approval	N/A	Mar 87	Mar 87	
( ) NPDM (Pilot Production Approval)	Feb 88	Mar 88	Mar 88	
( ) NPDM III A (Limited Prod Approval)	Mar 89	Oct 88	Oct 88	
( ) Techeval	Apr 90	Apr 90	Apr 90	
( ) NPDM III A2 (Limit Prod Approval)	Mar 90	Oct 89	Jan 90	(ch-1)
( ) OPEVAL	Jun 90	May 90	Jun 90	(ch-2)
( ) NPDM III B (Full Production Approval)	Oct 90	Sep 90	Nov 90	(ch-3)
( ) Deliver First Production F-14D	Mar 90	Mar 90	Mar 90	
( ) BIS	Sep 90	Sep 90	Sep 90	
( ) Initial Operating Capability (1st Sqdrn)	(b)(1)			(ch-4)

b. Previous Change Explanations --

(b)(1) ch-1 IOC delayed from (b)(1) due to decreased quantity of aircraft being procured in FY 1990 and FY 1991.

9. Schedule: (Con't)

c. Current Change Explanations --

ch-1 NPDM IIIB date changed from OCT 89 to JAN 90 due to Congressional changes made to production plans. NPDM IIIB milestone name changed to NPDM IIIA-2.

ch-2 OPEVAL commencement delayed one month to accommodate aircraft preparation for OPEVAL subsequent to TECHEVAL.

ch-3 NPDM IIIC milestone name changed to NPDM IIIB

ch-4 IOC changed back to original date due to Congressional increase to production quantity and resulting aircraft availability.

d. References --

Production Estimate: NDCP was approved by the Assistant Secretary of the Navy (RE&S), 13 Jan 1989.

Approved Program: DAE baseline approved 30 June 1989.

10. Technical/Operational Characteristics:

(Fighter escort configuration with 0 PHOENIX, 4 Sparrow and 4 Sidewinder missiles unless otherwise indicated)

~~(U)~~ a. Technical	Prod Est	Approved Program Goal	Approved Program Threshold	Demonstrated Perf	Current Estimate
( ) Weight					
Empty no stores (lb)	41,977	N/A	41,700	N/A	41,977
Max T/O	72,234	N/A	72,467	N/A	72,234
( ) Length/Height/Span (ft)	62/16/64.1	N/A	62/16/64.1	N/A	62/16/64.1
( ) Spotting Factor (A7=1.0)	1.55	N/A	1.55	N/A	1.55
( ) Direct Maintenance Manhours per flight hours (unscheduled O-level)	6.4	N/A	6.4	N/A	6.4
( ) SDLM Cycle (mo.)	44	N/A	44	N/A	44
( ) MFHBF (Total Weapon Sys)	1.8	N/A	1.8	N/A	1.8
~~(U)~~ b. Operational A/					
( ) Acceleration, 0.8-1.6M, 35,000 ft, Max A/B (Sec)	(b)(1)				
( ) Rate of Climb, Single Engine, Take-off Wt (ft/min)	297	N/A	350	N/A	300 B/
( ) CAP Loiter Time @ 150 NM, 35,000 ft (HRS)	(b)(1)				C
( ) Combat Radius Escort Miss. (NM)					
( ) Max Specific Excess Power (P_S), IRT, 10,000 FT. (FPS)					/
( ) Sustained Load Factor (G), MIL, 10,000 FT					/
( ) Specific Excess Power					

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10. Technical/Operational Characteristics: (Con't)

NOTES:

A/ ( ) Aircraft configured with single chin pod and glove vanes.
B/ ( ) Sea level, 89.8 F, minimum catapult speed + 15 kts, IRT, takeoff weight less 600 lbs. of initial useable fuel, takeoff configuration.
C/ ( ) Fleet Air Defense Configuration (4 Phoenix, 2 Sparrows, 2 Sidewinders, 2 Tanks).
D/ ( ) Combat weight, defined as takeoff weight less 40% initial useable fuel.

c. Previous Change Explanations -- Changes are a result of projections based on flight test data.

d. Current Change Explanations -- N/A

e. References --
Production Estimate: NDCP was approved by the Assistant Secretary of the Navy (RE&S), 13 Jan 1989.
Approved Program: DAE baseline approved 30 June 1989.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. ~~(U)~~ Cost --	Production Estimate	Approved Program	Current Estimate
Development	1864.9	1864.2	1803.6
Procurement	19664.7	16282.6	16704.6
Airframe	(7702.7)	(5512.5)	(7109.7)
Engine	(2929.6)	(2250.7)	(2292.2)
Avionics	(2216.6)	(1993.9)	(1991.8)
Other Hardware	(2536.2)	(2385.2)	(2246.1)
Total Flyaway	(15385.1)	(12142.3)	(13639.8)
Other Wpn Sys Cost	(3039.6)	(2900.3)	(1864.6)
Initial Spares	(1240.0)	(1240.0)	(1200.2)
Construction (MILCON)	13.9	13.9	13.5
Total FY 89 Base-Year $	21543.5	18160.7	18521.7
Escalation	3478.4	2888.3	4532.6
Development (RDT&E)	(-20.8)	(-20.9)	(-6.5)
Procurement	(3498.0)	(2908.0)	(4537.5)
Construction (MILCON)	(1.2)	(1.2)	(1.6)
Total Then-Year $	25021.9	21049.0	23054.3

b. ~~(U)~~ Quantities --			
Development (RDT&E)	0	0	
Procurement	527	419	(b)(1)
Total	527	419	

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11. Program Acquisition Cost (Cont.)

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References --
Production Estimate: NDCP was approved by the Assistant Secretary of the Navy (RE&S), 13 Jan 1989; FY 1990-91 Amended Budget Submit
Approved Program: DAE baseline approved 30 June 1989.

12. Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then Year) Dollars in Millions)

	Current Year		Budget Year
	SAR Current Dec 89 SAR	UECR Baseline Jun 89 SAR	UCR Baseline Dec 89 SAR
a. Program Acquisition --			
(1) Cost	23054.3 (b)(1)	21049.0	23054.3 (b)(1)
(2) Quantity		419	
(3) Unit Cost		50.2	
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	1517.4	1517.4	997.0
Less CY Adv Proc	82.7	82.7	126.3
Plus PY Adv Proc	110.5	110.5	82.7
Net Total	1545.2	1545.2	953.4
(2) Quantity	24	24	12
(3) Unit Cost	64.4	64.4	79.5

13. Cost Variance Analysis

a. Summary -- (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1844.1	23162.7	15.1	25021.9
Previous Changes				
Economic	0.0	0.0	0.0	0.0
Quantity	0.0	-4956.7	0.0	-4956.7
Schedule	0.0	-31.1	0.0	-31.1
Engineering	0.0	0.0	0.0	0.0
Estimating	-0.8	1170.7	0.0	1169.9
Support	0.0	-155.0	0.0	-155.0
Other	0.0	0.0	0.0	0.0
Subtotal	-0.8	-3972.1	0.0	-3972.9
Current Changes				
Economic	21.5	1363.0	0.5	1385.0
Quantity	0.0	1226.8	0.0	1226.8
Schedule	-67.7	-429.9	0.0	-497.6
Engineering	0.0	386.6	0.0	386.6
Estimating	0.0	833.6	-0.5	833.1
Support	0.0	-1328.6	0.0	-1328.6
Other	0.0	0.0	0.0	0.0
Subtotal	-46.2	2051.5	0.0	2005.3
Total Changes	-47.0	-1920.6	0.0	-1967.6
Current Estimate	1797.1	21242.1	15.1	23054.3

FY 1989 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1864.9	19664.7	13.9	21543.5
Previous Changes				0.0
Quantity	0.0	-3819.8	0.0	-3819.8
Schedule	0.0	-432.6	0.0	-432.6
Engineering	0.0	0.0	0.0	0.0
Estimating	-0.7	1009.8	0.0	1009.1
Support	0.0	-139.5	0.0	-139.5
Other	0.0	0.0	0.0	0.0
Subtotal	-0.7	-3382.1	0.0	-3382.8
Current Changes				
Quantity	0.0	853.4	0.0	853.4
Schedule	0.0	-244.8	0.0	-244.8
Engineering	0.0	293.3	0.0	293.3
Estimating	-60.6	595.6	-0.4	534.6
Support	0.0	-1075.5	0.0	-1075.5
Other	0.0	0.0	0.0	0.0
Subtotal	-60.6	422.0	-0.4	361.0
Total Changes	-61.3	-2960.1	-0.4	-3021.8
Current Estimate	1803.6	16704.6	13.5	18521.7

b. Previous Change Explanation --

RDT&E
Estimating: decrease due to budget cuts.

Procurement
Quantity: decrease in number of F-14D aircraft to be procured from 527 to 419.
Schedule: decrease due to reduction in number of F-14D new production aircraft to be delivered to the fleet.
Estimating: increase due to production shut down cost, increased radar cost a result of nullification of negotiated not to exceed contract prices and sunk cost resulting from discontinuation of advance acquisition contract and increased GFE costs.
Support: decrease reflects budget decrease to partially fund cost associated with cancellation of F-14D new production.

c. Current Change Explanation --

	(Dollars in Millions) Base-Year FY-89$	Then-Year
(1) RDT&E:		
Increase due to revised economic escalation rates. (Economic)	N/A	21.5
Decrease due to budget cuts.(Estimating)	-60.6	-67.7
(2) Procurement:		
Increase due to revised economic escalation rates. (Economic)	N/A	1363.0
Reflects increase in number of F-14D aircraft to be procured from 419 to 437. (Quantity)	853.4	1226.8
Decrease is caused by earlier deliveries of aircraft beginning in FY-90. (Schedule)	-244.8	-429.9
Engineering changes for OPEVAL deficiencies, ARC-210, BOL-HIPPAG, kroma displays, multi display repeater indicator. (Engineering)	293.3	386.6
Increase in labor and overhead rates and CFE and GFE costs based on recent proposal data and better definition of the F-14D remanufacture program. (Estimating)	595.6	833.6
Reflects a reduction in outyear support requirements. (Support)	-1075.5	-1328.6
3) MILCON:		
Increase due to revised economic escalation rates. (Economic)	N/A	.5

c. Current Change Explanation --(Con't) (Dollars in Millions)

(3) MILCON	Base-Year FY-89$	Then-Year
Decrease due to refinement of estimate. (Estimating)	-.4	-.5

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

a. Initial SAR Estimate to Current Estimate

(Dev Est)	Changes (Then Year in Millions)								PAUC (PdE)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
63.223	-.525	-8.610	-1.527	0.437	-8.884	3.366	0.000	-15.743	47.480

PAUC (Prod Est)	Changes (Then Year in Millions)								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
(b)(1) [redacted]									52.756

15. Contract Information: (Then-Year Dollars in Millions)

Cost and schedule variance sections are not provided because they are not required for firm fixed price contracts.

FY-84-90 FSD	Initial Contract Price Target	Ceiling	Qty
Grumman Aerospace Corp Bethpage, NY N00019-84-C-0015 ** Award: July 31, 1984 Definitized: December 18, 1986	984.3	N/A	0*

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
N/A	1044.3	0	1044.3	1044.3

Explanation of Change: Grumman reported cost growth on the F-14D FSD program due to late and defective government furnished equipment (GFE). Grumman Corporation's formal proposal was submitted and an equitable adjustment negotiated.

* This contract is for full scale development of the F-14D and therefore quantity is not applicable.

** The basic contract was a firm fixed price type of contract. The Navy had intended to convert the contract to fixed price incentive as part of the equitable adjustment for the late and defective GFE. However, there was no profit or incentive fee involved in the negotiation settlement for the equitable adjustment. This hybrid contract is best described as fixed price with a 50/50 cost sharing of costs in excess of the initial price of $984.3M up to a maximum government liability of $1044.3M ($984.3M + $60.0M).

b. Procurement --

FY-88 Airframe
Grumman Aerospace Corp
Bethpage, NY N00019-87-C-0131 (FFP)
Award: November 1987
Definitized: September 1988

Initial Contract Price		
Target	Ceiling	Qty
431.0	N/A	7 1/

Current Contract Price		
Target	Ceiling	Qty
431.0	N/A	7

Estimated Price At Completion	
Contractor	Program Manager
431.0	431.0

FY-89 Airframe
Grumman Aerospace Corp
Bethpage, NY N00019-88-C-0025 (FFP)
Award: May 1988
Definitized: October 1989

Target	Ceiling	Qty
504.3	N/A	12

Current Contract Price		
Target	Ceiling	Qty
504.3	N/A	12

Estimated Price At Completion	
Contractor	Program Manager
504.3	504.3

FY-90 Airframe
Grumman Aerospace Corporation
Bethpage, NY N00019-88-C-0276 (AAC) 2/
Award: January 1989
Definitized: TBD

Target	Ceiling	Qty
1,163.2	N/A	24

Current Contract Price		
Target	Ceiling	Qty
N/A	N/A	24

Estimated Price At Completion	
Contractor	Program Manager
1,163.2	3/

FY-88 Engine
General Electric Corp
Evandale, OH F33657-84-C-2011 (FFP)
Award: March 1987
Definitized: March 1988

Target	Ceiling	Qty
40.9	N/A	14

Current Contract Price		
Target	Ceiling	Qty
40.9	N/A	14

Estimated Price At Completion	
Contractor	Program Manager
40.9	40.9

FY-89 Engine
General Electric Corp
Evandale, OH F33657-84-C-2011 (FFP)
Award: March 1988
Definitized: October 1989

Target	Ceiling	Qty
73.0	N/A	24

Current Contract Price		
Target	Ceiling	Qty
73.0	N/A	24

Estimated Price At Completion	
Contractor	Program Manager
73.0	73.0

FY-90 Engine
General Electric Corp
Evandale, OH F33657-84-C-2011 (AAC) 2/
Award: February 1989
Definitized: TBD

Target	Ceiling	Qty
175.0	N/A	48

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
N/A	N/A	48	175.0	3/

c. MILCON -- N/A

1/ FY-87 contract is for 5 F-14A(PLUS)s and 7 F-14Ds. Estimated price is for F-14Ds.

2/ Advance Acquisition Contracts. (A fully structured contract initially containing advance procurement funds which is converted to an FFP contract in the full funding year).

3/ Contract is currently in negotiation. It is inappropriate to disclose program manager's estimate due to sensitivity of pricing.

6. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 50% (8 years/16 years).
(2) Percent Program Cost Appropriated: 20% ($4591.6/$23054.3)

b. Appropriation Summary --

Appropriation	Current & Prior FY83-89	Budget Year FY 90	Budget Year FY 91	Balance to Complete FY 92-98	Total
RDT&E	1252.7	117.8	121.4	305.2	1797.1
Procurement	1696.7	1517.4	997.0	17031.0	21242.1
MILCON	7.0	0.0	0.0	8.1	15.1
Total	2956.4	1635.2	1118.4	17344.3	23054.3

16. Program Funding Summary
c. Annual Summary --

Fiscal Year	Qty	Flyaway FY 89 Dollars NonRec	Flyaway FY 89 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Obligated	Expended	Escal Rate (%)
Appropriation: RDT&E								
1983		0			7.7	6.5	6.5	4.90
1984	0			46.8	40.7	40.3	40.3	3.80
1985	0			306.9	275.2	275.2	263.2	3.40
1986	0			376.8	347.6	347.5	344.1	2.80
1987	0			276.1	262.2	262.0	258.8	2.70
1988	0			171.0	167.9	167.7	148.3	3.00
1989	0			149.3	152.6	110.3	51.0	4.20
1990	0			110.7	117.8	89.5	5.0	4.00
1991	0			109.7	121.4			4.20
1992	0			108.0	124.1			4.00
1993	0			21.3	25.3			3.70
1994	0			25.0	30.7			3.40
1995	0			23.7	30.0			3.10
1996	0			23.0	30.0			3.10
1997	0			22.3	30.0			3.10
1998	0			25.3	35.1			3.10
Subtotal	0			1803.6	1797.1	1299.4	1117.2	
Appropriation: APN								
1987	0	50.5	0.0	129.7	131.0	131.0	89.1	4.20
1988	7	120.8	319.5	595.2	614.4	548.6	315.6	3.00
1989	12	73.5	545.6	886.0	951.3	880.5	255.9	4.20
1990	24	275.1	932.3	1362.8	1517.4	45.8	7.7	4.00
1991	12	71.8	466.5	860.6	997.0			4.20
1992	(b)(1)	128.7	739.0	1177.2	1412.9			4.00
1993		182.3	1309.1	1791.1	2217.3			3.70
1994		192.7	1553.1	2007.4	2561.8			3.40
1995		204.3	1507.5	2070.4	2723.7			3.10
1996		257.0	1490.1	2100.2	2848.3			3.10
1997		255.8	1587.4	2180.8	3048.9			3.10
1998		250.7	1126.5	1543.2	2218.1			3.10
Subtotal		2063.2	11576.6	16704.6	21242.1	1605.9	668.2	

[redacted]

[redacted]

16. Program Funding Summary
c. Annual Summary -- (Con't)

Fiscal Year	Qty	Flyaway FY 89 Dollars NonRec	Flyaway FY 89 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Obligated	Expended	Escal Rate (%)
Appropriation: MILCON								
1987				0.5	0.5			2.70
1988				6.4	6.5			3.00
1989				0.0	0.0			4.20
1990				0.0	0.0			4.00
1991				0.0	0.0			4.20
1992				2.7	3.2			4.00
1993				0.0	0.0			3.70
1994				3.9	4.9			3.40
1995				0.0	0.0			3.10
Subtotal				13.5	15.1	0.0	0.0	
TOTAL	(b)(1)	2063.2	11576.6	18521.7	23054.3	2905.3	1785.4	

17. Production Rate Data:

a. Annualized Production Rates: NOTE: The annualized production rates shown differ from the annual funded buy quantities because the funded delivery period is 5 months for FY-88 and 10 months for FY-89.

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1988	7	7	17	7
1989	18	12	14	12
1990	24	18	24	24
1991	36	24	12	42
1992	30	36	(b)(1)	48
1993	30	60		48
1994	30	72		72
1995	30	72		72
1996	30	72		72
1997	30	77		40
1998	39	77		

b. Cost Variance -- Dollars in Millions

Item		Production Estimate	Variance (CE less Pd E)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY $)	21543.5	-3021.8	18521.7	2054.2	16467.5
	(TY $)	25021.9	-1967.6	23054.3	2700.0	20354.3
PAUC	(BY $)	[redacted] (b)(1)				37.683
	(TY $)					46.577

c. Schedule Variance --

Item	Production Estimate	Variance (CE les Pd E)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	4/1987	0	4/1987	0	4/1987
Duration (in Months)	155	0	155	24	131
End Date (Mo/Yr)	3/2000	0	3/2000	24	3/1998

17.d. Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
PROCUREMENT	0/0

17.e. Approved Design to Cost Goals - N/A

18. Operating and Support Costs:

a. Assumptions and Ground Rules -- The O&S cost elements required by the SAR are broken out to six major areas: Personnel, O&S Consumables, Direct Depot Maintenance, Sustaining Investment, Other Direct Costs, and Indirect Costs.

Personnel Costs are based on the quantity of military personnel required to operate and support a 10-aircraft squadron. The Squadron Manning Document (SQMD) for the F-14A and F-14D were used to determine number of personnel necessary to support the aircraft. The F-14A enlisted rate varies for the F-14D due to different skill levels needed to support the upgraded aircraft.

O&S Consumables are those non-repairable items consumed at the O&I maintenance levels. Included here are pre-expended materials used in everyday maintenance of the aircraft such as oil, rags, and grease, items which do not pertain to a specific Work Unit Code. Also included are costs or aviation petroleum, oil and lubricants (POL), which includes allowances for distribution, storage, and spillage. POL costs and consumption rates were obtained from the OP-51 Flying Hour Report. VAMOSC Air Maintenance Subsystem (MS) data is used in the bottoms-up model estimates of O&I Maintenance Consumables.

Directed Depot Maintenance Costs are all the cost incurred at the depot maintenance level. They include personnel, material, overhead, modification, and installation costs. These costs are broken down into three categories: Engine, Airframe, and Component Rework. Airframe rework cost and intervals were provided by the Naval Aviation Depot Operations Center (NADOC). Engine rework costs were provided by AIR-411. Component rework costs were obtained from VAMOSC-Air MS.

Sustaining Investment Costs are the costs of replacing disposed of items and the cost of those services and items that allow for continued operation and support of the aircraft. These costs are broken down into five categories: 1) Replenishment Spares - for components which are no longer repairable at the intermediate and depot maintenance levels; 2) CETS/NETS - travel, board and time spent on specialized aircraft problems by contractor and Navy engineer staffs; 3) Modifications - modification kits to make any safety or operationally required modification on the aircraft; 4) Publication Updates - changes and updates to all data after the aircraft is out of production; and 5) Training Expendable Stores - ammunition expended in training operations. VAMOSC total support system (TSS) is used as a source for CETS/NETS and publication updates. VAMOSC-Air MS data is used for replenishment spares. Modifications and training expendable stores costs were obtained from the AFR-173-13, U.S. Air Force Cost and Planning Factors, dated 2 September 1986.

18. Operating and Support Costs: (Con't)

Other Direct Costs are not separately tracked in Navy accounting systems.

Indirect Costs which are included in personnel costs include: permanent change of duty station, basic allowances, leaves, holidays, retirements, and personnel support rates as defined in revision 035750 of the Navy Comptroller Manual and the manual of Navy Standard Composite Rates.

b. Costs --

(FY-89 Constant (Base Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per F-14D 10 A/C Squadron	Avg Annual Cost Per F-14A 10 A/C Squadron
Personnel	8.27	10.40
O&S Consumables	5.32	5.28
Direct Depot Maintenance	8.41	8.85
Sustaining Investments	5.53	5.19
Other Direct Costs	N/A	N/A
Indirect Costs	N/A	N/A
Total	27.53	29.72

18.c. Contractor Support Costs --

	FY 1989 & Prior	FY 1990 Year	FY 1991 Year	Balance To Comp	Total
O&M,N	7.2	5.0	6.0		18.2
Industrial Fund	8.7	6.3	5.9		20.9
Total	15.9	11.3	11.9		39.1

AF-12 F-15 ~~CONFIDENTIAL~~ SAK-89-054

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: F-15

AS OF DATE: December 31, 1989

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MAR 1 1990 16
DIRECTORATE FOR FREEDOM OF INFORMATION
AND SECURITY REVIEW (OASD-PA)

1. (U) Designation and Nomenclature (Popular Name): F-15/Tactical Fighter (Eagle)

2. (U) DoD Component: U.S. Air Force

3. (U) Responsible Office and Telephone Number:

P-15 Program Office
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433

Col M. Hayashi
Assigned: 26 Jun 87
AV 785-3111; Comm (513)255-3111

4. (U) Program Elements and Procurement line Items:

RDT&E: PE 0207130F/0207134F
PE 0604270F/0604241F (Shared Funding)
PROCURREMENT: APPN 3010, ICN P015AD; PE 0207130F/0207134F

5. (U) Related Programs: F100 Engine, AMRAAM (Advanced Medium Range Air-to-Air Missile), JTIDS (Joint Tactical Information Distribution System), AIM-7, AIM-9, LANTIRN, Tactical Protective Systems, Simulator Development, SRAM-T, CPS, MSS II

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~~Classified By: P-15 SCG, dtd 15 Oct 86~~
~~Declassify On: OADR~~

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6. (U) Mission and Description: The F-15 is an advanced tactical fighter which was developed and procured originally for the air superiority mission. It replaced the F-4 as the USAF's primary air superiority aircraft. It is a twin engine, fixed swept wing aircraft. It is characterized by high thrust to weight and low wing loading for maximum maneuverability, acceleration, and agility. Since the program started, four models have been fielded as mission design series changes became necessary. The fifth and newest model, the F-15E, is a two crewmember aircraft, designed to provide a long range, large payload capability to strike second echelon targets at night and under the weather while retaining the superior theater air defense capability of its predecessors.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- In December 1969, McDonnell Douglas Corporation was selected as prime contractor for development and production of the F-15 aircraft. The FY78 procurement introduced the F-15C/D models, which had an additional 2000 lbs of internal fuel capacity and provisions for Conformal Fuel Tanks (CFTs) and a Programmable Signal Processor (PSP), allowing radar enhancement through software changes. The first PSP equipped F-15C/D aircraft were delivered in June 1980. Initial planning for implementation of the Multi-Staged Improvement Program (MSIP) began in November 1981. The F-15 MSIP provides a long range acquisition/modification plan to satisfy the all weather, day or night Air Defense, and Air Superiority requirements of the Tactical Air Forces. Major program elements include enchancements to Fire Control and Weapons Delivery Systems, Tactical Electronics Warfare Systems (TEWS) and secure communications systems. Planning for development of an F-15 derivative configuration with Air-to-Ground capability was also directed. On 1 October 1982, management responsibility for all fielded F-15 aircraft was transferred to AFLC under the F-15 Program Management Responsibility Transfer (PMRT) Agreement. AFSC still maintains responsibility for all production and R&D efforts on the F-15 program.

In April 1983, a comparison was directed between derivative versions of the F-15 and F-16 as possible choices to meet the Tactical Air Force's need for a long-range dual-role fighter. Both aircraft demonstrated their ability to fulfill Air-to-Air combat requirements and Air-to-Ground mission capabilities. The flight demonstration was completed in July 1983 and the F-15E was selected as the new Dual Role Fighter for the Air Force in early CY84.

The first MSIP aircraft was delivered in June 1985. Following this success, the program began flight testing the ALR-56C in October 1985. To date in testing the ALR-56C, no insurmountable problems have been noted. Anti-Satellite Missile System (ASAT) was successfully tested in November 1985, but subsequently canceled in March 1988. Additionally, the Quick Reaction Capability (QRC) ALQ-135 began flight testing in April 1986. The ALE-45 began production installation during July 1986 while the ALR-56C began field installation in December 1986, Software Qualification Testing (SQFT) was completed on the ALQ-135 and Northrop began production on the QRC ALQ-135 in September 1986 with deployment in September 1988.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- (continued)

The F-15/F100 DEEC (Digital Electronic Engine Control)/Gearpump Field Service Evaluation was a two year program. Over 4,800 sorties were flown and accumulated more than 10,000 engine flight hours. This program verified the new modular control system maintenance philosophy which permits the replacement of Shop Replaceable Units (SRUs) to expedite the engine repairs and improve the base level self-sufficiency. The F100-PW-220 powered F-15C/Ds began delivery to Eglin in July 1986. The deployment began six months ahead of schedule and all of the Intermediate Level (I-Level) engine TOs and 95% of the Operational Level (O-Level) TOs were validated and verified prior to first aircraft delivery.

The F-15E program completed Preliminary Design Review (PDR) in March 1985 with Critical Design Review (CDR) in November 1985. First flight occurred on 11 December 1986 and combined Development/Operational Test and Evaluation commenced.

The production of APG-63 Fire Control Radar ceased with the first F-15C delivered with an APG-70 radar in June 1986. The APG-70 has demonstrated significantly higher reliability than its predecessor. An agreement was reached with the Air Force Logistics Command (AFLC) to effect program management responsibility transfer for MSIP items in October 1987. The second F-15E first flew in May 1987 and entered flight test at Edwards AFB.

F-15E production was delayed due to a wiring bundle rework and delay in delivery of critical electronic components. These delays slowed production deliveries but McAir continued to do workarounds which still met the minimum training requirements at Luke AFB to ensure a limited IOC at Seymour Johnson AFB. The overall funded program was reduced from a total of 392 aircraft to 278 aircraft in the AF FY90 BES. Subsequently the AF proposed a multiyear procurement approach for FY90-93 at 36 aircraft per year (minimum economic order quantity) which DoD approved in December 1988. In April 1989, the FY 1990-91 Amended President's Budget reduced the number of F-15E aircraft to a total of 200 and cancelled the multiyear procurement approach. FY91 is the last annual year buy.

b. (U) Significant Developments Since Last Report: Delivery of critical electronic components continue to delay F-15E aircraft deliveries. However, there were sufficient aircraft available to achieve a limited IOC at Seymour Johnson AFB in September 1989. The P3I ALQ-135 Internal Countermeasures Set will not be available until middle 1990. This system experienced software development delays and will be entering flight test in early 1990.

The F-15 is expected to satisfy its mission requirement.

c. (U) Changes Since "As Of" Date -- None

8. (U) Threshold Breaches: There are currently no Defense Acquisition Executive (DAE) baseline (dated June 30, 1989) breaches.

9. (U) Schedule:

a. (U) Milestones

P-15A/B/C/D	Development Estimate	Approved Program	Current Estimate
Award Total System Development Contract	Jan 70	Jan 70	Jan 70
Preliminary Design Review (PDR)	Sep 70	N/A	Sep 70
Critical Design Review (CDR)	Apr 71	N/A	Apr 71
Engine Preliminary Flight Rating Test (PFRT)	Feb 72	N/A	Feb 72
First Flight	Jul 72	N/A	Jul 72
Long Lead Release (Production Approval)	Oct 72	Oct 72	Oct 72
Engine Qualification Test (EQT)	Feb 73	N/A	Oct 73
First Wing Full Release	Feb 73	N/A	Feb 73
Fatigue Test - Three Life Times	Nov 73	N/A	Oct 73
Increase Production Rate	Jan 74	N/A	Jan 74
Begin AFDT&E Tests	Mar 74	N/A	Feb 74
Fatigue Test - Four Life Times	Jul 74	N/A	Feb 74
First Aircraft to TAC	Nov 74	N/A	Nov 74
Exercise Option for 2nd Wing	Dec 74	N/A	Oct 74
Initial Operational Capability (IOC) A/	Jul 75	Sep 75	Sep 75
Last P-15 MSIP Aircraft	N/A	May 88	Aug 89(CH-1)
—15E			
Contract Award (Letter Contract)	Apr 84	Apr 84	Apr 84
System Integration PDR	Mar 85	N/A	Mar 85
System Integration CDR	Nov 85	N/A	Nov 85
First Flight	Jan 87	Dec 86	Dec 86
Begin Flight Test	Jan 87	N/A	Dec 86
OT&E Start	May 88	Dec 88	Dec 88
OT&E Completion	Jun 89	Sep 89	Sep 89(CH-2)
IOC (F-15E) B/	Jun 89	Sep 89	Sep 89(CH-3)

A/ (U) IOC is the point at which the first squadron received over 50% of its primary aircraft authorization (PAA).

B/ (U) IOC occurs when the First Operational Squadron achieves mission readiness status. Limited IOC occurred in September 1989.

9. ~~(U)~~ Schedule (Continued):

b. ~~(U)~~ Previous Change Explanations --

~~(U)~~ The Engine Qualification Test was reprogrammed for completion by October 1973 versus February 1973 by the Deputy Secretary of Defense in September 1973.

~~(U)~~ The completion dates for Fatigue Test to Three and Four Life Times were rescheduled (from November 1973 and July 1974 to December 1973 and October 1974 respectively) to accommodate increased fatigue spectrum requirements identified by the Scientific Advisory Board. This rescheduling was accomplished in the spring of 1970. These two milestones were then successfully completed ahead of the revised schedule (October 1973 and February 1974 respectively) as no F-15 structural deficiencies were revealed which would require a major redesign and retesting.

~~(U)~~ The initiation of Air Force Development, Test and Evaluation (DT&E) activities occurred ahead of schedule (February 1974 versus March 1974) because Contractor DT&E progressed satisfactorily, allowing aircraft and support resources to be available earlier than planned for the AF DT&E effort.

~~(U)~~ The date to exercise Option for the Second Wing was rescheduled to October 1974 because the full funding date for the FY75 buy was 1 November 1974.

~~(U)~~ The IOC for the first training squadron was delayed from July 1975 to September 1975 due to the strike at McDonnell Douglas.

~~(U)~~ F-15E milestones were added to the SAR in December 1984.

~~(U)~~ Reduced aircraft quantities in FY87/88 due to congressional reductions, delayed IOC (F-15E) by three months.

~~(U)~~ The First Flight of the F-15E occurred on 11 December 1986 (vs Jan 87). The F-15E began flight testing the same month.

~~(U)~~ The last F-15 MSIP aircraft milestone was added to reflect the USD(A) baseline approved 9 Feb 1988.

~~(U)~~ The last F-15 MSIP delivery changed from May 1988 to June 1989 because of a wire braid problem.

~~(U)~~ The F-15E OT&E Start and Completion milestones were added to the SAR in Dec 88.

~~(U)~~ The last F-15 MSIP delivery changed from Jun 89 to Sep 89 because of unavailable/limited MSIP unique parts, resulting from phase-out of MSIP production line.

9. (U) Schedule: (Continued)

c. (U) Current Change Explanations-- (CH-1) The last F-15 MSIP was delivered in August 1989 instead of September 1989. (CH-2) F-15E OT&E completed Sep 89 instead of Dec 89. Test and evaluation requirements were deferred to TAC conducted Follow-on OT&E to accommodate development delays with automatic terrain following and LANTIRN targeting pod development. (CH-3) F-15E limited IOC occurred on 29 September 1989 (Vs Oct 89).

d. (U) References --

(U) Development Estimate:
(1) F-15 A/B/C/D
DCP #19, 15 September 1968; modified by Program Schedule briefed to Secretary of Defense in 1969 and DCP #19B, 24 January 1973.
(2) F-15E
PMD R-P2060(43)/27130F/F-15, dated 19 September 1985.

(U) Approved Program:
DAE Baseline, 30 June 1989

10. (U) Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold	Demon- a/ strated Perf	Current Estimate
a. (U) Technical				
(U) F-15 A/B/C/D				
(U) Thrust to Weight Ratio Take-Off	1.17	N/A/N/A	1.15	1.15
(U) Take-Off Thrust Engine (lbs)				
(U) Max Rated	23470	N/A/N/A	23759	23759
(U) Mil Rated	14120	N/A/N/A	14626	14626
(U) Take-Off Gross Weight (lbs)	40000	41500/41500	41491	41491
(U) Design Mission Radius (NM)	(b)(1)			
(U) Cruise				
(U) Dash				
(U) F-15E AIR-TO-GROUND CONFIGURATION	b/ e/			
(U) Take-Off Gross Weight (lbs)	81000	81000/81000	81000	81000
(U) Mission Radius (NM)				
(U) Hi-Lo-Lo-Hi	620	620/620	N/A	575
(U) Lo-Lo-Lo-Lo	360	360/360	N/A	335

10. (U) Technical/Operational Characteristics: (continued)

	Dev Est	Approved Program Goal/Threshold	Demon- a/ strated Perf	Current Estimate
a. (U) Technical				
(U) F-15E AIR-TO-AIR CONFIGURATION: e/ f/				
(U) Cruise Thrust per Engine 0.8M/SL (lbs)				
(U) Mil Rated	12100	N/A/N/A	N/A	12100
(U) Max Rated	25950	N/A/N/A	N/A	26100(CH-1)
(U) Take-Off Gross Weight (lbs)	62500	N/A/N/A	N/A	63200(CH-1)
(U) Design Mission Radius (NM)				
(U) Cruise	200	N/A/N/A	N/A	200
(U) Dash	215	N/A/N/A	N/A	113(CH-1)
b. (U) Operational				
(U) F-15 A/B/C/D				
(U) Max Speed/Sea Level, Sustained (Mach)	1.2	1.2/1.2	1.16	1.2
(U) Max Speed/At Altitude, Sustained (Mach)	2.3	2.3/2.3	2.3	2.3
(U) Max Speed/Burst (Mach)	2.5	2.5/2.5	2.5	2.5
(U) Take-Off Distance: 50 ft Obstacle (Ft)	2500	N/A/N/A	2313	2313
(U) Landing Distance: 50 ft Obstacle (Ft)	3840	N/A/N/A	3773	3773
(U) System Serial Mean Time Between Failure (Hr)	3.5	N/A/N/A	3.8	3.8
(U) System Operationally Ready Rate (%)	70	N/A/N/A	80	80
(U) Direct Maintenance Man-Hours Per Flight Hour (MMH/FH)	20.8	12.04/12.04	12.04	12.04
(U) Specific Excess Power (Ft/Sec)				
(U) Mach 0.6/5G/10000 FT (A/B)	205	N/A/N/A	343	198
(U) Mach 0.9/1G/10000 FT (A/B)	1055	N/A/N/A	1006	995
(U) Mach 0.9/5G/10000 FT (A/B)	881	N/A/N/A	915	826
(U) Mach 0.9/5G/30000 FT (A/B)	-167	N/A/N/A	-54	-125
(U) Mach 1.6/5G/35000 FT (A/B)	58	N/A/N/A	-88	22
(U) Mach 0.9/5G/35000 FT (A/B)	-564	N/A/N/A	-533	-533
(U) Full Mission Capable Rate	N/A	81%	81%	81%

10. (U) Technical/Operational Characteristics: (Continued)

b. (U) Operational	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
(U) F-15E AIR-TO-GROUND CONFIGURATION b/ e/				
(U) Take-Off Roll (81000 Lbs Gross Weight (Ft)	3590	N/A/N/A	N/A	6300(CH-1)
(U) Max Speed/Sea Level, Sustained (Mach) c/	.97	N/A/N/A	N/A	.97
(U) Max Speed/Sea Level, Sustained (Mil Power) (Mach) c/	.84	N/A/N/A	N/A	.82(CH-1)
(U) Direct Maintenance Man-Hours per flight hour	N/A	11.95/11.95	N/A	11.95
(U) Maximum Sustained Load Factor (G)				
(U) Mil Power/Sea Level d/	3.8	N/A/N/A	N/A	3.8
(U) Max Power/Sea Level d/	7.2	N/A N/A	N/A	7.2
(U) Max Instantaneous/Sea Level with LANTIRN	7.33	N/A/N/A	N/A	7.33
(U) F-15E AIR-TO-AIR CONFIGURATION: e/ f/				
(U) Max Speed/Sea Level, Sustained (Mach)	1.04	1.04/1.04	N/A	1.0
(U) Max Speed at Altitude, Sustained (Mach)	1.76	1.76/1.76	N/A	1.7
(U) Max Speed, Burst (Mach)	1.76	1.76/1.76	N/A	1.7
(U) Thrust to Weight Ratio at Take-Off	.67	N/A/N/A	N/A	.61(CH-1)
(U) Take-Off Distance/50 Ft Obstacle (Ft)	3520	N/A/N/A	N/A	4150(CH-1)
(U) Landing Distance/50 Ft Obstacle (Ft)	5000	N/A/N/A	N/A	5000
(U) Max Instantaneous Load Factor (G) (0.8M/30,000 Ft)	4.5	N/A/N/A	N/A	3.8(CH-1)
(U) Specific Excess Power (Ft/Sec)				
(U) 0.6M/5G/10000 Ft/Max	-700	N/A/N/A	N/A	-840(CH-1)
(U) 0.9M/1G/10000 Ft/Max	550	N/A/N/A	N/A	550
(U) 0.9M/5G/10000 Ft/Max	200	N/A/N/A	N/A	180(CH-1)
(U) 0.9M/5G/30000 Ft/Max	-1650	N/A N/A	N/A	-1750(CH-1)
(U) 1.6M/5G/30000 Ft/Max	-980	N/A/N/A	N/A	-1010(CH-1)
(U) 1.6M/1G/35000 Ft/Max	75	N/A/N/A	N/A	35(CH-1)
(U) 1.6M/5G/35000 Ft/Max	-1250	N/A N/A	N/A	-1310(CH-1)
(U) Full Mission Capable Rate	N/A	80%/80%	N/A	80%

10. (U) Technical/Operational Characteristics: (Continued)
a/ (U) Best and/or most reliable estimate
b/ (U) F-15E Air-To-Ground Configuration: CFTs (Conformal Fuel Tanks), (6) CBU-87, (2) AIM-9, (2) AIM-120, (3) 610 Gal External Fuel Tanks, LANTIRN, Internal ECM
c/ (U) Mid combat weight, stores on, tanks on
d/ (U) Mid combat weight, stores dropped, tanks dropped
e/ (U) Additional F-15E Operational/Technical Characteristics will be provided as they become available.
f/ (U) F-15E Air-To-Air Configuration: CFTs, (4) AIM-9L, (4) AIM-120, Full Ammo, 50% Internal Fuel, F100-PW-220 at Spec Levels

c. (U) Previous Change Explanations --

(U) The current estimate and demonstrated performance for the F-15 A/B/C/D Thrust-to-Weight Ratio at Take-Off was revised from 1.17 to 1.15 to reflect data gathered from the DT&E Program. Basic Air Superiority take-off gross weights are estimated to fall within the weight range of 41,381 to 41,658 pounds.

(U) The demonstrated performance and current estimate for the F-15 A/B/C/D Take-Off Engine Thrust (lbs) and Take-Off and Landing Distances with a 50 Foot Obstacle favorably exceeded a conservative Development Estimate (DE).

(U) The current estimate and demonstrated performance for the F-15 A/B/C/D Take-Off Gross Weight (lbs) was revised from 40,000 to 41,491 and 41,500 respectively to reflect data gathered from the DT&E Program. Basic Air Superiority take-off gross weights are estimated to fall within the weight range of 41,381 to 41,658 pounds.

(U) The demonstrated performance and current estimate of the F-15 A/B/C/D Design Mission Radius (NM) favorably exceeded a conservative Development Estimate (DE).

(U) The demonstrated performance and current estimate for System Serial Mean Time Between Failures of 3.8 hours is based on field data of 18 months after IOC.

(U) System Operational Ready Rate of 70% for the F-15 A/B/C/D reflected in the DE was defined for the end of AF RDT&E. DCP #19, Revision C (5 May 1977) reflected the Air Force approved program of 80% at 18 months after IOC (March 1977). The demonstrated performance and current estimate were measured against the approved program.

(U) MMH/FH for the F-15 A/B/C/D of 20.8 hours reflected in the DE was defined for the end of AF RDT&E. Approved Program for MMH/FH from DCP #19, Revision C (5 May 1977) is 12.26 at 18 months after IOC (March 1977). The actual performance (12.04) measured against the approved program is reflected as the demonstrated performance and current estimate.

10. (U) Technical/Operational Characteristics: (Continued)

c. (U) Previous Change Explanations --

(U) The demonstrated performance and current estimate of the P-15 A/B/C/D Specific Excess Power Operational Characteristics in feet/second changed due to an increase in the weight of the aircraft.

(U) F-15E Operational/Technical Characteristics were added in the 31 December 1984 SAR. Direct Maintenance Man-hours per flight hour added per USD(A) baseline of 9 Feb 1988 for the F-15E.

(U) Correction of a typing error from previous SAR submission (31 December 1984).

(U) Change in take-off gross weight from 41500 to 41491 due to revised estimate.

(U) F-15E Air-to-Air Configuration Full Mission Capable Rate added to reflect DAR baseline.

(U) Change in F-15 Air-To-Ground Configuration: Mission Radius (NM) Hi-Lo-Lo-Hi, and Lo-Lo-Lo-Lo; and F-15 Air-To-Air Configuration: Max Speed, Sea Level, Sustained (Mach); Max Speed at Altitude, Sustained (Mach); Max Speed, Burst, due to revised estimate based upon aircraft weight growth impacts and drag and engine thrust deck updates from wind tunnel and flight test to performance analysis data base.

(U) P-15 A/B/C/D Full Mission Capable Rate revised to include demonstrated performance.

d. (U) Current Change Explanations -- (CH-1) Changes due to revised estimate based on aircraft weight growth impacts and drag and engine thrust deck updates. Data obtained from wind tunnel and flight test in F-15E Air-to-Air configuration and Air-to-Ground configuration.

e. (U) References --

(U) Development Estimate:
(1) F-15 A/B/C/D
DCP #19, 15 September 1968; modified by Program Schedule briefed to Secretary of Defense in 1969 and DCP #19B, 24 January 1973. Air Force Estimates as a result of Source Selection and Contract Definitization.
(2) F-15E
PMD R-P2060(43)/27130P/F-15, dated 19 September 1985. Air Force Estimates as a result of Source Selection and Contract Definitization.

(U) Approved Program:
DAR Baseline, 30 June 1989

11. ~~(U)~~ Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. ~~(U)~~ Cost --			
Development (RDT&E)	$ 1657.8	$ 2452.3	$ 2425.3
Procurement	4333.2	(b)(1)	
Airframe	(1679.1)		
Engines	(832.4)		
Electronics	(866.8)		
Armament	(111.8)		
Other Hardware	(18.2)		
Total Flyaway	(3508.3)		
Peculiar Support	(449.2)		
Initial Spares	(375.7)		
Construction (MILCON) 1/	--		
Total: FY 70 Base-Year $	5991.0		
Escalation	1364.2		
Development (RDT&E)	(120.8)		
Procurement	(1243.4)		
Total Then Year $	7355.2		

1/ The F-15 Program has $131.4M MILCON funding in the primary program PE.

b. ~~(U)~~ Quantities --

Development (RDT&E)	20	20	20
Procurement	729	1074	1074
Total	749	1094	1094

c. ~~(U)~~ Foreign Military Sales -- Sales to Date total 144 aircraft at an estimated cost of $5523.8M, broken out by country as follows:

Country	Quantity	Estimated Cost
Israel	56	$1512.6M
Japan	14	292.6M
Saudi Arabia	74	3718.6M
Total	144	5523.8M

d. ~~(U)~~ Nuclear Costs -- None

11. (U) Program Acquisition Cost (Continued)

e. (U) References --

Development Estimate: (1) F-15 A/B/C/D, DCP #19, 15 September 1968, modified by Program Schedule briefed to Secretary of Defense in 1969 and DCP #19B, 24 January 1973. 2) F-15E, PMD R-P2060(43)/27130P/F-15, dated 19 September 1985.

Approved Program: DAE Baseline, 30 June 1989

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions)

		Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. (U)	Program Acquisition--	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1)	Cost	30137.9	33533.3	30137.9
(2)	Quantity *	1074	1152	1074
(3)	Unit Cost	28.061	29.109	28.061
b. (U)	Current Procurement--	(FY 1990)	(FY 1990 APPN)**	(FY 1991)
(1)	Cost	1443.4	1443.4	1750.8
	Less CY Adv Proc	115.8	115.8	0.0
	Plus PY Adv Proc	100.7	100.7	115.8
	Net Total	1428.3	1428.3	1866.6
(2)	Quantity	36	36	36
(3)	Unit Cost	39.675	39.675	51.850

* This value has been revised to exclude R&D units (20) that are not planned to be part of the inventory objective. The R&D units are not considered fully configured end items for this unit cost calculation.

** Adjusted to reflect FY90 Appropriation Act in accordance with Congressional change to SAR law.

13. (U) Cost Variance Analysis:

a. (U) Summary --(Current (Then-Year) Dollars in Millions)

Development Estimates	RDT&E 1778.6	PROC 5576.6	TOTAL 7355.2
Previous Changes			
Economic	- 16.4	+ 429.7	+ 413.3
Quantity	+ 0.0	+12178.7	+12178.7
Schedule	+ 0.0	+ 1457.5	+ 1457.5
Engineering	+ 1195.2	+ 1495.7	+ 2690.9
Estimating	+ 239.4	- 45.2	+ 194.2
Other	+ 208.6	+ 559.1	+ 767.7
Support	+ 94.1	+ 5312.5	+ 5406.6
Subtotal	+ 1720.9	+21388.0	+23108.9
Current Changes			
Economic	+ 11.1	+ 246.5	+ 257.6
Quantity	+ 0.0	+ 0.0	+ 0.0
Schedule	+ 0.0	+ 0.0	+ 0.0
Engineering	- 52.3	+ 0.0	- 52.3
Estimating	- 27.1	- 0.7	- 27.8
Other	+ 0.0	+ 0.0	+ 0.0
Support	- 1.1	- 502.6	- 503.7
Subtotal	- 69.4	- 256.8	- 326.2
Total Changes	+ 1651.5	+ 21131.2	+22782.7
Current Estimate	3430.1	26707.8	30137.9

13. (U) Cost Variance Analysis: (continued)

a. (U) Summary--(FY 1970 Constant Dollars (Base-Year) in Millions)

	RDT&E	PROC	TOTAL
Development Estimate	1657.8	4333.2	5991.0
Previous Changes			
Quantity	+ 0.0	+ 2819.8	+ 2819.8
Schedule	+ 0.0	+ 221.6	+ 221.6
Engineering	+ 532.6	+ 312.8	+ 845.4
Estimating	+ 87.9	- 60.3	+ 27.6
Other	+ 173.9	+ 445.2	+ 619.1
Support	+ 0.1	+ 1163.0	+ 1163.1
Subtotal	+ 794.5	+ 4902.1	+ 5696.6
Current Changes			
Quantity	+ 0.0	+ 0.0	+ 0.0
Schedule	+ 0.0	+ 0.0	+ 0.0
Engineering	- 17.5	+ 0.0	- 17.5
Estimating	- 9.0	+ 0.9	- 8.1
Other	+ 0.0	+ 0.0	+ 0.0
Support	- 0.5	- 107.5	- 108.0
Subtotal	- 27.0	- 106.6	- 133.6
Total Changes	+ 767.5	+ 4795.5	+ 5563.0
Current Estimate	2425.3	9128.7	11554.0

13. (U) Cost Variance Analysis:

b. (U) Previous Change Explanations --

(U) RDT&E

Economic: Revised Economic Escalation Indices

Engineering: Closeout engine development and system test and development. Requirements beyond baseline program. AMRAAM Integration, deletion of conformal fuel tanks (CFTs). Flight test and F-15 enhancements added. F-15E development, Augmented MSIP development and Advanced Derivative Engine (ADE) Integration effort added. MER-200P Rack. Fiscal Year (FY) 84 reprogrammings for increased air-to-ground capability for C/D aircraft and for incorporation of Very High Speed Integrated Circuitry (VHSIC). FY 83 reprogramming is based on a reduction in scope of the HAVE TALON program. Upgrade of radar capability to counter evolving Electronic Counter Measures (ECM) capabilities. Integration of a Common Data Transfer Module. Development of Advanced Avionics Software and Electronic Counter-Countermeasures (ECCM) compatability. Development of Mission Support System (MSS), HAVE QUICK Capability, Multi-Source Integration and Global Positioning System (GPS). Development of new central computer for VSHIC technology. Development cost for integration of expanded weapons, F-15E nuclear certification, Short Range Attack Missile (SRAM T), Low Altitude Navigation Target Infra Red for Night (LANTIRN), Standard Crash Survivable Data Recorder (SCSDR), other F-15E avionics capabilities. Development of new improved F-15E vertical tail.

Estimating: Reestimate of procurement program initial spares, engines, ECO, radar and Tactical Electronic Warfare Sets (TEWS). Withdrawal of Rapid Deployment Forces Funds. Revised estimating factors for Aerospace Ground Equipment (AGE) and training spares. Additional requirements for systems engineering/management, flight test, Government Furnished Equipment (GFE) to support testing and electronic warfare support. Adjustment for change in escalation indices of years prior to the budget year. Reestimate of Programmable Signal Processor (PSP) Improvements, Aircraft Structural Life Assessment Program, Empennage Improvement Program, and C/D MSIP efforts. Adjustments to current and prior years due to funding constraints and changes in escalation indices. Qualification of Second Source for the new Inertial Navigation System (INS). Revised Estimates for Flight Test, Mission Support, C/D Multi-Staged Improvement Program (MSIP) development, ECCM improvements and the Improved Performance Engine (IPE). Revised estimates for Mission Support, Flight Test, C/D MSIP and Augmented MSIP Programs, AN/ALQ-135 Update program, Operational Flight Program (OFP) Updates, Radio Frequency (RF) Interoperability Program, Improved Performance Engine (IPE) Integration, Inertial Navigation System (INS) Second Source Qualification, Very High Speed Integrated Circuitry (VHSIC), RDT&E Estimating Methodology, SRAM-T, and Vertical Tail development.

Other: Deletion of engine procurement by the Navy; Component Improvement Program (CIP) transferred from Procurement to Development; McDonnell Douglas Cost Overrun.

Support: Avionics Integrated TEWS RDT&E transferred to another program element. Initial Spares reduction. Additional Peculiar Support equipment (PSE). Definitization of training, PSE, engine and airframe spares. Additions for CFTs, Tangential Carriage CFTs, Electronic Warfare Support requirements, and C/D MSIP simulator changes. Development effort to support electronic module testing -- Memory Module Test Station (MMTS) and APG-70 Radar Module Test Station (RMTS). Revised estimate for TEWS

13. (U) Cost Variance Analysis:

b. (U) Previous Change Explanations --

Support (Continued):

Intermediate Support System (TISS) and C/D MSIP Simulators. Development effort associated with providing Interim I-Level (Intermediate Level) support for the Radar Warning Receiver (RWR). Revised estimates for Support Equipment Development, TEWS Intermediate Support System (TISS), Simulator Development, Memory Module Test Station (MMTS) development and Radar Module Test Station (RMTS) development. Deletion of Radar module Test Station from development funding.

~~(U)~~ Procurement

Economic: Revised Economic Escalation Indices

Quantity: Changes in F-15 aircraft procurement quantities. Correcting entries due to the recalculation of the 31 December 1983 and 1984 SARs (Quantity, Schedule, and Quantity-related Changes).

Schedule: F-15 aircraft production rate changes. Rephasing of JTIDS (Joint Tactical Information and Distribution System) Program. Schedule changes associated with quantity changes. Correcting entries due to the recalculation of the 31 December 1983 and 1984 SARs (Quantity, Schedule, and Quantity-related Changes). Rephased schedule correcting entries due to recalculation of the 31 December 1983 and 1984 SARs. Schedule change to peak procurement rate of 48 aircraft/year in the FY87 PB. Schedule change to peak procurement rate of 42 aircraft/year in the FY88 PB. FY89 PB reduced quantity to 30 aircraft per year. Schedule acceleration from 30 to 36 aircraft per year; change in completion date from 1998 to 1994 and from 1994 to 1991.

Engineering: Closeout engine development and system test and development. Requirements beyond baseline program. AMRAAM (Advanced Medium Range Air-to-Air Missile) integration. Deletion of CFTs. Additional flight testing, addition of MER-200P Rack, F-15 Enhancements, Alternate Fighter Engine (AFE), ADE, F-15E, Augmented MSIP, and Tangential Carriage CFTs. Engineering changes associated with quantity changes. Correcting entries due to the recalculation of the 31 December 1983 and 1984 SARs (Quantity, Schedule, and Quantity-related Changes). Transfer of JTIDS (Joint Tactical Information and Distribution System) procurement funding to retrofit. Addition of Linear Linkless Ammunition System and Tangential Carriage CFT (Conformal Fuel Tank) Ejector Unit. Incorporation of Global Positioning System (GPS) Group A aircraft modifications, Short Range Attack Missile (SRAM II) adapters to F-15E.

Estimating: Reestimate of procurement program, initial spares, engines, ECO, radar, TEWs, and Countermeasures Dispenser Sets (CMDs). Withdrawal of Rapid Deployment Forces Funds. Revised estimating factors for AGE and training spares. Reduced ECO for congressional reduction to fund Peacekeeper. OSD-directed reduction to engine ECO and warranty. Reestimate to reflect savings from CFT competition and Configured Engine Bay (CEB). Revised estimate of multiyear procurement estimate of requirements and savings. Adjustment for change in escalation indices for years prior to the budget year. Estimating changes associated with quantity changes. Correcting entries due to the recalculation of the 31 December 1983 and 1984 SARs (Quantity, Schedule, and Quantity-related Changes). Base Year only correction to the 31 December 1983 SAR for adjustment for prior year escalation and deescalation of Advance Buy Then Year $ (TY$). Recategorization associated with balancing the corrections

13. (U) Cost Variance Analysis:

b. (U) Previous Change Explanations --

Estimating (Continued):
made to the 31 December 1983 and 1984 SARs (revised estimate amount previously netted in the original cost changes). Propulsion Estimating Methodology Change. Augmented MSIP (Multi-Staged Improvement Program) and F-15E nonrecurring cost decrease due to actuals coming in at a lower than expected cost. Increase in F-15E CFT cost due to deletion of F-15 C/D CFTs. Withdrawal of Contingent Liability Funding by Higher Headquarters. Revision of F-15 Program Estimating methodology. Adjustment to refine the mix of previous support and estimating category changes primarily related to the impact of escalation changes on current and prior years. Reprogrammings and Funding withdrawals to include: Reprogramming to fund purchase of Avionics Systems, funds withdrawal for Contra Aid, turn-in of excess program funds and FY86 Gramm-Rudman reductions. Revised program estimate based on "Should Cost" study. Deferral of R&M improvements to Radar Warning Receiver and engineering changes. Revised engine estimate to incorporate competition impacts. Revised estimate of F-15E non-recurring, and recurring flyaway cost. Incorporation of multi-year acquisition strategy. Deletion of multi-year acquisition strategy.

Other: Deletion of engine procurement by the Navy. CIP (Component Improvement Program) transferred from avionics procurement to development. McDonnell Douglas Cost overrun.

Support: Avionics integrated TEWs RDT&E transferred to another program element. Initial Spares reduction. Additional PSE (Peculiar Support Equipment). Definitization of training, PSE and engine and airframe spares. Addition for CFTs, F-15E training, PSE, Data and Initial Spares requirements. Reprogrammings based on reductions in prior years to actual requirements and a reduction in management reserve. Adjustments for impact of inflation index changes on current and prior years. Initial Spares and other support requirement changes associated with quantity changes. PSE reduction. Correcting entry due to the recalculation of the 31 December 1983 SAR (Quantity, Schedule, and Quantity-related Changes). Deletion of AGETS (Automated Ground Engine Test Sets) and F-15 C/D CFTs. Revised Training requirement based on new schedule and additional requirements for the IPE (Improved Performance Engine). Revision of out-year estimate for PGSE (Peculiar Ground Support Equipment) and additional requirements for the IPE. Discrete estimate of out-year Data requirements. Revised Initial Spares requirements due to directed redefinition of the Initial Spares budgetary process. Adjustment to refine the mix of previous support and estimating category changes primarily related to the impact of escalation changes on current and prior years. FY86 Gramm-Rudman reduction. Revised estimates for F-15E Simulators, F-15E Cockpit/Egress Procedures Trainers (CPT/EPT), training engines, engine Aerospace Ground Equipment (AGE), Sustaining Engineering requirements, TEWS Depot, Avionics Depot, C/D MSIP Avionics Intermediate Shop (AIS) Mobile Shelter requirements, Avionics Intermediate Shop/Mobile Electronics Test Set (AIS/MBTS) and Initial Spares requirements. Refinement of Maintenance Training Equipment (MTE) requirements and required Aerospace Ground Equipment (PAGELs) for the F-15E. Restructure of TEWS Intermediate Support System (TISS) requirements. Definition of F-15E Mechanical Depot requirement. Deferral of maintenance and depot support equipment. Revised estimate of F-15E support requirements, such as weapon system trainers, TPE-19. Deletion of support requirements due to reduction of 78 aircraft.

13. ~~(U)~~ Cost Variance Analysis:

c. (U) Current Change Explanations--

	(Dollars in Millions) Base-Year $	Then-Year $
(1) (U) RDT&E		
Revised economic escalation indices (Economic).	$ N/A	$ + 11.1
Adjustment for current and prior year escalation indices change (Estimating).	- 0.2	- 0.8
F-15E SRAM T integration funding transferred to Program Element 0604245F SRAM T Engineering Development (Engineering)	- 17.5	- 52.3
Revised estimate for flight test, Improved Performance Engine incorporation, Low Altitude Navigation Target Infra Red for Night (LANTIRN) system integration, and other development activities (Estimating).	- 8.8	- 26.3
Revised estimate of Mission Support System II (MSS II) (Support).	- 0.5	- 1.1
(2) ~~(U)~~ Procurement		
Revised economic escalation indices (Economic).	$ N/A	$ + 246.5
Adjustment for current and prior year escalation indices change (Estimating).	- 22.6	- 100.6
Revised estimate of F-15E recurring flyaway costs (Estimating).	+ 24.9	+ 105.8
Revised estimate of F-15E nonrecurring costs (Estimating).	- 1.4	- 5.9
Adjustment of current and prior year escalation indices (Support).	- 5.9	- 25.6
Revised estimates of initial spares requirement (Support).	- 12.6	- 59.0
Revised peculiar support requirement estimates. (Support)	- 80.5	- 377.1

13. (U) Cost Variance Analysis

c. (U) Current Change Explanations--

	(Dollars in Millions) Base-Year $	Then-Year $
(2) (U) Procurement (continued)		
Revised peculiar support estimate of Avionics Intermediate Shop (AIS) mobile shelters, Priced Aerospace Ground Equipment List, and other support equipment updates (Support).	$ - 8.5	$ - 40.9

14. (U) Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

(U) Initial SAR Estimate to Current Estimate

	Changes(Then-Year Dollars in Millions)								
PAUC (Initial SAR/Dev Est)*	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	PAUC Current Estimate)
10.089	+0.625	+8.099	+1.357	+2.456	+0.155	+4.565	+ 0.715	+17.972	28.061

* These unit cost values have been revised to exclude R&D units(20) that are not planned to be a part of the inventory objective. The R&D units are not considered fully configured end items for these calculations.

15. (U) Contract Information: (Then-Year Dollars in Millions) C/

a. (U) RDT&E -- NONE

b. (U) Procurement

	Initial Contract Price		
	Target	Ceiling	Qty
Engines Buy			
United Technologies, Pratt & Whitney, West Palm Beach, FL	$ 896.9	$ N/A	258

F33657-84-C-2014, FFP
Award: February,1984 (CPR or C/SSR not required)
Definitized: February, 1984

Current Contract Price			Estimated Price at Completion A/	
Target	Ceiling	Qty	Contractor	Program Manager
$ 1308.1	$ N/A	501	$ 1308.1	$ 1308.1

	Initial Contract Price		
	Target	Ceiling	Qty
FY86C/D/E Aircraft Buy			
McDonnell Douglas, St. Louis, MO	$1000.9	$ N/A	48

F33657-86-C-2001, FFP
Award: April 29, 1987 (CPR or C/SSR not required)
efinitized: April 29, 1987

Current Contract Price			Estimated Price at Completion A/	
Target	Contract	Qty	Contractor	Program Manager
$1396.1	$ N/A	48	$1396.1	$1396.1

	Initial Contract Price		
	Target	Ceiling	Qty
FY87 E Aircraft Buy			
McDonnell Douglas, St. Louis, MO	$872.5	$ N/A	42

F33657-87-C-2027, FFP
Award: March 1, 1988 (CPR or C/SSR not required)
Definitized: March 1, 1988

Current Contract Price			Estimated Price at Completion D/	
Target	Ceiling	Qty	Contractor	Program Manager
$1071.0	$ N/A	42	$1071.0	$1071.0

15. (U) Contract Information: (continued) (Then-Year Dollars in Millions)

b. (U) Procurement (continued)

	Initial Contract Price		
	Target	Ceiling	Qty
FY88 E Aircraft Buy	$880.0	$ N/A	42

McDonnell Douglas, St. Louis, MO
F33657-88-C-2022, FPP
Award: December 13, 1988 (CPR or C/SSR not required)
Definitized: December 13, 1988

Current Contract Price			Estimated Price at Completion A/	
Target	Ceiling	Qty	Contractor	Program Manager
$899.7	$ N/A	42	$899.7	$899.7

	Initial Contract Price		
	Target	Ceiling	Qty
F-15E/AMSIP/Prod Nonrecurring	$ 373.4	$ 416.3	N/A

McDonnell Douglas, St. Louis, MO
F33657-84-C-2228, FPIF
Award: March 11, 1985
Definitized: March 11, 1985

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager A/
$ 521.6	$ 586.3	N/A	$ 586.3	$ 586.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -80.5	$ -25.2
Cumulative Variances to Date (10/30/89)	-85.2	- 9.8
Net Change	- 4.7	+15.4
Cumulative Variance Change Percentage	- 5.8%	+61.1%

Explanation of Change:

(U) The cumulative cost variance is driven by the underestimation of the structural changes required for the 9G wing loads requirement, Built-Up Low Cost Advanced Titanium Structure (BLATS) technology incorporation and the Internal Countermeasures Set (ICS) changes. The cum schedule variance is driven by late delivery of avionics CPE which are being incorporated into P-15E No. 3. Sufficient funds are budgeted to cover the goverment's share of the overrun. Impact: Increased cost due to changes for BLATS and ICS are nonrecoverable. No impact to major program milestones. Contract at Ceiling. No additional impact to program cost.

15. (U) Contract Information: (continued) (Then-Year Dollars in Millions)

	Initial Contract Price		
	Target	Ceiling	Qty
Band 3, Internal Countermeasures Set (ICS) Lot III	$ 304.3	$345.7	129

Northrop Corporation, Rolling Meadows, IL
F33657-87-C-2029, FPIF
Award: August, 1987
Definitized: August, 1987

Current Contract Price			Estimated Price at Completion B/	
Target	Ceiling	Qty	Contractor	Program Manager
$ 318.2	$ 361.4	121	$ 342.8	$ 346.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -9.9	$ +12.7
Cumulative Variances to Date (10/31/89)	-22.9	+13.6
Net Change	-13.0	+0.9
Cumulative Variance Change Percent	-131.3%	+ 7.1%

Explanation of Change:

(U) The change in the cumulative cost variance is due primarily to unplanned effort involving printed wire boards (PWBs). Northrop must now manufacture these PWBs in-house as opposed to vendor procurement. The schedule variance is driven by a Management Control System procedure that schedules BCWS at usage and BCWP at receipt. Northrop is behind in deliveries; however, BCWP is being taken as material is received. A MCS Description change is in process to correct this faulty procedure. Impact: No impact to major program milestones.

c. (U) MILCON -- NONE

A/ Change in Estimate at Completion is due to further definitization of the contract.

B/ The variance between the contractor and Program Manager Estimated Price at Completion reflects different methodology in arriving at the estimated price at completion.

C/ Reporting change to the six largest contracts represent incorporation of Internal Countermeasures Set Lot III and deletion of contract F33657-83-C-0043 which is more than 95% complete.

D/ Change in Current Contract Price and Estimate at Completion is due to addition of Tactical Electronic Warfare System (TEWS) Intermediate Support System production buy, 29 Sep 1989.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status --

(1) Percent Program Completed: 80.0% (24yrs/30yrs)

(2) Percent Program Cost Appropriated: 92.1% ($27768.9M/$30137.9M)

b. (U) Appropriation Summary --

	(Then Year Dollars in Millions)				
Appropriation	Prior Years (FY67-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-96)	Total
RDT&E	$ 3131.9	$ 86.3	$ 89.1	$ 122.8	$ 3430.1
Procurement	$ 23107.3	$ 1443.4	$ 1750.8	$ 406.3	$ 26707.8
MILCON	$ --	$ --	$ --	$ --	$ --
Total	$ 26239.2	$ 1529.7	$ 1839.9	$ 529.1	$ 30137.9

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

c. (U) Annual Summary --

FISCAL YEAR	BASE-YEAR DOLLARS QTY	FLYAWAY FY70 DOLLARS NONREC	FLYAWAY FY70 DOLLARS REC	TOTAL BASE YEAR	TOTAL THEN-YEAR DOLLARS PROGRAM	OBLIGATED 1/	EXPENDED 1/	ESCL RATE (%)
APPROPRIATION: RDT&E								
1967	--	--	--	1.1	1.0	1.0	1.0	3.2
1968	--	--	--	1.1	1.0	1.0	1.0	3.7
1969	--	--	--	78.2	75.5	75.5	75.5	3.5
1970	--	--	--	175.1	175.1	175.1	175.1	3.6
1971	--	--	--	338.3	349.5	349.5	349.5	3.3
1972	--	--	--	397.1	422.9	422.9	422.9	3.1
1973	--	--	--	408.6	454.4	454.4	454.4	4.4
1974	--	--	--	223.8	258.0	258.0	258.0	3.7
1975	--	--	--	154.2	184.2	184.2	184.2	3.6
1976	--	--	--	28.2	34.9	34.9	34.9	3.6
197T	--	--	--	3.9	5.3	5.3	5.3	4.4
1977	--	--	--	43.3	59.6	59.6	59.6	4.6
1978	--	--	--	41.7	61.1	61.1	61.1	7.0
1979	--	--	--	7.2	11.7	11.7	11.7	8.4
1980	--	--	--	1.4	2.5	2.5	2.5	9.4
1981	--	--	--	5.8	11.6	11.6	11.6	11.9
1982	--	--	--	15.6	33.3	33.3	33.3	9.2
1983	--	--	--	50.8	114.0	114.0	114.0	4.9
1984	--	--	--	54.2	126.2	126.2	126.2	3.8
1985	--	--	--	79.4	190.8	190.8	190.8	3.4
1986	--	--	--	88.7	218.9	218.9	218.9	2.8
1987	--	--	--	61.7	157.0	157.0	122.8	2.7
1988	--	--	--	37.4	98.6	98.6	65.2	3.1
1989	--	--	--	30.7	84.8	80.7	21.9	4.2
1990	--	--	--	30.2	86.3	3.7	.2	4.0
1991	--	--	--	29.9	89.1			4.2
1992	--	--	--	12.2	37.8			4.0
1993	--	--	--	7.4	23.7			3.7
1994	--	--	--	7.2	23.9			3.4
1995	--	--	--	7.9	26.8			3.1
1996	--	--	--	3.0	10.6			3.1
1997	--	--	--	0.0				
1998	--	--	--	0.0				
SUBTTL	20	--	--	2425.3	3430.1	3131.5	3001.6	

1/ Reflects Program Office records as of 31 December 1989.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

c. (U) Annual Summary --

FISCAL YEAR	BASE-YEAR DOLLARS				THEN-YEAR DOLLARS			
	QTY	FLYAWAY FY70 DOLLARS		TOTAL BASE YEAR $	PROGRAM	OBLIGATED 1/	EXPENDED 1/	ESCL RATE %
		NONREC	REC					
APPROPRIATION: PROCUREMENT								
1973	30	3.3	269.6	344.5	478.1	478.1	478.1	7.9
1974	62	15.4	425.7	575.2	903.1	903.1	903.1	10.7
1975	72	1.6	434.4	542.1	927.0	927.0	927.0	13.8
1976	108	11.4	649.4	828.2	1522.3	1522.3	1522.3	12.5
197T	24	4.8	135.1	163.1	322.2	322.2	322.2	5.3
1977	108	6.1	617.0	712.1	1418.6	1418.6	1418.6	5.0
1978	97	3.5	598.3	711.6	1517.2	1517.2	1517.2	7.4
1979	78	0.7	435.0	536.5	1386.8	1386.8	1386.8	8.7
1980	60	--	330.6	365.1	1056.6	1056.6	1056.6	9.7
1981	42	--	261.5	349.4	1101.8	1101.8	1101.8	11.9
1982	36	--	260.2	346.2	1148.5	1148.5	1148.5	9.6
1983	39	7.1	288.0	417.4	1467.7	1467.7	1467.7	9.0
1984	36	33.2	276.8	394.3	1446.0	1446.0	1446.0	8.0
1985	42	30.9	328.4	529.5	2003.9	2003.9	2003.9	3.4
1986	48	16.3	334.8	446.6	1738.2	1719.0	1525.4	2.8
1987	42	2.1	306.5	416.7	1690.8	1690.8	1471.1	2.7
1988	42	7.2	279.2	357.6	1508.5	1413.5	912.3	3.1
1989	36	11.3	281.1	331.5	1470.0	684.9	190.1	4.2
1990	36	7.2	269.7	313.2	1443.4	7.4	0.0	4.0
1991	36	18.4	268.4	366.4	1750.8			4.2
1992	0	11.1	0.0	60.4	298.7			4.0
1993	0	7.0	0.0	21.1	107.6			3.7
1994	0	0.0	0.0	0.0	0.0			
1995	0	0.0	0.0	0.0	0.0			
1996	0	0.0	0.0	0.0	0.0			
1997	0	0.0	0.0	0.0	0.0			
1998	0	0.0	0.0	0.0	0.0			
SUBTTL	1074	198.6	7049.7	9128.7	26707.8	22215.4	20798.7	
TOTAL	1094	198.6	7049.7	11554.0	30137.9	25346.9	23800.3	

1/ Reflects Program Office records as of 31 December 1989.

17. (U) Production Rate Data:

a. (U) Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate 1/	Current Estimate	Maximum Economic 2/
1973	30	30	30	30
1974	77	62	62	62
1975	144	72	72	72
1976	144	108	108	108
1977T		24	24	24
1977	144	108	108	108
1978	144	97	97	97
1979	46	78	78	78
1980		60	60	60
1981		42	42	42
1982		36	36	36
1983		39	39	39
1984		36	36	36
1985		42	42	42
1986		48	48	48
1987		48	42	42
1988		48	42	42
1989		48	36	36
1990		48	36	36
1991		48	36	36
1992		48	0	
1993		48	0	
1994		48	0	
1995			0	
1996			0	
1997			0	
1998			0	

1/ A Production Estimate Baseline was not required for SAR reporting at the time the F-15 Program completed the DSARC III process. As a result, the Production Estimate Baseline was established from the Current Program Estimate for the 31 December 1985 SAR.

2/ Maximum Economic quantity in 1991 is constrained by buy out of program.

17. ([illegible]) Production Rate Data:

b. ([illegible]) Cost Variance -- Dollars in Millions

Item	Production Estimate	Change (Cur Est Less Prod Est)	Current Estimate	Change (Cur Est Less Maximum)	Maximum Economic
Prog Acq Cost (BY$)	13167.2	-1613.2	11554.0	+ 0	11554.0
Prog Acq Cost (TY$)	37978.5	-7840.6	30137.9	+ 0	30137.9
PAUC (BY$) *	10.401	+.357	10.758	+ 0	10.758
PAUC (TY$) *	29.999	-1.938	28.061	+ 0	28.061

* This value has been revised to exclude R&D units (20) that are not planned to be part of the inventory objective. The R&D units are not considered fully configured end items for this unit cost calculation.

c. ([illegible]) Schedule Variance --

	Production Estimate	Change (Cur Est Less Prod Est)	Current Estimate	Change (Cur Est Less Maximum)	Maximum
Start Date (Mon/Yr)**	Oct 1972	N/A	Oct 1972	N/A	Oct 1972
Duration (In Months)	284	-36	248	0	248
End Date (Mon/Yr)**	Apr 1996	N/A	May 1993	N/A	May 1993

** Start date for all estimates is defined as of the Production Approval Decision for the F-15A Program. The End Date is the month that the last delivery of aircraft will take place.

d. ([illegible]) Deliveries (Plan/Actual) --

	To Date
RDT&E	20/20
Procurement	948/949***

*** Reflects program office records as of 31 December 1989

18. (U) Operating and Support Costs:

a. The O&S cost estimate for the F-15E program was developed using the Cost Oriented Resourse Estimating (CORE) model (as defined in AFR 173-13). FY 87 factors were applied to the CORE model to develop the annual squadron costs by command. The concept of operation is an 18 aircraft trainer squadron flying each fighter at 367.2 hours per year and a 24 aircraft operational squadron flying each fighter at 480 hours per year. This estimate is based on a fleet of 278 fighters as of Oct 88.

b. F-15E Operating & Support Costs (FY 88$ IN MILLIONS)

	TAC TRAINING	TAC	USAFE	PACAF	TOTAL
UNIT MISSION PERSONNEL	$25.5	$23.3	$23.6	$24.3	$96.7
UNIT LEVEL CONSUMPTION	$16.5	$27.7	$26.8	$30.3	$101.3
DEPOT MAINTENANCE	$5.5	$9.3	$9.3	$9.3	$33.4
SUSTAINING INVESTMENT	$18.4	$30.6	$30.6	$30.6	$110.2
INSTALLATION SUPPORT PERSONNEL	$3.9	$3.6	$3.6	$2.6	$13.7
INDIRECT PERSONNEL SUPPORT	$6.7	$6.2	$8.9	$9.5	$31.3
DEPOT NON-MAINTENANCE	$0.2	$0.3	$0.3	$0.3	$1.1
PERSONNEL ACQUISITION AND TRNG	$2.3	$2.3	$2.2	$2.4	$9.2
ANNUAL SQUADRON COST	$79.0	$103.3	$105.3	$109.3	$396.9
*NUMBER OF SQUADRONS 1/	2.0	6.0	2.0	3.0	
ANNUAL COMMAND COST	$158.0	$619.8	$210.6	$327.9	$1316.3

1/ There are 18 PAA aircraft in the Training Squadron
There are 24 PAA aircraft in Operational Squadrons

c. Contractor Support Costs --

(Then-Year Dollars in Millions)

	FY 1989 & PRIOR	FY 1990 YEAR	FY 1991 YEAR	BALANCE TO COMPLETE	TOTAL
O&M (AF)	75.2	49.5	55.3	TBD	180.0
Industrial Fund	51.6	29.0	30.3	TBD	110.9
Total	126.8	78.5	85.6	TBD	290.9

D. AF-13 F-16

SAR-89-053

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A) 823)

PROGRAM: F-16

AS OF DATE: December 31, 1989

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MAR 1 1990 18
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

1. Designation and Nomenclature (Popular Name): F-16 Multimission Fighter (Fighting Falcon)

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

F-16 System Program Office
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433-6503

Brig Gen Ralph H. Graham
Assigned: July 1, 1989
AV 785-6151; COMM (513)255-6151

4. Program Elements/Procurement Line Items:

RDT&E: PE0207133F
PROCUREMENT: PE0207133F APPN: 3010 ICN F016AD

5. Related Programs:

Advanced Medium Range Air-to-Air Missile (AMRAAM), Low Altitude Navigation and Targeting Infrared for Night (LANTIRN), Airborne Self-Protection Jammer (ASPJ), Global Positioning System (GPS), On Board Oxygen Generation System (OBOGS), 30MM Gun Pod (GPU 5/A), Harpoon Interface Adapter Kit (HIAK), F-16 Mid-Life Update, Automatic Target Handoff System (ATHS), Seek Eagle, High Speed Antiradiation Missile (HARM), and Advanced Tactical Air Reconnaissance System (ATARS).

6. Mission and Description:

The F-16 Multimission Fighter is a single engine, lightweight, high performance aircraft, powered by a 25,000 pound thrust class afterburning turbofan engine. It is a tactical fighter aircraft with an air-to-air and air-to-surface, multi-role capability that can be deployed from the continental U.S. to any possible trouble area of the world with minimum enroute support and with

gh reliability and simplified maintenance procedures to assure successful erations under austere conditions. The F-16 Program is part of the continuing modernization of U.S. tactical fighters to reverse the upward trend in higher total investment and operating and support costs. The F-16 is employed in a complementary role to the F-15 in counter air missions, and to supplement the surface attack capabilities of the F-4, F-111, and A-10.

7. Program Highlights:

a. Significant Historical Developments--The F-16 received Secretary of Defense approval for program initiation in August 1971. DSARC I approval occurred in December 1974 and the full scale development contract was awarded in January 1975. The United States and four European countries (Belgium, Denmark, The Netherlands, and Norway) signed a memorandum of understanding for F-16 co-production in June 1975. Approval for long lead procurement was given at DSARC III A in January 1977 and production approval was given at DSARC III B in October 1977. The first aircraft delivery to Tactical Air Command occurred in September 1978 and Hill AFB activated the first F-16 squadron in February 1979. The USAF initial operational capability was reached in October 1980. In March 1985, the last of 785 F-16A/B aircraft were delivered to the USAF. Program management responsibility transfer (PMRT) from Air Force Systems Command to Air Force Logistics Command, for the F-16A/B aircraft, occurred on 1 October 1985. Air Force Systems Command retains responsibility for the continuing F-16C/D program. The 2000th F-16 was delivered to the Republic of Singapore Air Force in February 1988. We formally surpassed the three-digit radar reliability threshold in terms of Mean Flight Time Between Maintenance Actions in September 1988 with a three month moving average of 03 hours.

b. Significant Developments Since Last Report--A total of 798 F-16C/D aircraft have been delivered to the USAF by the end of CY89 and the F-16C/D is operational at sixteen USAF bases. The F-16 is now operated by air forces of 17 different friendly nations, including the original European Participating Governments. The USAF F-16 world wide fleet surpasses 2.4M flying hours and remains the safest single engine fighter in USAF history. Both the F-16A/B as well as the C/D series continue to meet or exceed operational and supportability requirements. The High-Speed Antiradiation Missile (HARM) completed phase II flight test program for the integration of HARM onto the Block 30 aircraft. The 30MM gunpod (GPU-5A) accelerated program was completed in June 1989. Integration was accomplished at the 174th TFW at Syracuse, New York, where all their F-16s are fully capable of employing the GPU-5A weapon.

The F-16 continues to meet its current mission requirements.

The F-16 production rate has been set contractually (Multiyear III) at 150 aircraft per year for Fiscal Year (FY) 1990 through 1993.

c. Changes Since "As of" Date -- None

8. Threshold Breaches:

There are currently no DAE Baseline, 31 December 1988 thresnold breaches

9. Schedule:

a.

F-16A/B Milestones	Development Estimate	Approved Program	Current Estimate
Complete Competitive Flight Test	Dec 74	NA	Dec 74
Award Development	Jan 75	NA	Jan 75
DSARC II	Mar 75	Apr 75	Apr 75
Radar Contractor Selection	Jan 76	NA	Nov 75
First FSD Flight	Dec 76	NA	Dec 76
DSARC IIIA	Jan 77	Jan 77	Jan 77
DSARC IIIB	Sep 77	Oct 77	Oct 77
First Flight, Production Aircraft	Aug 78	NA	Aug 78
First Aircraft to TAF	Sep 78	Sep 78	Sep 78
Deliver 100th Production Aircraft to USAF	May 80	NA	May 80
F-16A/B PMRT	NA	NA	Oct 85
F-16C/D Milestones			
Begin MSIP I (Blk 15)	Feb 80	NA	Feb 80
Program Direction-MSIP II	Dec 80	NA	Dec 80
Begin MSIP II (Blk 25/30)	May 81	NA	May 81
MSIP I First Delivery	Nov 81	NA	Nov 81
Deliver First F-16C to USAF	Jul 84	NA	Jul 84
Initial F-16C/D Delivery to TAC	Dec 84	Dec 84	Dec 84
First Delivery Block 40	Dec 88	NA	Dec 88
LANTIRN Nav Pod Inst	Oct 89	NA	Oct 89
LANTIRN Tgt Pod Inst	Oct 90	NA	Oct 90
First Blk 50 Delivery	Oct 91	NA	Oct 91

b. Previous Change Explanations --

F-16A/B
Program Management Responsibility Transfer (PMRT) date.

F-16C/D
Integration of F-16C/D (MSIP) milestones into the December 1988 SAR.
First Delivery Block 40
LANTIRN Nav Pod Inst
LANTIRN Tgt Pod Inst
First Blk 50 Delivery

c. Current Change Explanations

None.

d. References --

F-16A/B

Development Estimate: Decision Coordinating Paper (DCP) #143, 10 March 1975 (For Coordination - Revised).
Approved Program DAE Baseline, 31 December 1988.

F-16C/D

Development Estimate: F-16 Multinational Staged Improvement Program baseline (December 1985).
Approved Program: DAE Baseline, 31 December 1988

10. Technical/Operational Characteristics:

	Dev Est	Approved Program Goals/ Thresholds	Demonstrated Performance	Current Estimat
a. Technical				
F-16A/B				
(1) Sustained Turn Rate, 30,000 ft.				
Mach 1.2 (Deg per sec)	6.5	NA	6.4	6.0
(Max Attainable Gs)	4.3	NA	4.3	4.0
Mach 0.9 (Deg per sec)	8.7	NA	8.1	8.1
(Max Attainable Gs)	4.3	NA	4.1	4.1
F-16C/D				
(2) Sustained Turn Rate, [5] 30,000 ft., Air-to-Air.				
Mach 1.2 (Deg per sec)	5.1	5.1	5.4 (CH-1)	5.4 (CH-1)
Mach 0.9 (Deg per sec)	7.3	7.3	7.3 (CH-1)	7.3 (CH-1)
(3) Sustained Turn Rate, [3][5] 200 ft., Air-to-Ground.				
500 KTAS (Deg per sec)	6.6	6.6	7.1 (CH-1)	7.1 (CH-1)
b. Operational				
F-16A/B				
(1) Mission Reliability (%)	85	NA	87 (CH-1)	87 (CH-1)
(2) Mean Flight Time Between Maint Actions(MFTBMA) (Hrs)	1.75	NA	3.05	3.50
(3) Air-to-Air Mission				
No./wt. per Missile	2/169	NA	2/195	2/195
No./wt. of Ammo	500/280	NA	500/280	500/280
(4) Air-to-Ground Mission				
No./wt. of Weapon	2/2000	NA	2/1970	2/1970
No./wt. of ECM Pod	1/392	NA	1/675	1/675
(5) Max Sustained Speed (Mach)				
Sea Level, Air-to-Air	1.2	NA	1.2	1.2
(6) Max Sustained Speed (Mach)				
Altitude, Air-to-Air	2.0	NA	2.0	2.0

Technical/Operational Characteristics (Cont'd):

		Development Estimate	Approved Program Goals/ Thresholds	Demonstrated Performance	Current Estimat
(7)	Design Mission Combat Radius				
	Air-to-Air (NM)	600	NA	655	655
	Air-to-Ground (NM)	550	NA	666	666
	F-16C/D				
(8)	Mission Reliability (%)(CH-2)	85		89	89
(9)	Mean Flight Time Between Maint Action (MFTBMA)(Hrs.)	3.0	NA	5.1	4.5
(10)	Air-to-Air Mission [1]				
	No./wt. per Missile	2/195	NA	2/195	2/195
	No./wt. of Ammo	500/280	NA	500/280	500/280
(11)	Air-to-Air Mission [2]				
	No./wt. per AIM-9L	2/195	NA	2/195	2/195
	No./wt. per AMRAAM	2/328	NA	N/A	2/345
	No./wt. of Ammo	500/280	NA	500/280	500/280
(12)	Air-to-Ground Mission [3]				
	No./wt. of Weapon	2/1980	NA	2/1980	2/1980
	No./wt. per Missile	2/195	NA	2/195	2/195
	No./wt. of Ammo	500/280	NA	500/280	500/280
(13)	Air-to-Ground Mission [4]				
	No./wt. of Weapon	4/1856	NA	4/1856	4/1856
	No./wt. per Missile	2/195	NA	2/195	2/ 195
	No./wt. of Ammo	500/280	NA	500/280	500/280
(14)	Total Mission Radius (NM)[5]				
	Air-to-Air [1]	420	420/420 (CH3)	491(CH-1)	491 (CH-1)
	Air-to-Ground: Hi-Lo-Lo-Hi [3]	465	465/465	476(CH-1)	476 (CH-1)
	Air-to-Ground: Lo-Lo-Lo-Lo [3]	295	295/295	318 (CH-1)	318 (CH-1)
(15)	Max Speed, Air-to-Ground [5] 200ft [3]				
	with weapons (kts)	565	565/565	568 (CH-1)	568 (CH-1)
	without weapons (kts)	580	580/580	592 (CH-1)	592 (CH-1)
(16)	Mean Time Between Failure (MFTBF)	N/A			

[1] Air-to-Air Loading 1: 2 AIM-9L, 500 Rounds Ammo, 2 370 Gal Tanks
[2] Air-to-Air Loading 2: 2 AIM-9L, 500 Rounds Ammo, 2 370 Gal Tanks, 2 AMRAAM
[3] Air-to-Ground Loading 1: 2 AIM-9L, 500 Rounds Ammo, 2 370 Gal Tanks, 2 Mk-84, 1 ALQ-131
[4] Air-to-Ground Loading 2: 2 AIM-9L, 500 Rounds Ammo, 2 370 Gal Tanks 4 AGM-65/TRL, LANTIRN Pods
[5] F-16C Block 25

10. Technical/Operational Characteristics (Cont'd):

c. Previous Change Explanations --

F-16A/B

(1) Technical Characteristic No. 10.a. changes are due to increase of maximum Take Off Gross Weight (TOGW) to accommodate an increase in payload requirements.

(2) Operational Characteristic No. 10.b.(1) changed to reflect decrease in average mission duration from 3.3 hours to 2.3 hours.

(3) Operational Characteristic No. 10.b(2) changed to reflect improved hardware reliability from active program to minimize number of parts. Current estimate changed to reflect maintenance man hour data.

(4) Operational Characteristic No. 10.b.(3): Development Estimate of missile weight based on AIM-9J; current estimate based on AIM-9L.

(5) Operational Characteristic No. 10.b.(4): Development Estimate of weapon weight reflected nominal value; current estimate reflects measured weight. Development estimate of pod weight based on ALQ-119-3; current estimate based on ALQ-131.

(6) Operational Characteristic No. 10.b.(7): Current estimate and demonstrated performance exceed both air-to-air and air-to-ground DCP goals.

(7) Technical Characteristic No. 10.b.(2): Reliability performance continues to improve.

(8) Operational Characteristic No. 10.b.(7): This characteristic was inadvertently placed in the F-16C/D section in the December 31, 1986 SAR; it pertains to the F-16A/B.

F-16C/D

(1) - 10.b.(10) AMRAAM weight is 345 for current estimate.
(2) - Change 3: New data added.
(3) - 10.b.(8) Reliability performance continues to improve.
(4) - 10.b.(13) Current estimate improved relative to earlier analysis results.
(5) - 10.b.(9) MFTBMA improvement based on DO-56/MODAS failure and maintenance manhour data.

d. Current Change Explanations --

- Change (1) Demonstrated performance values added as a result of completion of F-16 C/D performance flight test and analyses. Current estimate updated accordingly.
- Change (2) Data added to allow comparison with F-16 A/B.
- Change (3) Air-to-Air mission radius development estimate and approved program goal/threshold were changed to correct a typographical error in the DAB Baseline of 17 February 1988.

e. References

F-16A/B

Development Estimate: Decision Coordinating Paper (DCP) #143, 10 March 1975 (For Coordination)

Approved Program: DAE Baseline, 31 December 1988.

E-16C/D

Development Estimate: F-16 Multinational Staged Improvement program Baseline (December 1985).

Approved Program: DAE Baseline, 31 December 1988.

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. (U) Cost --			
Development (RDT&E)	$ 578.6	$ 1355.7	$ 1090.1
Procurement	3798.2	19756.7	19101.0
Airframe	(1375.4)	(6430.5)	(6165.8)
Engine	(911.3)	(3760.4)	(3747.4)
Electronics	(539.6)	(3900.2)	(3620.0)
Armament	(171.6)	(609.1)	(627.0)
Sys/Proj Mgt	(33.8)	(619.1)	(627.3)
Total Flyaway	(3031.7)	(15319.3)	(14787.5)
Peculiar Support	(435.2)	(2702.4)	(2653.0)
Other Weapon System Cost	(--)	(124.3)	(141.4)
Initial Spares	(331.3)	(1610.7)	(1519.1)
Construction (MILCON)	--	--	--
Total FY 75 Base-Year $	$ 4376.8	$ 21112.4	$20191.1
Escalation	1677.7	32658.0	32850.6
Development (RDT&E)	(80.5)	(1104.7)	(688.3)
Procurement	(1597.2)	(31553.3)	(32162.3)
Construction (MILCON)	--	--	--
Total Then-Year $	$ 6054.5	$ 53770.4	$53041.7
b. (U) Quantities --			
Development (RDT&E)	8	8	8
Procurement	650	2999	2999
Total	658	3007	3007

c. (U) Foreign Military Sales --

(1) *348 for European Participating Governments (EPG) Program for a total cost of $5,385.2M (Then Year) which includes 116 @ $1,646.0M for Belgium, 58 @ $851.0M for Denmark, 102 @ $902.1M for the Netherlands, and 72 @ $1,274.0M for Norway.

(2) *44 follow-on aircraft @ $944.5M (Then Year) for Belgium

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars) (Cont'd)

c. (U) ** Foreign Military Sales -- (Cont'd)

(3) * 12 follow-on aircraft @ $154.9M (Then Year) for Denmark

(4) * 111 follow-on aircraft @ $1,621.7M (Then Year) for the Netherlands

(5) * 2 follow-on aircraft @ $26.3M (Then Year) for Norway

(6) 121 @ $3,065.1M (Then Year) for Egypt

(7) 210 @ $4,438.8M (Then Year) for Israel

(8) 40 @ $794.2M (Then Year) for Korea

(9) 111 @ $2,589.5M (Then Year) for Pakistan

(10) 160 @ $4,113.3M (Then Year) for Turkey

(11) 24 @ $463.3M (Then Year) for Venezuela

(12) 8 @ $234.3M (Then Year) for Singapore

(13) 18 @ $416.5M (Then Year) for Thailand

(14) 12 @ $336.5M (Then Year) for Indonesia

(15) 12 @ $358.9M (Then Year) for Bahrain

* EPG procurements are technically not Foreign Military Sales, but constitute international cooperative program with the U.S. Government.

** On 29 Nov 88, Japan and the United States signed an agreement to codevelop the FS-X (F-16 derivative).

d. Nuclear Costs -- None

e. References --

Development Estimate: President's FY77 Budget dated January 19, 1976

Approved Program: Selected Acquisition Report, 31 December 1988.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est Dec 89 SAR	UCR Baseline Dec 88 SAR	UCR Baseline Dec 89 SAR
a. (U) Program Acquisition --			
(1) Cost	53041.7	53770.4	53041.7
(2) Quantity	2999	2999*	2999
(3) Unit Cost	17.686	17.929*	17.686
b. (U) Current Procurement --	(FY 1990)	(FY 1990 APPN)**	(FY 1991)
(1) Cost	3195.3	3195.3	2902.6
Less CY Adv Proc	- 556.1	- 556.1	- 437.4
Plus PY Adv Proc	258.9	258.9	409.4
Net Total	2898.1	2898.1	2874.6
(2) Quantity	150	150	150
(3) Unit Cost	19.321	19.321	19.164

* This value has been revised to exclude eight (8) RDT&E units that are not planned to be a part of the inventory objective. Such RDT&E units are not considered Fully-Configured end items for the purpose of this calculation.

** Adjusted to reflect the FY90 Appropriation Act in accordance with congressional change to SAR law.

13. (U) Cost Variance Analysis:

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	659.1	5395.4		6054.5
Previous Changes:				
Economic	+ 18.4	- 2330.8		- 2312.4
Quantity		+ 22866.1		+ 22866.1
Schedule	+ 0.1	+ 2128.0		+ 2128.1
Engineering	+ 1469.4	+ 17162.3		+ 18631.7
Estimating	+ 137.9	- 4207.9		- 4070.0
Other	+ 20.6	+ 35.8		+ 56.4
Support	+ 154.9	+ 10261.1		+ 10416.0
Subtotal	+ 1801.3	+ 45914.6		+ 47715.9
Current Changes:				
Economic	+ 51.3	+ 2120.6		+ 2171.9
Quantity				
Schedule				
Engineering	- 747.9	- 1355.1		- 2103.0
Estimating	+ 14.6	- 328.3		- 313.7
Other				
Support		- 483.9		- 483.9
Subtotal	- 682.0	- 46.7		- 728.7
Total Changes	+ 1119.3	+ 45867.9		+ 46987.2
Current Estimate	1778.4	51263.3		53041.7

(FY 1975 Constant Dollars (Base-Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	578.6	3798.2		4376.8
Previous Changes:				
Quantity		+ 8053.1		+ 8053.1
Schedule		+ 365.7		+ 365.7
Engineering	+ 633.2	+ 5523.5		+ 6156.7
Estimating	+ 27.4	- 1679.3		- 1651.9
Other	+ 15.5	+ 24.6		+ 40.1
Support	+ 101.0	+ 3670.9		+ 3771.9
Subtotal	+ 777.1	+ 15958.5		+ 16735.6
Current Changes:				
Quantity				
Schedule				
Engineering	- 269.6	- 397.1		- 666.7
Estimating	+ 4.0	- 134.7		- 130.7
Other				
Support		- 123.9		- 123.9
Subtotal	- 265.6	- 655.7		- 921.3
Total Changes	+ 511.5	+ 15302.8		+ 15814.3
Current Estimate	1090.1	19101.0		20191.1

13. (U) Cost Variance Analysis (Cont'd)

b. (U) Previous Change Explanations--

RDT&E

Economic:	Revised escalation indices.
Engineering:	Added capability (Improved radar, Advanced IFF, AMRAAM integration) and development of an F-16 derivative configuration.
Estimating:	Refinement of estimates.
Other:	Congressional action on ICS, CIP, and FOT&E Funding.
Support:	Development of AIS.
Schedule:	Change schedule

Procurement

Economic:	Revised escalation indices.
Quantity:	Addition of 2349 aircraft.
Schedule:	Stretchout of FY82-85 and FY92-94 procurement and associated impact of quantity changes.
Engineering:	Production incorporation of added capabilities (ASPJ, AMRAAM, LANTIRN, Improved RWR) and associated impact of quantity changes.
Estimating:	Flyaway cost re-estimates; three multiyear procurements and associated impact of quantity changes; re-estimate of Block 40 tasks.
Other:	Potential contract award fees.
Support:	Increased support for added aircraft and capability enhancements.

c. (U) Current Change Explanations--

	(Dollars in Millions) Base-Year $	Then-Year $
(1) (U) RDT&E		
Revised economic escalation indices. (Economic)	N/A	+ 51.3
Deletion of funding for development of an F-16 Derivative Configuration. (Engineering)	- 351.9	- 972.1
Development of a Close Air Support (CAS) retrofit kit. (Engineering)	+ 43.8	+ 117.6
USAF Share of Development of an F-16 A/B Mid-life Update (MLU) retrofit kit. (Engineering)	+ 38.5	+ 106.6
Re-estimate of Avionics Upgrade Tasks. (Estimating)	+ 5.3	+ 16.9

15. (U) Cost Variance Analysis (Cont'd)

c. (U) Current Change Explanations (Cont'd)--

	(Dollars in Millions) Base-Year $	Then-Year $
(1) (U) RDT&E (Cont'd)		
Re-estimate of test and mission requirements. (Estimating)	- 1.3	- 2.3
(2) (U) Procurement		
Revised economic escalation indices. (Economic)	N/A	+ 2120.6
Deletion of funding for production incorporation of F-16 derivative configuration changes.	- 236.9	- 863.4
--Aircraft changes. (Engineering)	(- 208.6)	(- 760.6)
--Peculiar Support requirements. (Support)	(- 28.3)	(- 102.8)
Directed termination of F-16 ASPJ program with deletion of funding through FY94 by Program Budget Decision 807. Funds are included in FY95 and on for a future F-16 jamming system.	- 240.5	- 755.9
--Aircraft impact. (Engineering)	(-188.5)	(- 594.5)
--Support impact. (Support)	(- 52.0)	(- 161.4)
Grassroots re-estimate of airframe cost. (Estimating)	- 63.4	- 121.9
Adjustment for prior year Escalation.	- 89.0	- 257.9
--Adjustment for prior flyaway elements. (Estimating)	(-71.3)	(- 206.4)
--Adjustment for support elements. (Support)	(- 17.7)	(- 51.5)

13. (U) Cost Variance Analysis (Cont'd)

c. (U) Current Change Explantations (Cont'd) --

	(Dollars in Millions) Base-Year $	Then-Year $
Increased weapons system training equipment requirements. (Support)	+ 6.6	+ 20.9
Refinement of other peculiar support costs. (Support)	+ 5.3	+ 15.1
Re-estimate of initial spares requirements. (Support)	- 37.8	- 204.2

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars).

(U) Initial SAR Estimate to Current Baseline Estimate --

PAUC Initial SAR Development Estimate *	Changes (Then Year Dollars in Millions)								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
9.315	-.047	+.328	+.710	+5.511	-1.462	+.019	+3.312	+8.371	17.686

* This value has been revised to exclude eight (8) RDT&E units that are not planned to be apart of the inventory objective. Such RDT&E units are not considered fully-configured end items for the purposes of these calculations.

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E - None

Initial Contract Price		
Target	Ceiling	Qty
$144.0M	$165.6M	N/A

General Dynamics/Fort Worth Division, Fort Worth, Texas
F33657-82-C-2038 (MSIP), FPIF
Award: N/A (Follow-on effort)
Definitized: April 15, 1982

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$1021.6M	$1137.6M	N/A	$1038.0M	$1037.3M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-71.8M	$-28.5M
Cumulative Variances to date (10/31/89)	$-83.8M	$-17.2M
Net changes	$-12.0M	$+11.3M
Cumulative Variance Change percent	- 16.7%	+ 39.6%

Explanation of Change: The increase in the negative cum-to-date cost variance since the 31 December 1988 SAR is $12.0M. The increase was due to cost overruns associated with reworks necessitated by revised engineering drawings for CCP 9226 "Development/Integration of Block 40 Initiatives", GD's rejection of software documentation (including an operator's manual) from the Advanced Identification Friend or Foe (AIFF) vendor and cost overruns associated with a classified task . We have budgeted additional funds for the anticipated impact of the negative cost variance on the contract cost at completion. The decrease in the negative cum-to-date schedule variance is $11.3M due to the delivery of previously scheduled hardware in the F-16 C/D Head-Up Display (HUD) WBS element from GEC Avionics and the delivery of previously scheduled hardware in the AIFF WBS element from Teledyne systems. Both the contractor and the program manager's estimate is above the contract target price. Actions have been taken in the F-16 System Program Office to insure the availability of funds to cover the government share of this potential over target at completion.

F-16 Aircraft:

General Dynamics/Fort Worth Division
Fort Worth, Texas
F33657-82-C-2034 (FY84) FPIF
Award: N/A (Follow on Effort)
Definitized: 30 August 1983

Initial Contract Price		
Target	Ceiling	Qty
$669.6M	$724.8M	144

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$1,384.2M	$1,484.1M	144	$1,386.2M	$1,390.9M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-56.1M	$-20.1M
Cumulative Variances to date (10/31/89)	$-61.8M	$-17.1M
Net Change Cumulative Variance	$- 5.7M	$+ 3.0M
Change Percent	- 10.2%	+ 14.9%

Explanation of Change: The increase in the negative cum-to-date cost variance since the 31 Dec 88 SAR is $5.7M. The most significant occurrences are: A decrease to indicated overrun at completion for SONACA within the Avionics Familiarization Trainer Fuselage Integration and Assembly resulting from negotations on Change Order 14, and the greater than planned actual costs for the LOE retrofit tasks associated with the incorporation of F-16 A/B Operational Capability Upgrade Program for Research and Engineering. We have budgeted additional funds for the anticipated impact of the negative cost variance on the contract cost at completion. The decrease in the negative cum-to-date schedule variance of $3.0M was attributed to the delivery of previously delinquent hardware items within the Air Vehicle Kits WBS element Research and Engineering by Smith Industries and the delivery of previously schedule hardware for the Expanded Fire Control Computer. There will be no corrective action required and no impact to the total program is anticipated. Both the contractor and the program manager's estimate is above the contract target price. We have requested that a contingent liability be set up for this over target at completion.

F-16 Aircraft:

General Dynamics/Fort Worth Division
Porth Worth, Texas
F33657-84-C-0247 (FY89) FPP
Award: N/A (Follow on Effort)
Definitized: January 1989

Initial Contract Price		
Target	Ceiling	Qty
$1261.2	N/A	180

Current Contract Price		
Target	Ceiling	Qty
* FFP $1236.3M	N/A	180

Estimated Price at Completion	
Contractor	Program Manager
$1236.3M	$1236.3M

Engines:

General Electric Corporation
Evendale, Ohio
F33657-84-C-2011 (FY87) FPP
Award: (Follow on Effort)
Definitized: 13 March 1987

Initial Contract Price		
Target	Ceiling	Qty
$519.1M	N/A	172

Current Contract Price		
Target	Ceiling	Qty
* FFP $530.3	N/A	172

Estimated Price at Completion	
Contractor	Program Manager
$ 530.3M	$ 530.3M

* No CPR reporting-required.

F-16 Aircraft:

General Dynamics/Fort Worth Division
Fort Worth, Texas
F33657-84-C-0247 (FY87) Multiyear II FFP
Award: N/A (Follow on Effort)
Definitized: September 1986

Initial Contract Price

Target	Ceiling	Qty
$1035.0M	N/A	180

Current Contract Price

Target	Ceiling	Qty
* FFP $1164.9M	N/A	180

Estimated Price at Completion

Contractor	Program Manager
$1164.9M	$1164.9M

General Dynamics/Fort Worth Division
Fort Worth, Texas
F33657-84-C-0247 (FY88) Multiyear II FFP
Award: N/A (Follow on Effort)
Definitized: January 1988

Initial Contract Price

Target	Ceiling	Qty
$1189.8M	N/A	180

Current Contract Price

Target	Ceiling	Qty
* FFP $1218.4M	N/A	180

Estimated Price at Completion

Contractor	Program Manager
$1218.4M	$1218.4M

* No CPR reporting required.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status --

(1) Percent Program Completed: 69.6% (16 yrs/23 yrs)

(2) Percent Program Cost Appropriated: 60.5% (32111.4/53041.7)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY75-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-97)	Total
RDT&E	1369.1	25.0	70.1	314.2	1778.4
Procurement	27522.0	3195.3	2902.6	17643.4	51263.3
MILCON	-	-	-	-	-
Total	28891.1	3220.3	2972.7	17957.6	53041.7

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary

Fiscal Year	Qty	FLYAWAY FY75 DOLLARS		TOTAL BASE YEARS	TOTAL THEN-YEAR $.			Escl Rate (%) *
		NonRec	Rec		PROGRAM	OBLI-GATED	EXPENDED	
Appropriation: RDT&E								
1975				31.2	32.0	32.0	32.0	--
1976				187.2	214.7	214.7	214.7	11.0
197T				57.7	69.0	69.0	69.0	5.4
1977				211.9	256.4	256.4	256.4	2.1
1978				121.3	162.3	162.3	162.3	5.9
1979				65.8	93.6	93.6	93.6	8.4
1980				17.4	27.6	27.6	27.6	9.4
1981				24.6	43.1	43.1	43.1	11.9
1982				30.9	57.9	57.9	57.9	9.2
1983				36.2	70.9	70.9	70.9	4.9
1984				45.7	93.1	93.1	93.1	3.8
1985				43.1	90.6	90.6	90.6	3.4
1986				28.3	61.1	61.1	61.1	2.8
1987				23.4	52.0	52.0	52.0	2.7
1988				9.4	21.7	21.7	18.8	3.1
1989				9.6	23.1	17.2	9.4	4.2
1990				10.0	25.0	1.5	.4	4.0
1991				26.9	70.1			4.2
1992				31.2	84.2			4.0
1993				27.1	75.9			3.7
1994				15.4	44.4			3.4

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

1995				12.1	35.9			3.1
1996				11.9	36.6			3.1
1997				11.8	37.2			3.1
SUBTOTAL	8	**	**	1090.1	1778.4	1364.7	1352.9	

* Since outlay rates are not shown, the escalation rates cannot be used to verify the composite index.

** Not Available

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary

Fiscal Year	Qty	FLYAWAY FY75 DOLLARS		TOTAL BASE YEARS	TOTAL THEN-YEAR $**			Escl Rate (%) *
		NonRec	Rec		PROGRAM	OBLI-GATED	EXPENDED	
Appropriation: Procurement								
1977				182.2	257.6	257.6	257.6	6.2
1978	105	61.0	523.6	889.5	1385.9	1385.9	1385.9	6.6
1979	145	30.0	550.3	852.8	1434.4	1434.4	1434.4	8.7
1980	175	50.4	676.7	872.0	1641.9	1641.9	1641.9	9.7
1981	180	43.0	705.0	935.2	1918.0	1918.0	1918.0	11.9
1982	120	52.6	488.5	1021.6	2205.7	2205.7	2205.7	9.6
1983	120	187.1	527.0	895.3	2048.4	2048.4	2048.4	9.0
1984	144	69.3	644.6	969.3	2312.8	2312.8	2312.8	8.0
1985	150	141.2	695.9	1064.1	2620.8	2620.8	2620.8	3.4
1986	180	137.2	750.7	1136.5	2877.7	2877.7	2725.1	2.8
1987	180	97.4	764.4	1103.3	2912.8	2912.8	2599.6	2.7
1988	180	51.5	770.8	997.4	2738.0	2524.6	1225.2	3.1
1989	180	144.3	810.3	1098.1	3168.0	2604.5	363.3	4.2
1990	150	55.0	686.0	1065.5	3195.3	476.7	.1	4.0
1991	150	32.8	718.1	933.6	2902.6			4.2
1992	150	22.8	726.6	896.3	2882.6			4.0
1993	150	17.9	705.7	844.4	2803.3			3.7
1994	150	6.2	718.5	864.3	2958.5			3.4
1995	150	5.6	777.1	954.1	3366.9			3.1
1996	120	5.6	665.7	810.6	2949.9			3.1

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

1997	120	5.6	665.5	714.9	2682.2		**	3.1
Subtotal	2999	1216.5	13571.0	19101.0	51263.3	27221.8	22738.8	
Total	3007	1216.5	13571.0	20191.1	53041.7	28586.5	24091.7	

* Since outlay rates are not shown, the escalation rates cannot be used to verify the composite index.
Obligated and expended amounts shown on pages 20 thru pages 23 reflect program office records as of 31 December 1989.

17. (U) Production Rate Data:

a. (U) Annualized production rate can achieve a maximum of 27 (21 aircraft plus 6 aircraft equivalents) per month at General Dynamics with no additional tooling expense. This includes USAF as well as European Participating Government use and all current Foreign Military Sales.

	Production Rates (Quantity/Year)			
Fiscal Year	Development Estimate *	Production Estimate	Current Estimate	Maximum Economic
1986	N/A	180	180	180
1987	N/A	216	180	180
1988	N/A	216	180	180
1989	N/A	216	180	180
1990	N/A	216	150	180
1991	N/A	216	150	324
1992	N/A	216	150	324
1993	N/A	216	150	312
1994	N/A	216	150	N/A
1995	N/A	N/A	150	N/A
1996	N/A	N/A	120	N/A
1997	N/A	N/A	120	N/A

* The production rate for the development estimate did not include years after 1982.

b. (U) Cost Variance - Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum * Economic
Prog Acq Cost (BY $)	N/A	N/A	20191.1	+632.7	19558.4
(TY $)	N/A	N/A	53041.7	+2251.6	50790.1
PAUC (BY $)	N/A	N/A	6.733	+.211	6.522
(TY $)	N/A	N/A	17.686	+.750	16.936

7. (U) Production Rate Data:

b. (U) Cost Variance - Dollars in Millions (Cont'd)

* Does not include inefficiencies of rapid production growth with resultant hiring of new and inexperienced personnel and the difficulty in the abrupt change in rate from 150 to 324 per year (12.5 per month to 27).

c. (U) Schedule Variance

	Production Estimate	Variance CE vs Pd E	Current Estimate	Variance CE vs Max	Maximum
Start Date (mo/yr)	2/87	--	2/87	N/A	2/87
Duration (in months)	112	--	148	40	108
End Date (mo/yr)	5/96	--	5/99	N/A	1/96

d. (U) Deliveries (Plan/Actual)

	To Date
RDT&E	8/8
Procurement	
A/B	785/785
C/D	814/798

e. (U) Approved Design-to-Cost Goal -- None

18. (U) Operating and Support Costs:

a. Assumptions and Groundrules--
The concept of operations is a 24 aircraft squadron operating at a 20 year steady state at 366 Flying hours per aircraft per year. Personnel costs include personnel pay and support. Operational and support (O&S) consumables costs consist of aviation petroleum, oil and lubricants (POL). Sustaining investment costs includes replenishment spares and support/modifications. Other direct costs consist of munitions and missiles. Indirect costs are personnel acquisition training. The F-16C/D estimate is based on a Block 25B baseline. This O&S estimate was approved as part of the F-16 Annual Estimate briefed to the ASD commander on February 16, 1989.

b. Costs--(FY 1988 Constant Dollars in Millions)

Cost Element	Avg Annual Cost Per F-16 C/D Squadron	Avg Annual Cost Per F-16 A/B Squadron (Antecedent)
Personnel	28.12	34.05
O&S Consumables	2.56	5.42
Organic Depot Maintenance	1.71	7.13
Sustaining Investment	17.30	15.73
Other Direct Costs	2.59	1.86
Indirect Costs	4.99	5.00
Total	57.27	69.19

c. Contractor Support Costs --

(Then-Year Dollars in Millions)

	FY 1989 & PRIOR	FY 1990 YEAR	FY 1991 YEAR	BALANCE TO COMPLETE	TOTAL
O&M (AF)	31.6	35.5	42.5	TBD	109.6
Industrial Fund	.9	.5	.2	TBD	1.6
TOTAL	32.5	36.0	42.7	TBD	111.2

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N-16 F/A-18

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SAR-89-020

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)
PROGRAM: HORNET (F/A-18)

AS OF DATE: December 31, 1989

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MAR 22

1. (U) Designation and Nomenclature: F/A-18 Naval Strike Fighter (HORNET)

2. (U) DoD Component: United States Navy

3. (U) Responsible Office and Telephone Number:

F/A-18 Program Office
Naval Air Systems Command
Washington DC 20361-1265

CAPT J.A. LOCKARD

Assigned: September 30, 1986
AV 222-9191; COMM (202) 692-9191

4. (U) Program Elements/Procurement Line Items:

RDT&E (6.4) Development:	PE 0604263N
PROCUREMENT (APN): 1506:	PE 0204136N PE 0204156X PE 0206134M
MILCON:	PE 0204611N PE 0206496M

5. (U) Related Programs: AMRAAM, ASPJ, ALR-67, LASER & IR Maverick, NACES Ejection Seat, ALQ-126B, HARM, HARPOON, SPARROW/SIDEWINDER, SLAM, RECCE(ATARS), AV-8B, F-15, F404 Engine, Oxygen Generating System, AYK-14 (XN-6), ASN-130/139, ARC-182/210, BRU-32, and Deployable Flight Incident Recorder (DFIR).

CLASSIFY: [redacted] 5513.2B-26
DECLASSIFY: [redacted]

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MAR 2 [illegible]

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6. [redacted] Mission and Description: The F/A-18 Naval Strike Fighter is a twin engine, mid-wing, multi-mission tactical aircraft. The F/A-18 Hornet is being employed in Navy Strike Fighter Squadrons and Marine Fighter-Attack Squadrons, and was designed to replace the F-4 Phantom and A-7 Corsair. The F/A-18 A and C are missionized for traditional fighter & attack roles. The F/A-18 B and D are two-seat versions. The F/A-18B is used primarily for training, but the F/A-18D will replace USMC A-6E, OA-4, TA-4 and RF-4 aircraft in Attack, TAC, FAC, and Reconnaissance (RECCE) squadrons. Six USMC A-6E Attack squadrons will transition to F/A-18D's beginning in 1990. Any aircraft can quickly be configured to perform either fighter or attack missions, or both, offering the operational commander more flexibility in employing his tactical aircraft in a changing scenario. In 1991, the Hornet will have the provisions to accept the Advanced Tactical Air Reconnaissance System (ATARS) with the installation of a sensor pallet in place of the gun system. The ATARS suites will be delivered in 1993 and installed in the sensor pallet of the RECCE configuration.

The primary design mission application for the aircraft is fighter escort, with fleet air defense as its secondary mission. The attack missions are interdiction and close air support. Since the same airframe, engine, flight controls, and weapons systems are used for both fighter-attack missions, excellent fighter performance, self-defense, and increased survivability are inherent.

7. [redacted] Program Highlights:

a. Significant Historical Developments -- In 1975, the Navy selected a carrier capable variant of the Northrop YF-17 to satisfy its multimission strike fighter requirement. Full scale devlopment contracts were awarded to McDonnell Douglas (MCAIR) (with Northrop as principal subcontractor) for the airframe and to General Electric for the engine. First flight occurred in November 1978. The first fleet readiness squadron (VFA-125) commenced operations two years later and the first two tactical squadrons achieved initial operational capability (IOC) in March 1983.

In February 1985, Carrier Air Wing 14 (CVW-14) on board USS Constellation (CV-64) deployed to the Western Pacific with two F/A-18 squadrons; since then the carriers Coral Sea (CV-43), Midway (CV-41), Theodore Roosevelt (CVN-71), America (CV-66), and Independence (CV-62) have been configured to operate the F/A-18. Canada, Australia, and Spain have contracted for a total of 285 F/A-18s and have received 273 to date. The U.S. Navy and Marine Corps have received 605 F/A-18s. Switzerland has selected the F/A-18 as their new fighter aircraft and is in the process of receiving government approval.

The first major upgrade of the F/A-18, the F/A-18 C (single seat) and F/A-18D (dual seat) began delivery in October 1987. This aircraft contains provisions for the Airborne Self-Protection Jammer (ASPJ), the Advanced Medium Range Air-to-Air Missile (AIM-120 AMRAAM) and the Infrared Imaging Maverick Air-to-Ground Missile (AGM-65F). The F/A-18 C/D aircraft delivered in October 1989 and subsequently are configured with an improved night attack capability featuring a Navigation Forward-Looking Infrared (NAVFLIR) pod, a raster head-up display, special cockpit lighting compatible with night vision devices, a digital color moving map and an independent multipurpose color display.

[redacted]

7. [redacted] Program Highlights: (Continued)

b. Significant developments since last report -- The Republic of Korea selected the F/A-18 as their new fighter/attack aircraft and is in the process of receiving government approval. Kuwait contracted for a quantity of 40 aircraft.

In 1989 the carriers Saratoga (CV-41), Eisenhower (CVN-69), and the Abraham Lincoln (CVN-72) were configured to operate the F/A-18.

605 F/A-18s had been delivered to the USN/USMC as of 31 Dec 89. These include the 11 Full Scale Development (FSD) aircraft plus one replacement. In November 1989, the first night attack capable F/A-18 was delivered.

Engine improvements are progressing as planned and are expected to be completed by 1991. The Enhanced Performance Engine (EPE) program is proceeding in accordance with FY 1991 production effectivity for USN aircraft.

The F/A-18 continues to establish records in readiness and with operational squadrons consistently maintaining mission capable rates in excess of 80%, the F/A-18 fully expects to meet all mission requirements.

c. Changes Since "As Of" Date -- None

8. [redacted] Threshold Breaches: There are currently no DAE baseline breaches. (Dated 31 Dec 88)

[redacted]

9. [redacted] Schedule:

a. Milestones	Development Estimate	Approved Program	Current Estimate
Release of RFP	Oct 74	Oct 74	Oct 74
Award Advanced Engineering Contracts			
General Electric (Engine)	May 75	May 75	May 75
McDonnell Douglas (Airframe)	May 75	May 75	May 75
Award Full Scale Development Contract			
General Electric (Engine)	Nov 75	Nov 75	Nov 75
DSARC II	Dec 75	Dec 75	Dec 75
Award Full Scale Development Contract			
McDonnell Douglas (Airframe)	Jan 76	Jan 76	Jan 76
First Flight	Jul 78	Nov 78	Nov 78
DSARC IIIA-Program Review	Mar 80	NA	NA
OSD Review-DSARC Principals	NA	Apr 80	Apr 80
Fighter Missions IOT&E	Oct 80	Feb 81	Feb 81
Begin Fighter Board of Inspections Survey Trials	Nov 80	Mar 82	Mar 82
DSARC IIIB	Nov 80	NA	NA
DSARC III (FIGHTER)	NA	Jun 81	Jun 81
OSD Limited Program Review	NA	Jun 81	Jun 81
DSARC III (ATTACK)	NA	Dec 82	Dec 82
OPEVAL Completion	Dec 81	Oct 82	Oct 82
End Fighter Board of Inspections Survey Trials	May 82	Feb 83	Feb 83
IOC, First F/A-18 Squadron	Sep 82	Mar 83	Mar 83
Navy Support Date	NA	Oct 83	Oct 83
DSARC Principals Review	NA	Mar 85	Mar 85

[redacted]

9. [redacted] Schedule (continued)

b. Previous Change Explanations --

First Flight: Was rescheduled from Jul 78 to Sep 78 in accordance with contract definitization. First flight date was delayed from Sep 78 to Nov 78 to permit thorough evaluation of the digital fly-by-wire flight control system.

DSARC IIIA: Redesignated program review - DSARC IIIA changed to OSD program review for DSARC principals.

DSARC IIIB: DSARC IIIB redesignated DSARC III (Fighter) and rescheduled for SEP 80 with a limited program review scheduled for Feb 81 upon completion of IOT&E. DSARC III (Attack) was scheduled for Sep 82 upon completion of OPEVAL. Changes were made based upon Program Review (April 80) and OSD Program Guidance (May 80). Decision Memorandum (17 Dec 80) established February 1981 to be the date for a Limited Program Review, which combined with the November 1980 Program Review, constituted DSARC III (Fighter). The Limited Program Review was held in March 1981. DSARC III (Fighter) completed as stated in 29 Jun 81 Decision Memorandum. DSARC III (Attack) was set for Fall 82 by Decision Memorandum (29 Jun 81) and completed in December 1982.

OPEVAL Completion: Concurrent fighter and attack systems OPEVALs rescheduled for the period Sep 81 - Feb 82, to accommodate delays in contractor and DON DT&E. Results contribute to OSD Program Review scheduled for April 1982. OPEVAL completion slipped until August 82, on the flight test schedule. Carrier portions of OPEVAL slipped to October due to availability of carrier.

End Board of Inspection and Survey Trials: Combined Fighter and Attack BIS completed in August 82. BIS consolidated into the minimum number of flights. Navy Technical Evaluation conducted in March/April in lieu of Initial BIS Trials. Final phase of Service Acceptance Test completed 2nd quarter, FY 83, using production aircraft.

IOC, First F/A-18 Squadron: Six month slip due to FY 79 budget decision on procurement schedule. Congressional direction to purchase additional FY 80 aircraft permitted moving Mar 83 IOC date to Sep 82. Change to Dec 82, in accordance with Weapon System Planning document of Jun 80. Aircraft delivery locations were rearranged so that 11 VMFA-314 aircraft in latest configuration would be coming off production line.

Review for DSARC Principals: OSD Program Review, scheduled for Oct 84, occurred in Mar 85, and included data on initial F/A-18 aircraft carrier workups. Operational testing results were presented to OUSDR&E in Mar 85; all requirements were met.

c. Current Change Explanations -- None

d. References --

Development Estimate: DCP #141 dated 18 Nov 76
OSD Program Review Memorandum, 17 Mar 83.

Approved Program: DAE Baseline approved 31 Dec 1988

10. [redacted] Technical/Operational Characteristics:

a. [redacted] Technical --	Dev Est	Approved Prgm Goal/ Threshold	Demonstrated Performance	Current Estimate
Weight (lbs)				
( ) Empty VF	21649	23014	23832	23832 (Ch-1)
( ) Empty VA	21720	23014	23832	23832 (Ch-1)
( ) Take-off Gross Escort Mission	(b)(1)			(Ch-1)
( ) Max Take-off Gross Interdiction Mission				
Dimensions (Ft)				
( ) Length	56	56	56	56
( ) Height	15.3	15.3	15.3	15.3
( ) Wing Span	37.5	37.5	37.5	37.5
Spotting Factor				
( ) A-7 Equivalent	1.2	1.2	1.2	1.2
b. [redacted] Operational --				
Speed, At Altitude (Mach)				
( ) Combat Weight	1.7	1.7	1.7	1.7
Radius (NM)				
( ) Fighter Escort, Internal Fuel	400	362	340	340 (Ch-1)
( ) Strike Mission	550	575	535	535 (Ch-1)
Combat Ceiling VF (FT)				
( ) Max Thrust	(b)(1)			(Ch-2)
( ) Military Thrust	48100	48000	46050	46050 (Ch-2)
Mission Reliability				
( ) VF @ 2500 hours	0.7	0.93	.89*	.93
System Maintenance, VF @ 2500 hours				
( ) Mean Flight Hours Between Failure, Fighter Config., Organizational Level	1.4	2.0	1.7	1.8 (Ch-3)
( ) Unscheduled Direct Level Maintenance Manhours per Flight Hour	8.0	5.8	9.0	5.4 (Ch-3)
( ) Operating Factor, Maintenance	12	12		12
Maint Men per Aircraft, BIT				
( ) Development Completion	NA	100%	100%	100%
( ) False Indication Rate.	NA	28%	14%	14% (Ch-4)
( ) Standard Depot Level Maintenance (Months)	48	48	48	48

[redacted]

10. [redacted] Technical/Operational Characteristics (Continued)--

Mission reliability: Reliability demonstration 90% confidence; 96% actually demonstrated.
Organizational level, system maintenance: Measured at 9000 cumulative flight-hours, Maintainability demonstration completed 4 May 1982.

c. Previous Change Explanations --

Weight, empty VF: +1365 lbs. minus fighter and attack commonality, initial estimated production weight adjusted for weight reduction program, actual FY 79 production weight plus modification, FY 80 production weight involving changes, roll rate modification, and other minor changes.

Weight, empty VA: +1294 lbs. Attack changes corresponding to spec. 2.a(1) and the change to common VF and VA aircraft.

Take-off gross weight (Escort): +1128 lbs. Original DSARC II estimate VF/VA configurations commonality, final design review, Lot III production specification weight adjusted for weight reduction, actual production delivery weights and modifications/changes.

Max take-off gross weight (Interdiction): +4756 lb. max take-off weight changes associated with the above growth.

Radius (fighter escort): -38 Initial design reviews and engine performance estimates revised to reflect demonstrated ranges on tests.

Speed, at altitude: Mach 2.0 is max speed in a dive, 1.7 is max speed at altitude.

Combat ceiling, maximum thrust: [redacted] (b)(1) as stated in McDonnell Douglas Report A08576, "F/A-18 Substantiating Performance Data, 31 Mar 84, Rev 1 Oct 85".

Combat ceiling, military thrust: -100 ft. Estimate based on flight test data in R&D aircraft.

Mission reliability: +.1 Changed due to original DSARC II estimate and contract award (Mar 76 SAR). Current Estimate of .93 stated in McDonnell Douglas Report A08576.

System Maintenance VF: 2.77 as reflected in DCP #141. 2.0 from 3M test data of May-Oct 86 Operational Squadron. 1988 SAR updated to reflect 3-M data from operational squadrons, Nov 87 thru Oct 88.

Unscheduled Direct Maintenance: 5.8 derived from 3M test data of May-Oct 86 Operational Squadron. 1988 SAR updated to reflect 3-M data from operational squadrons.

BIT Development Completion: Follow-on testing for BIT enhancement ongoing until approximately FY 88.

BIT False Indication Rate: 28% from Lot VII Aircraft, Fall 1984 to Spring 1986.

[redacted]

10. [redacted] Technical/Operational Characteristics (Continued)--

d. Current Change Explanations --

(Ch-1): Changes due to increased weight associated with Night Attack/ LOT XII configuration and survivability airframe changes.
(Ch-2): Derived using new aircraft weights in accordance with McDonnell Douglas Report A08576, "F/A-18 Substantiating Performance Data, 31 Mar 84, Rev 1 Oct 85".
(Ch-3): Reflects 3-M data from operational squadrons, Apr - Sep 1989.
(Ch-4): Naval Air Test Center F/A-18 FID Code Evaluation Progress Summary, Mar - Apr 1989.

e. References --

Development Estimate: DCP #141 dated 18 Nov 76
OSD Program Review Memorandum, 17 Mar 83.

Approved Program: DAE Baseline approved 31 Dec 1988

[redacted]

11. Program Acquisition Cost: (Current Estimate in Millions $)

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development	$ 1,437.7	$ 1,652.3	$ 1,652.3
Procurement	6,560.9	12,572.3	12,855.2
Airframe	(3,599.6)	(6,675.8)	(6,784.5)
Engines	(1,059.7)	(1,550.8)	(1,530.7)
Avionics	(198.8)	(369.8)	(368.2)
Arms/Other GFE	(61.3)	(1,437.4)	(1,521.6)
Total Flyaway	(4,919.4)	(10,033.8)	(10,205.0)
PGSE	(610.3)	(1,046.1)	(1,092.8)
Training/Other	(517.5)	(808.5)	(857.6)
Gross P-1	(6,047.2)	(11,888.3)	(12,155.4)
Initial Spares	(513.7)	(684.0)	(699.8)
Construction (Milcon)	18.0	21.6	26.8
Total FY 75 Base-Year $	8,016.6	14,246.2	14,534.3
Escalation	4,858.7	23,363.4	25,013.6
RDT&E	(396.7)	(751.3)	(751.3)
Procurement	(4,451.7)	(22,592.6)	(24,248.0)
Milcon	(10.3)	(19.5)	(14.3)
Total Then-Year $	$12,875.3	$37,609.5	$39,547.9

b. Quantities --

Development (RDT&E)	11	11
Procurement	800	(b)(1)
Total	811	

c. Foreign Military Sales -- F/A-18 sales to date (DD 1513, Offer and Acceptance) are:

Country	Aircraft Qty	Program Cost (Billion $)
Spain	72	$2.339
Australia	75	$2.598
Kuwait	40	$1.554

d. Nuclear Costs -- None

e. References --

Development Estimate: DCP #141 dated 18 Nov 76
OSD Program Review Memorandum, 17 Mar 83.

Approved Program: DAE Baseline approved 31 Dec 1988.

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12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current Then-Year Dollars in Millions)

	Current Est	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition --	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	39547.9	37609.5	39547.9
(2) Quantity	(b)(1)	1168	(b)(1)
(3) Unit Cost		32.200	
b. Current Procurement --	FY 1990	FY 1990 APPN	FY 1991
(1) Cost (P1 Proc)	2064.3	2064.3	2123.2
Minus CY Advance Proc	141.4	141.4	150.8
Plus PY Advance Proc	138.8	138.8	141.4
NET TOTAL	2061.7	2061.7	2113.8
(2) Quantity	66	66	66
(3) Unit Cost	31.238	31.238	32.027

[redacted]

13. [redacted] Cost Variance Analysis:

a. Summary -- Current (Then-Year) Dollars in Millions

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1834.4	11012.6	28.3	12875.3
Previous Changes:				
Economic	190.7	5674.7	-1.3	5864.1
Quantity	0.0	2471.7	0.0	2471.7
Schedule	14.6	5557.2	-0.6	5571.2
Engineering	55.6	2746.9	0.0	2802.5
Estimating	298.8	4667.8	16.1	4982.7
Other	6.5	0.0	0.0	6.5
Support	3.0	3033.9	-1.4	3035.5
Sub-Totals	569.2	24152.2	12.8	24734.2
Current Changes:				
Economic	0.0	772.3	-2.6	769.7
Quantity	0.0	0.0	0.0	0
Schedule	0.0	437.4	0.0	437.4
Engineering	0.0	0.0	0.0	0
Estimating	0.0	324.7	2.6	327.3
Other	0.0	0.0	0.0	0
Support	0.0	404.0	0.0	404
Sub-Totals	0.0	1938.4	0.0	1938.4
Total Changes	569.2	26090.6	12.8	26672.6
Current Estimate	2403.6	37103.2	41.1	39547.9

FY 75 (Base Year) Dollars in Millions

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1437.7	6560.9	18.0	8016.6
Previous Changes:				
Quantity	0.0	1768.1	0.0	1768.1
Schedule	9.4	772.7	-0.9	781.2
Engineering	37.8	851.5	0.0	889.3
Estimating	161.4	1633.8	5.0	1800.2
Other	4.5	0.0	0.0	4.5
Support	1.5	985.3	-0.5	986.3
Sub-Totals	214.6	6011.4	3.6	6229.6
Current Changes:				
Quantity	0.0	0.0	0.0	0
Schedule	0.0	88.5	0.0	88.5
Engineering	0.0	0.0	0.0	0
Estimating	0.0	82.8	5.2	88.0
Other	0.0	0.0	0.0	0
Support	0.0	111.6	0.0	111.6
Sub-Totals	0.0	282.9	5.2	288.1
Total Changes	214.6	6294.3	8.8	6517.7
Current Estimate	1652.3	12855.2	26.8	14534.3

[redacted]

13. [redacted] Cost Variance Analysis (Continued):

b. Previous Change Explanations --

RDT&E	
Economic:	Revision to escalation rates.
Schedule:	lower production build-up and extension of the radar test bed aircraft usage.
Engineering:	Commonality of fighter and attack aircraft; extended testing requirements.
Estimating:	Revisions for budget changes, flight test costs, equipment price analysis, and reprogramming of unobligated balances.
Support:	Additional operational test time support.
Other:	Court ruling on previous year's allowable cost to the government.
PROCUREMENT	
Economic:	Revisions to escalation indices.
Quantity:	566 additional aircraft; change in annual procurement. Reduction from 1366 to [redacted](b)(1)
Schedule:	Fluctuations in production rates and final production year. Rephase and accelerate program (+57 in FY 87-90) Program stretchout [redacted](b)(1) procurred in FY 93-95). Increase FY [redacted] quantity by 12 and decrease FY 95 quantity by 12.
Engineering:	Commonality, additional equipment and correction of defects, changes in procurement of two-seaters, refinements to ECP-178, reduction in two-seaters, changes in configuration (ECP-87 & GPS). Upgrade systems by replacing ASN-130 with ASN-139, ARC-182 with ARC-210, ALE-39 with the ALE-47 and replace KAPTON wire. Add weapons capability (ECP-290), Advanced Air Tactical Reconnaissance System, Multi-mode Landing System, Deployable Flight Incident Recorder, Enhanced Performance Engine, and Integrated Night Vision System.
Estimating:	Revised procurement strategy and program estimates based on more current information, reduced profit in outyears, removal of multi-year pricing assumptions, demonstrated contract performance, 5-YR Budget Plan, FY-88 Contract Settlement, reflect impact of increase to Subcontractor Overhead Rates (above previous should cost estimates).
Support:	Changes in projected sites, aircraft distribution, increased aircraft quantity, decreased spares, adjusted allocation for support due to change in aircraft procurement schedule. Reduction in support due to some decreased requirements and a challenge to reduce costs. Increase in spares funding due to configuration changes and to maintain readiness objectives.
MILCON	
Economic:	Revision to escalation rates.
Schedule:	Facility restructuring to meet changed deliveries.
Estimating:	Redistribution of requirements, updated estimates.
Support:	Realignment of facilities; changes in program allocation of MILCON funds.

[redacted]

13. [redacted] Cost Variance Analysis (Continued)

c. Current Change Explanations -- (Dollars in Millions)

(1) RDT&E -- None

(2) Procurement

		Base Year	Then-Year
Economic:	Revision to escalation guidance.	N/A	772.3
Schedule:	Decreased FY 90-94 (from 72 t[redacted](b)(1) increased FY 95 (from 52 to[redacted](b)(1) and FY 96 (from 0 to[redacted](b)(1)	88.5	437.4
Estimating:	Change in acquisition strategy from multi-year procurement to annual procurement accompanied by a loss of the projected multi-year savings.	82.8	324.7
Support:	a) The increase in support is due to standup of a newly identified site (Cherry Point). b) Funding for spares was increased support configuration changes and maintain readiness objectives.	111.6	404.0

(3) MILCON

Economic:	Revision to escalation guidance.	N/A	-2.6
Estimating:	Reduced estimate to absorb increases resulting from revised economic escalation.	5.2	2.6

[redacted]

14. [redacted] Program Acquisition Unit Cost (PAUC) History:

Current Baseline Estimate to Current Estimate
(Then year dollars in Millions)

PAUC (Dev Est)	Changes							PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
(b)(1)									

15. [redacted] Contract Information: (Then-Year Dollars in Millions)

a. RDT&E -- None

b. Procurement -- note: The initial contract price targets reflect the post negotiation clearances. Current contract price targets reflect definitization of unpriced orders and provisioned items subsequent to post negotiation clearances.

FY 90 AIRFRAMES:
McDonnell Douglas
N00019-88-C-0289, FFP
Award: 25 Aug 89
Definitized: TBD

Initial Contract Price

Target	Ceiling	Qty
450.0	NA	66

Current Contract Price

Target	Ceiling	Qty
450.0	NA	66

Estimated Price at Completion

Contractor	Program Manager
TBD	TBD

Explanation of Change: In negotiation; Limitation of funds.

FY 89 AIRFRAMES:
McDonnell Douglas
N00019-88-C-0069, FFP
Award: 31 May 88
Definitized: 28 Sep 89

Initial Contract Price

Target	Ceiling	Qty
1621.0	NA	84

Current Contract Price

Target	Ceiling	Qty
1621.0	NA	84

Estimated Price at Completion

Contractor	Program Manager
1621.0	1621.0

FY 88 AIRFRAMES:
McDonnell Douglas
N00019-85-C-0207, FFP
Award: 31 Jul 87
Definitized: 10 Feb 89

Initial Contract Price

Target	Ceiling	Qty
1492.9	NA	84

Current Contract Price

Target	Ceiling	Qty
1779.6	NA	84

Estimated Price at Completion

Contractor	Program Manager
1779.6	1779.6

Explanation of Change: Increase in target due to mods added for airframe changes, support and FLIR.

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15. [redacted] Contract Information (Continued)

FY 87 AIRFRAMES:
McDonnell Douglas
N00019-85-C-0250, FFP
Award: 29 Apr 86
Definitized: 18 Sep 87

Initial Contract Price

Target	Ceiling	Qty
1207.9	NA	84

Current Contract Price

Target	Ceiling	Qty
1694.4	NA	84

Estimated Price at Completion

Contractor	Program Manager
1694.4	1694.4

Explanation of Change: Increase in target price due to mods added for support, FLIR and additional ancillary.

FY 88/89/90 ENGINES:
General Electric
N00019-86-C-0247, FFP
Award: 17 Apr 87
Definitized: 31 Jan 90

Initial Contract Price

	Target	Ceiling	Qty
	226.8	NA	141
Option 1	207.1	NA	125
Option 2	229.0	NA	137

Current Contract Price

Target	Ceiling	Qty
662.9	NA	403

Estimated Price at Completion

Contractor	Program Manager
662.9	662.9

FY 88/89 ENGINES:
Pratt & Whitney
N00019-87-C-0045, FFP
Award: 4 Jun 87
Definitized: 22 Feb 89

Initial Contract Price

	Target	Ceiling	Qty
	140.3	NA	60
Option 1	116.8	NA	53

Current Contract Price

Target	Ceiling	Qty
257.1	NA	113

Estimated Price at Completion

Contractor	Program Manager
257.1	257.1

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* Note CPR not required for FFP contracts.

16. [redacted] Program Funding Summary:

a. Program Status --

(1) Percent Program Completed: 72.7%

16 Years Funds Appropriated
22 Total Program Years

(2) Percent Program Cost Appropriated: 69.6%

$27,531.9 Appropriated To Date (Mil)
$39,547.9 Total Program Funding

b. Appropriation Summary --

(Then-year Dollars in Millions)

	Prior Years FY75 - 89	Budget Year FY 1990	Budget Year FY 1991	Balance To Complete FY 92 - 96	TOTAL
RDT&E	2403.6	0.0	0.0	0.0	2403.6
PROCUREMENT (APN)	23022.9	2064.3	2123.2	9892.8	37103.2
MILCON	37.1	4.0	0.0	0.0	41.1
Total	25463.6	2068.3	2123.2	9892.8	39547.9

16. [redacted] Program Funding Summary (Continued)
c. Annual Summary --

RDT&E
(Current Estimate in Millions $)

Fiscal Year	Qty	Flyaway FY 75 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
1975	0	NA	NA	19.5	20.0	20.0	20.0	10.94
1976	1	NA	NA	100.1	110.4	110.4	110.4	6.61
1976T	0	NA	NA	18.9	22.2	22.2	22.2	2.88
1977	4	NA	NA	271.3	341.9	341.9	341.9	2.58
1978	6	NA	NA	462.8	626.8	626.8	626.8	6.80
1979	0	NA	NA	336.3	496.1	496.1	496.1	8.40
1980	0	NA	NA	192.8	314.8	314.8	314.8	10.59
1981	0	NA	NA	96.6	173.2	173.2	173.2	10.61
1982	0	NA	NA	100.1	190.5	190.5	190.5	7.60
1983	0	NA	NA	53.9	107.7	107.7	89.8	4.90
Subtotal	11	0	0	1652.3	2403.6	2403.6	2385.7	

PROCUREMENT
(Current Estimate in Millions $)

Fiscal Year	Qty	Flyaway FY 75 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
1978	0	0.0	0.0	19.8	34.1	34.1	33.3	6.8
1979	9	0.0	230.9	338.1	590.6	590.6	590.6	8.7
1980	25	0.0	433.0	595.9	1181.4	1181.4	1063.7	11.8
1981	60	0.0	671.4	943.7	2061.7	2061.7	1964.4	11.6
1982	63	0.0	616.0	1031.9	2452.3	2257.6	2327.1	14.3
1983	84	48.4	704.7	1024.4	2586.6	2586.6	2573.2	9.0
1984	84	0.0	635.1	909.6	2387.0	2387.0	2378.1	8.0
1985	84	56.4	568.7	872.6	2356.4	2356.4	2319.0	3.4
1986	84	13.4	549.8	766.1	2132.7	2132.7	2080.2	2.8
1987	84	9.7	538.5	794.1	2286.9	2286.9	2101.0	2.7
1988	84	46.9	541.2	810.2	2436.5	2436.4	1593.9	3.0
1989	84	29.2	547.3	804.2	2516.5	2412.7	491.4	4.2
1990	66	15.9	432.5	634.2	2064.3	386.6	38.1	4.0
1991	66	3.4	428.5	628.5	2123.2			4.2
1992	[redacted]	7.3	418.7	642.9	2248.1			4.0
1993	[redacted]	0.0	435.5	631.1	2279.4			3.7
1994	[redacted]	0.0	430.5	590.7	2200.5			3.4
1995	[redacted]	0.0	392.6	553.3	2122.1			3.1
1996	[redacted]	0.0	175.4	263.9	1042.9			3.1
Subtotal	[redacted] (1)(q)	230.6	8750.3	12855.2	37103.2	23110.7	19554.0	

[redacted]

16. [redacted] Program Funding Summary (Continued)
c. Annual Summary (Continued)

MILCON
(Current Estimate in Millions $)

Fiscal Year	Qty	Flyaway FY 75 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
1977T	NA	NA	NA	0.0	0.0	0.0	0.0	1.6
1977	NA	NA	NA	0.8	1.0	1.0	1.0	2.8
1978	NA	NA	NA	0.0	0.0	0.0	0.0	7.7
1979	NA	NA	NA	0.0	0.0	0.0	0.0	9.3
1980	NA	NA	NA	4.3	6.5	6.5	6.5	10.6
1981	NA	NA	NA	0.4	0.4	0.4	0.4	10.6
1982	NA	NA	NA	8.0	12.8	10.5	10.5	7.6
1983	NA	NA	NA	3.5	5.6	4.7	4.7	4.9
1984	NA	NA	NA	5.5	9.4	7.4	7.4	3.8
1985	NA	NA	NA	0.4	0.8	0.8	0.8	3.4
1986	NA	NA	NA	0.3	0.6	0.6	0.6	2.8
1987	NA	NA	NA	0.0	0.0	0.0	0.0	2.7
1988	NA	NA	NA	0.0	0.0	0.0	0.0	3.0
1989	NA	NA	NA	0.0	0.0	0.0	0.0	4.2
1990	NA	NA	NA	3.6	4.0	0.0	0.0	4.0
1991	NA	NA	NA	0.0	0.0			4.2
1992	NA	NA	NA	0.0	0.0			4.0
Subtotal	0	0.0	0.0	26.8	41.1	31.9	31.9	
TOTAL	(b)(1)	230.6	8750.3	14534.3	39547.9	25546.2	21971.6	

[redacted]

17. [redacted] Production Rate Data:

a. Annualized Production Rates

Fiscal Year	Development Estimate	Production Rates (Quantity/Year) Production Estimate	Current Estimate	Maximum Economic
1976	1			
1977	4			
1978	6			
1979	5		9	9
1980	15		25	25
1981	48		60	60
1982	96		63	76
1983	108		84	103
1984	132		84	94
1985	132		84	83
1986	132		84	90
1987	132		84	120
1988			84	137
1989			84	145
1990			56	145
1991			56	70
1992				
1993				
1994				
1995				
1996				

(b)(1)

[redacted]

17. [redacted] Production Rate Data (Continued)

b. Cost Variance -- Dollars in Millions.

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Program Acquisition					
Base Year $	8016.6	6517.7	14534.3	845.7	13688.6
Then Year $	12875.3	26672.6	39547.9	4812.1	34735.8
PAUC					
Base Year $	9.9	2.5	12.4	0.6	11.8
Then Year $	[redacted] (b)(1)				30.0

c. Schedule Variance --

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	11/78	0	11/78	0	11/78
Duration (Months)	132	108 mos	240	60 mos	180
End Date (Mo/Yr)	11/89	9 yrs	11/98	5 yrs	11/93

d. Deliveries (Plan/Actual) -- To Date 31 Dec 1989

RDT&E	11/11
Procurement	596/593

e. Approved Design to Cost Goal --
NOT APPLICABLE

18. [redacted] Operating and Support Costs:

a. Not Applicable

b. Not Applicable

c. Contractor Support Costs: (Then-Year Dollars in Millions)

FUNDING	FY 1989 & PRIOR	FY 1990	FY 1991	BALANCE TO COMPLETE	TOTAL
O&M	68.3	13.7	12.6	--	94.6
Industrial Fund	3.5	4.8	5	--	13.3
Total	71.8	18.5	17.6		107.9

A-6 BRADLEY FVS ~~SECRET~~

SAR-89-110

SELECTED ACQUISITION REPORT (RCS: DD-COMP(O&A)823)

PROGRAM: BRADLEY FIGHTING VEHICLE SYSTEMS (BFVS)

AS OF DATE: December 31, 1989

INDEX

AS AMENDED
CLEARED
FOR OPEN PUBLICATION
MAR 22 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

Concur in Classification as marked
21 MAR 1990
SECURITY REVIEW, OSD/SIMT, HQDA

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1. ~~(U)~~ Designation and Nomenclature (Popular Name): M2/M2A1/M2A2, Infantry Fighting Vehicle (IFV); M3/M3A1/M3A2, Cavalry Fighting Vehicle (CFV); Bradley Fighting Vehicles (BFVS)

2. ~~(U)~~ DoD Component: U.S. Army

3. ~~(U)~~ Responsible Office and Telephone Number:

PM, Bradley Fighting Vehicle Systems
U.S. Army Tank-Automotive Command
Warren, MI 48397-5000

PM: COL J. B. Holeman
Assigned: August 21, 1989
AUTOVON: 786-5630
Commercial: (313) 574-3630

4. ~~(U)~~ Program Elements/Procurement Line Items:

RDTE:
PE 6.36.25.A Project DH65 (sunk)
PE 6.46.16.A Project D258 (sunk)
PE 6.46.17.A Project D340 (sunk)
PE 6.46.16.A Project D460 (sunk)
PE 2.37.35.A Project D332

PROCUREMENT:
APPN 2033 SSN G80702
APPN 2033 SSN G21100
APPN 2033 SSN G15100 (sunk)
APPN 2033 SSN GA0153
APPN 2033 SSN G20900

MILCON
APPN 2050 PE 22393A (sunk)
APPN 2050 PE 85796A (sunk)
APPN 2050 PE 84731A (sunk)
APPN 2050 PE 85796A

5. ~~(U)~~ Related Program: M790 Family of 25mm Ammunition; BFVS Improvement Program; Multiple Launch Rocket System (MLRS); TOW-2 Subsystem.

~~Classified by: Multiple Sources~~
~~Declassify on: OADR~~

OASD(PA) DFOISR 90-T-0163

~~SECRET~~

6. (U) Mission and Description: The Bradley IFV and CFV are fully tracked, lightly armored fighting vehicles which provide protected cross-country mobility and vehicular mounted firepower to infantry/cavalry units. The IFV/CFV have swimming capability, are air transportable, and in the combined task force IFV/CFV meet requirements for a companion vehicle to the M1 Series Tank. Vehicle armament consists of a fully stabilized, dual-feed, externally powered M242 25mm automatic gun as its primary weapon, a TOW missile system, and a M240C, 7.62mm coaxially-mounted machinegun. Supplementary armament for the IFV is the M231 firing port weapon. The product-improved IFV/CFV versions incorporate improvements in missile performance, operations in a NBC environment, fightability, survivability, and in other functions. The M2A2/M3A2 incorporate improved armor protection, spall protection liners, and minor modifications such as restowages. The IFV/CFV introduces a formidable fighting vehicle into the Army forces that causes a concomitant re-distribution of some M113 Armored Personnel Carriers.

7. (U) Program Highlights:

a. (U) Significant Historical Developments: The Bradley Fighting Vehicles are an outgrowth of the plan to develop and test the predecessor Mechanized Infantry Combat Vehicle (MICV). The MICV entered engineering development in September 1972. Special studies requested by Congress and OSD were conducted which resulted in termination of the MICV/20mm but which supported the requirement for a IFV/CFV 25mm/TOW program. Secretary of Defense Decision Memorandum (SDDM) dated February 1, 1980, approved full production of the M2/M3, with basic TOW. The initial production contract was awarded to FMC Corporation in February 1980. In October 1980, OSD approved the start of a TOW 2 development program. The government accepted the first production IFV on May 8, 1981. IFV/CFV fielding to FORSCOM units began in March 1983. A comprehensive Block 1 modification program (A1) was initiated in July 1983. The Army approved M2A1/M3A1 vehicle production in May 1985. The A1 significantly improved vehicle performance and increased reliability. A Block 2 development program was initiated in October 1985 to provide increased survivability changes and improvements into production vehicles. On September 10, 1987, DA approved incorporating survivability improvements into the BFVS acquisition program. The first A2 production vehicle was delivered in May 1988, and the first A2 vehicle with 30mm HS protection was delivered in September 1988. In November 1988, DA approved a development program to increase engine horsepower from 500 to 600.

b. (U) Significant Developments Since Last Report: Bradley A1 vehicle fielding was completed in April 1989, with handoffs to the 3AD. The first production A2 vehicles with 600HP powertrain were delivered in May 1989 and will be fielded in Jan 90. Portions of the Bradley production line at FMC were shut down and vehicle shipping activities were curtailed as a result of the October 17, 1989 earthquake and numerous aftershocks. Major structural damage was done to the main machine shop which prevented the flow of machined parts. At year end, FMC was 52 IFVs/CFVs behind the contract delivery schedule. But recovery operations were begun which enabled FMC to resume production on November 27, 1989. Total recovery to the contract schedule is expected by 4Q FY90. The revised delivery schedule still supports Bradley fielding plans.

The Bradley Fighting Vehicle System satisfies mission requirements.

c. (U) Changes Since "As Of" Date - - None

BFVS, December 31, 1989

8. (U) Threshold Breaches: There are currently no actual breaches to the AAE Program Baseline, dated February 26, 1990.

9. (U) Schedule:

a. (U) Milestones --	Development Estimate	Approved Program	Current Estimate
(1) (U) MICV			
(A) ( ) QMR Approved, MICV 20mm	Oct 68	NA	Oct 68
(B) ( ) Concept Formulation Complete	Apr 72	NA	Apr 72
(C) ( ) Milestone II (DSARC)	Mar 79	NA	Apr 75 (CH-1)
(D) ( ) Engineering Development Contract Awarded	Nov 72	NA	Nov 76
(E) ( ) Terminate MICV 20mm Program	Mar 77	NA	Mar 77
(2) (U) M2/M3			
(A) ( ) Milestone III (DSARC)	Jan 80	NA	Jan 80
(B) ( ) Low Rate Initial Production Contract Awarded	Feb 80	NA	Feb 80
(C) ( ) First Production Delivery	May 81	NA	May 81
(D) ( ) Complete Initial Production Test	Apr 83	NA	May 83
(E) ( ) Initial Operating Capability (IOC)	Dec 83	NA	Dec 83
(3) (U) M2A1/M3A1			
(A) ( ) IPR Approval of M2A1/M3A1 Production	May 85	NA	May 85
(B) ( ) First A1 Production Contract Award	Jul 85	NA	Jul 85
(C) ( ) First Production Delivery M2A1/M3A1 Production	May 86	NA	May 86
(D) ( ) Complete Initial Prod Test	Jul 87	NA	Sep 87
(E) ( ) Initial Operating Capability (IOC) - M2A1/M3A1	Nov 88	NA	Nov 88

9. ~~(U)~~ Schedule - M2A2/M3A2 (cont'd)

	Development Estimate	Approved Program	Current Estimate	
(4) ~~(U)~~ M2A2/M3A2				
(A) (U) Engineering Development Contract Awarded - Phase I	NA	NA	NA	(Ch-2)
(B) (U) Engineering Development Contract Awarded - Phase II	NA	NA	NA	(Ch-2)
(C) (U) Development test (PQT-G)				
Start	NA	NA	NA	(Ch-2)
Complete	NA	NA	NA	(Ch-2)
(D) (U) Milestone III (DA IPR)	NA	Sep 87	Sep 87	
(E) (U) HS Production Contract Modification Award	NA	Oct 87	Oct 87	
(F) (U) 2nd A2 Veh Prod Contract Award (FY88 Buy)	NA	Jun 88	Jun 88	
(G) (U) First A2 Vehicle Delivered (less 30mm HS protection)	NA	NA	NA	(Ch-2)
(H) (U) Initial Production Testing:				
Start - 500 HP Engine	NA	Jun 88	Jun 88	
Start - 600 HP Engine	NA	Jun 89	Jun 89	(Ch-3)
Completed - 500 HP Engine	NA	Jun 89	Jun 89	
Completed - 600 HP Engine	NA	Jun 90	Jun 90	
(I) (U) First A2 Veh Prod Delivery w/30mm HS Protection	NA	Sep 88	Sep 88	
(J) (U) Instructor & Key Personnel Training Completed	NA	Sep 88	Sep 88	
(K) (U) 600 HP Engine IPR Decision	NA	Nov 88	Nov 88	
(L) (U) First A2 Veh Prod Delivery w/600 HP	NA	NA	NA	(Ch-2)
(M) (U) 2nd A2 Veh 1st Prod Delivery-Full Prod Veh (FY88)	NA	May 89	May 89	
(N) (U) 3rd A2 Veh Contract Award (FY89 Buy)	NA	Jul 89	Jul 89	(Ch-4)
(O) (U) First Comparison Prod Testing:	NA			
Start - With 500 HP Engine		Mar 89	Mar 89	(Ch-5)
Complete - With 500 HP Engine		Jul 89	Jul 89	(Ch-5)
(P) (U) Initial Operational Capability (IOC)	NA	Aug 89	Aug 89	
(Q) (U) 3rd A2 Veh Prod Delivery (FY89 Buy)	NA	May 90	Jun 90	(Ch-6)
(R) (U) 4th A2 Veh Prod Contract Award-FY90-FY94 Buys (MY)	NA	Jun 90	Aug 90	(Ch-7)

9. ~~(U)~~ Schedule - M2A2/M3A2 (cont'd)

	Development Estimate	Approved Program	Current Estimate	
(S) (U) Vehicle Retrofit - A1 to A2:				
Start - OCONUS	NA	Jun 90	Jun 90	(Ch-8)
Complete - OCONUS	NA	Feb 94	Feb 94	
Start - CONUS	NA	Oct 92	Oct 92	(Ch-9)
Complete - CONUS	NA	Jan 96	Jan 96	
(T) (U) 4th A2 Veh 1st Prod Delivery for MY Contract	NA	May 91	May 91	
(U) (U) Vehicle Hatch Upgrade Production Breakpoint	NA	Dec 92	Dec 92	
(V) (U) First Unit Equipped (FUE)- A2 Vehicle:				
- Europe	NA	Apr 89	Apr 89	
- CONUS	NA	Nov 93	Sep 92	(Ch-10)
(W) (U) Armor Tile FAT	NA	NA	NA	(Ch-2)

b. ~~(U)~~ Previous Change Explanations--

~~(U)~~ Engineering development, PQT-G, Operational Test II, initial production contract award, type classification standard, and first production delivery all were delayed due to DA's decision to terminate the MICV program and begin the IFV/CFV program development. Development estimate for the IOC was based on the MICV program. Actual IOC occurred later due to Army's redefinition of IOC. The Commander FORSCOM determined that the IOC for the M2/M3 occurred in December 1983. Subsequent to these changes, the Milestone Schedule for the Bradley Program was restructured in Dec 87 to show the most significant milestones for the MICV, M2/M3, M2A1/M3A1, and M2A2/M3A2. The Milestone Schedule for the A2 Program was again revised in Dec 88 to reflect the DAE Program Baseline, approved 26 Feb 88. Current estimate IPT (600 HP) completion date was changed from Apr 89 to Jun 89 to coincide with test priorities. Current estimate for First A2 Vehicle Production Delivery with 30mm HS protection was changed from Jul 88 to Sep 88 due to nonavailability of complete sets of A2 armor.

c. ~~(U)~~ Current Change Explanations--

~~(U)~~ (Ch-1) The date for MICV DSARC is corrected from Mar 75 as erroneously reported to Apr 75.

~~(U)~~ (Ch-2) SAR milestones listed are not an AAE-approved Program Baseline Milestones but have been reported in previous BFVS SARs. Inasmuch as they are not currently considered to be a significant program milestones, they are targeted for deletion in the next SAR submission.

~~(U)~~ (Ch-3) IPT-Start 600 HP Engine milestone is changed from Sep 89 to Jun 89 to reflect refinement of test schedule.

~~(U)~~ (Ch-4) 3rd A2 Vehicle Contract Award (FY89 Buy) milestone is changed from Jun 89 to Jul 89 due to required extended contract negotiations.

9. (U) Schedule - M2A2/M3A2 (cont'd)

(U) (Ch-5) Current estimate for First Comparison Production Testing - Start and Complete is changed from N/A to Mar 89 and Jul 89, respectively, to correspond with the AAE Program Baseline.

(U) (Ch-6) 3rd A2 Vehicle Production Delivery milestone is changed from May 90 to Jun 90, due to production delays resulting from the October 17, 1989 earthquake and aftershocks in Northern California.

(U) (Ch-7) FY90-FY94 Buys (MY) milestone is changed from Jun 90 to Aug 90, due to a delay in issuing the Request for Proposal (RFP). The RFP was delayed because of change in vehicle procurement quantity.

(U) (Ch-8) Start of OCONUS vehicle retrofit is changed from Sep 90 to Jun 90, due to earlier availability of revised Technical Data Package than was previously expected.

(U) (Ch-9) Start of CONUS vehicle retrofit is changed from Jan 92 (Dec 88 SAR erroneously showed Jan 93) to Oct 92, due to the DA withdrawal of $45.1M from the FY90 BFVS modification line.

(U) (Ch-10) Current estimate for FUE-CONUS is changed from Feb 94 to Sep 92, based upon a revised BFVS Fielding Plan which shows equipping 4th of the 31st Infantry (FT. Sill) first, rather than the National Training Center.

d. (U) References--

(U) Development Estimate: Development Concept Paper (DCP) No. 30, April 1972, with Cover Sheet Revision, September 1972. Decision Coordination Paper for M2E1/M3E1, November 30, 1984; Decision Coordination Paper for M2A1E1/M3A1E1 High Survivability BFVS, October 5, 1987.

(U) Approved Program: AAE Bradley Program Baseline, February 26, 1990.

BFVS, December 31, 1989

10. (U) Technical/Operational Characteristics:

(U) MICV/M2/M3 Configurations (500 HP Engine)

	Dev Est	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
a. (U) Technical				
(1) (U) Weight (Combat (Loaded) - lbs.	35-38,000	NA/NA	49,987	50,000
(2) (U) Armor Protection @	(b)(1)			
(U) Frontal				
(U) Side				
(U) Rear				
b. (U) Operational				
(1) (U) Firepower:				
(a) 25mm Gun				
(U) Stabilization Accuracy on a 4 mil. Target (% of Time Target)	80 to 90	NA/NA	94.5	94.5
(U) Single Shot Accuracy to 1,000M (rd. to rd. std. dev.) (Stat) (Mils.) (AP)	.50	NA/NA	.50	.50
(U) Dispersion:				
(U) HE (Mils.) (200 rds/min) 1/	.97	NA/NA	.97	.97
(U) AP (Mils.) (100 rds/min)	.59	NA/NA	.59	.59
(U) Receiver Life (rds.)	25,000	NA/NA	30,000	30,000
(U) Barrel Life (rds.)	3,750	NA/NA	13,000	13,000
(U) TOW			(b)(1)	
(U) Hit Prob Moving Targets 500-3,000M	NA	NA/NA		
(U) Hit Prob. Stat. Targets:				
(U) 500-2,000 Meters	NA	NA/NA		
(U) 2,000-3,000 Meters	NA	NA/NA		

10. (U) Technical/Operational Characteristics (Cont'd):

	Dev Est	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
b. (U) Operational (cont'd)				
(2) (U) Reliability:				
(U) System (MMBF)	330	NA/NA	580	580
(U) 25mm Gun (MRBS)	2,000	NA/NA	9,021	9,021
(3) (U) Maximum Speed (MPH)				
(U) Land	40-45	NA/NA	42.0	42.0
(U) Water	3.6	NA/NA	4.5	4.5
(4) (U) Acceleration 0-30 (MPH (sec)	18-22	NA/NA	18.5	18.5
(5) (U) Ground Pressure (p.s.i.)	7.0	NA/NA	7.8	7.8
(6) (U) Maintenance Ratio (Manhours/Oper. Hours)	.60	NA/NA	.40	.60

c. (U) Previous Change Explanations -

(U) Vehicular data in column 1, Development Estimate, reflects the 20mm MICV which was terminated prior to production. Armament data for Development Estimate shows the 25mm VRFWS-program, whereas the armament data for Approved Program is based upon the QMR for 25mm weapon system. Columns 3 and 4 also depict the M2/M3 program. Operational Characteristics for the Bradley changed in both demonstrated performance and current estimate as follows: Based upon the M2/M3 Materiel Need and system specification requirement, the M242 production gun single shot accuracy changed to .50 (rd. to rd. std. dev) (AP), HE dispersion changed to .97 (mils), and AP dispersion data changed to .59 (mils); reliability (MMBF) for the basic vehicle changed to 580, based upon Production Reliability Verification Test (PRVT) final scoring; gun reliability (MRBS) threshold changed to 2,000 to reflect the QMR, maximum land speed changed to 42.0 MPH; acceleration changed to 18.5 seconds, both based on average test results of PRVT test vehicles; and maximum water speed demonstrated performance and current estimate changed from 4.4 MPH to 4.5 MPH, respectively.

d. (U) Current Change Explanations -- None

e. (U) References -

(U) Development Estimate: Development Concept Paper (DCP) No. 30, April 1972, with Cover Sheet Revision, September 1972

(U) Approved Program: Materiel Need (MN) for an IFV/CFV, March 2, 1978, with changes through April 13, 1979, MN Annex May 25, 1982.

BFVS, December 31, 1989

10. (U) Technical/Operational Characteristics (Cont'd):

(U) Footnote -

1/ (U) 25mm Gun dispersion for the HE round is corrected from 500 to 200 rounds per minute to reflect the Materiel Need (MN) for the IFV/CFV, March 2, 1978 with changes through April 13, 1979 and MN Annex, November 29, 1988.

(U) M2A1/M3A1 Configuration (500 HP Engine)

	Dev Est	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
a. (U) Technical 1/				
(1) (U) Weight (Combat loaded) - lbs.	50,404	NA/NA	50,404	50,404
b. (U) Operational 1/				
(1) (U) Firepower:				
(a) (U) 25mm Gun				
(U) Barrel Life (rds.)	4,000	NA/NA	13,000	13,000
(b) (U) TOW (T2SS)				
TOW characteristics goals/thresholds/performance data are unchanged for M2A1/M3A1				
(2) (U) Reliability:				
(U) System (MMBF)	580	NA/NA	841 2/	841 2/
(3) (U) Maximum Speed (MPH):				
(U) Land	38	NA/NA	38	38
(U) Water	4.5	NA/NA	4.5 3/	4.5 3/
(5) (U) Ground Pressure (p.s.i.)	7.8	NA/NA	7.8	7.8
(6) (U) Maintenance Ratio (Manhours/Oper. Hours)	.60	NA/NA	.46 2/	.46 2/

c. (U) Previous Change Explanations -- None

d. (U) Current change Explanations -- None

10. (U) Technical/Operational Characteristics (cont'd):

e. (U) References -

(U) Development Estimate: Decision Coordinating Paper for M2E1/M3E1 BFVS, November 30, 1984; System Specification for IFV/CFV, January 4, 1980.

(U) Approved Program: Materiel Need (MN) Annex, May 25, 1982; DA Memorandum, May 2, 1985, Subject: Approval of TOW 2 for the BFVS-action Memorandum;

(U) Footnotes --

1/ (U) The technical characteristics and operational characteristics data depict the M2A1/M3A1 vehicle and are the same as shown for the M2/M3 (basic vehicle) shown in pages 7 and 8, except as specifically noted otherwise.

2/ (U) Demonstrated performance and current estimate data reflect final A1 IPT test results.

3/ (U) Maximum water speed demonstrated performance and current estimate reflect test results at Waterways Experiment Station (WES) in June 1987.

(U) M2A2/M3A2 Configuration (67,000 lb. Vehicle with 500 HP and 600 HP Engines)

	Dev Est	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
a. (U) Technical				
(1) (U) Length (inches)	NA	258/258	TBD 2/	258
(2) (U) Width (inches)	NA	141/141	TBD 2/	141
(3) (U) Height (inches)	NA	119	TBD 2/	119
(4) (U) Weight (combat loaded) - lbs.	NA	65,600/67,000	TBD 2/	67,000
(5) (U) Armor Protection- KE≥ 300M 1/ Probability of No Penetration:				
(1)(U) Frontal 60° Arc Of Hull (Front & Sides) Above 1M Line - 30mm KE	NA			
(2)(U) Frontal 60° Arc of Hull Front Glacis (Less Final Drive Housings) Below 1M Line - 30mm KE	NA			
(3)(U) Frontal 60° Arc of Turret Without ISU, TML & Vision Blocks - 30mm KE	NA			
(4)(U) Hull & Turret - Areas Other Than Above - 14.5mm KE	NA			
Vehicle Survivability:				
(U) Hand Held Anti-Tank Threat: (% Reduction in K-Kill probability)	25%		25%	25%

(b)(1)

10. (U) Technical/Operational Characteristics (cont'd):

(U) M2A2/M3A2 Configuration (67,000 lb. Vehicle with 500 HP and 600 HP Engines (cont'd)

b. (U) Operational

		Dev Est	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
(1)	(U) Mobility:				
(a)	(U) Range (miles):				
	(U) w/500 HP Engine	NA	260/240	TBD 2/	240
	(U) w/600 HP Engine	NA	260/250	TBD 2/	260-275 (Ch-1)
(b)	(U) Maximum Speed (MPH):				
	(U) Land:				
	(U) w/500 HP Engine	NA	40/36	TBD 2/	36
	(U) w/600 HP Engine	NA	40/38	TBD 2/	38-40 (Ch-2)
	(U) Water:				
	(U) w/500 HP Engine	NA	4.0/4.0	TBD 2/	4.0
	(U) w/600 HP Engine	NA	4.0/4.0	TBD 2/	4.0
(c)	(U) Acceleration 0-30 MPH (sec):				
	(U) w/500 HP Engine	NA	18/30	TBD 2/	30
	(U) w/600 HP Engine	NA	18/22	TBD 2/	17-22 (Ch-3)
(2)	(U) Firepower:				
	(U) 25mm Gun				
(a)	(U) Stabilization Accuracy on a 4 mil. Target (% of time on target)	NA	90/80	TBD 2/	>90
(b)	(U) Single shot accuracy to 1000M (rd. to rd.-std. dev.; stat; mils; AP)	NA	.50/.50	TBD 2/	.50
(c)	(U) Dispersion (hardstand):				
	HE (mils; 200 rds/min)	NA	.97/.97	.97	.97
	AP (mils; 100 rds/min)	NA	.59/.59	.59	.59
(d)	(U) Receiver Life (rds)	NA	25,000/25,000	30,000	30,000
(e)	(U) Barrel Life (rds)	NA	13,000/4,000	13,000	13,000
	(U) TOW Missile:				
(a)	(U) Hit Prob Moving Targets (500-3,000 Meters	NA	(b)(1)		
(b)	(U) Hit Prob Stationary Targets				
(c)	(U) 500-2,000 Meters	NA			
(d)	(U) 2,000-3,000 Meters	NA			
(3)	(U) Reliability:				
(a)	(U) System (MMBF)	NA	545/240	TBD 2/	624 (Ch-4)
(b)	(U) 25mm Gun (MRBS)	NA	6,000/2,000	9,021	9,021

9. (U) Technical/Operational Characteristics (cont'd):

(U) M2A2/M3A2 Configuration (67,000 lb. Vehicle with 500 HP and 600 HP Engines (cont'd)

		Dev Est	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
(4)	(U) Ground Pressure (p.s.i.)	NA	10.4/10.7	TBD 2/	10.4-10.7 (Ch-5)
(5)	(U) Maintenance Ratio (Manhours/Oper. Hours)	NA	.60/.60	TBD 2/	.60

c. Previous Change Explanations -

(U) Average vehicle weight current estimate was increased from 65,600 lbs to 67,000 lbs based on weigh in of PQT-G test vehicles with full armor package.

d. (U) Current Change Explanations -

(U) (Ch-1) Range for 600 HP vehicle is changed from 250 to an estimated 260-275, based upon emerging test results.

(U) (Ch-2) Land speed for the 600 HP vehicle is changed from 38 MPH to a range of 38-40 MPH, based upon emerging test results.

(U) (Ch-3) Acceleration for the 600 HP vehicle is changed from 22 seconds to a range of 17-22 seconds, based upon emerging test results.

(U) (Ch-4) Current estimate for vehicle (500 HP) reliability is increased from 550 to 624 MMBF, based on final scored results from A2 500 HP IPT.

(U) (Ch-5) Vehicle ground pressure is changed from 10.7 p.s.i. to 10.4-10.7 p.s.i., based upon weigh in of test vehicles with full armor package.

10. (U) Technical/Operational Characteristics (cont'd):

e. (U) References -

(U) Development Estimate: HQ DA Message, DAMA-ZA/DAMO-FDZ, 1614452 July 1984, Subject: High Survivability Program; Decision Coordinating Paper for M2A1E1/M3A1E1 High Survivability BFVS, October 5, 1987.

(U) Approved Program: AAE Bradley Program Baseline, February 26, 1990.

(U) Footnotes -

1/ Required armor protection levels are restated to conform with Annex VII of the approved Materiel Need for the A2, November 29, 1989.

2/ (U) Performance data not yet demonstrated for the A2, 67,000 lb. vehicle and the 25mm Gun mounted on the A2 vehicle. Vehicular demonstrated performance data will be reported after the completion of the 600 HP vehicle IPT and following the TECOM publication of those test results.

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars)

	(1) Development Estimate	(2) Approved Program	(3) Current Estimate
a. (U) Cost --			
Development (RDT&E)	$98.3	$ 387.9	$387.9
Vehicles	(34.3)	(238.9)	(238.9)
25mm Weapon/Ammo	(64.0)	(68.8)	(68.8)
Vehicle Improvement	N/A	(80.2)	(80.2)
Procurement (WTCV)	227.3	3497.6	3497.6
IFV/CFV	(170.6)	(3156.4)	(3156.4)
FPW	(N/A)	(9.0)	(9.0)
25mm Wpn	(54.2)	(125.7)	(125.7)
Initial Spares	(2.5)	(135.0)	(135.0)
Training Devices	(0.0)	(71.5)	(71.5)
Construction (MILCON)	N/A	19.2	19.2
Total: FY72 BASE YEAR $	325.6	3904.7	3904.7
Escalation	111.3	8675.8	8675.8
Development (RDT&E)	(23.8)	(340.8)	(340.8)
Procurement (WTCV)	(87.5)	(8296.2)	(8296.2)
Construction (MILCON)	(N/A)	(38.8)	(38.8)
TOTAL: Then-Year $	$436.9	$12580.5	$12580.5
b. (U) Quantities			
Development	15	21	21
Procurement	1190	8811	8811
Total	1205	8832	8832

11. (U) Program Acquisition Cost (cont'd):

c. (U) Foreign Military Sales --- Saudi Arabia: 200 M2A2 vehicles at a total estimated price of $550,000,000.

d. (U) Nuclear Costs---None

e. References--

Development Estimate: Development Concept Paper (DCP) No. 30, April 1972, with Cover Sheet Revision, September 1972. Decision Coordination Paper for M2E1/M3E1, November 30, 1984. Decision Coordination Paper for M2E1/M3A1E1 High Survivability BFVS, October 5, 1987.

Approved Program: AAE Bradley Program Baseline, February 26, 1990.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (then-Year) Dollars in Millions)

		Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. (U)	Program Acquisition	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1)	(U) Cost	12580.5	12052.8	12580.5
(2)	(U) Quantity	8811	8464 1/	8811
(3)	(U) Unit Cost	1.428	1.424	1.428
b. (U)	Current Procurement	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1)	(U) Cost	657.8	657.8	715.3
	Less CY Adv Proc	67.7	67.7	32.5
	Plus PY Adv proc	28.1	28.1	44.6
	Net Total	618.2	618.2	727.4
(2)	(U) Quantity	600	600	600
(3)	(U) Unit Cost	1.030	1.030	1.212

(U) Footnote:

1/ (U) The total acquisition quantity shown has been revised to exclude 21 R&D vehicles that are not planned to be part of the inventory objective. Such R&D units are not considered to be fully configured end items for the purpose of unit cost calculation.

13. (U) Cost Variance Analysis

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	122.1	314.8	-	436.9
Previous Changes:				
Economic	-1.7	-463.8	-2.4	-467.9
Quantity	+18.0	+4117.3	-	+4135.3
Schedule	+22.1	+747.4	-	+769.5
Engineering	+382.9	+1859.2	+29.9	+2272.0
Estimating	+31.1	+3536.0	+31.7	+3598.8
Other	+17.9	-	-	+17.9
Support	+135.6	+1154.7	-	+1290.3
Subtotal	+605.9	+10950.8	+59.2	+11615.9
Current Changes:				
Economic	+0.7	+164.4	-0.2	+164.9
Quantity	-	+289.5	-	+289.5
Schedule	-	-12.2	-	-12.2
Engineering	-	+103.7	-	+103.7
Estimating	-	-38.6	-1.0	-39.6
Other	-	-	-	-
Support	-	+21.4	-	+21.4
Subtotal	+.7	+528.2	-1.2	+527.7
Total Changes	+606.6	+11479.0	+58.0	+12143.6
Current Estimate	728.7	11793.8	58.0	12580.5

(U) (FY 1972 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	98.3	227.3	-	325.6
Previous Changes:				
Quantity	+11.1	+1223.1	-	+1234.2
Schedule	+13.8	+64.4	-	+78.2
Engineering	+162.9	+559.9	+9.0	+731.8
Estimating	+25.2	+990.4	+11.1	+1026.7
Other	+11.0		-	+11.0
Support	+65.1	+349.7	-	+414.8
Subtotal	+289.1	+3187.5	+20.1	+3496.7
Current Changes:				
Quantity	-	+66.7	-	+66.7
Schedule	-	-	-	-
Engineering	-	+24.7	-	+24.7
Estimating	+.5	-12.7	-0.9	-13.1
Other	-	-	-	-
Support	-	+4.1	-	+4.1
Subtotal	+0.5	+82.8	-.9	+82.4
Total Changes	+289.6	+3270.3	+19.2	+3579.1
Current Estimate	387.9	3497.6	19.2	3904.7

13. (U) Cost Variance Analysis Cont'd)

b. (U) Previous Change Explanations --

RDT&E

Economic:	Revised escalation indices.
Quantity:	Addition of six prototype vehicles to support the IFV/CFV Dev Phase.
Schedule:	Delays due to redirection of program from one-man weapon station with 20mm Gun/25mm Gun and TCW Subsystem (IFV/CFV configuration) which caused complete restructuring of R&D effort.
Engineering:	Design effort associated with redirection of program to IFV/CFV configuration; additional design effort of A1 configuration; incorporation of vehicle/modification costs (project D332) into the SAR reporting.
Estimating:	Revised estimate for government and contractor engineering; program adjusted to reflect contract deobligation, AMC decisions to withdraw funds, OSD inflation cut, and congressional action.
Other:	Engineering contractor cost growth.
Support:	Revised requirements for TMDE and "New Look" manuals.

Procurement

Economic:	Revised escalation rates.
Quantity:	Addition of 7,274 vehicles and associated increase in gun quantity.
Schedule:	Production delay due to extension of R&D effort and stretch-out of production to permit delivery of additional vehicles; reschedule of production during FY88 thru FY91; schedule changes applicable to increase in vehicle quantity.
Engineering:	Design changed to IFV/CFV, A1, and A2 configurations. Addition of high survivability requirements. Engineering changes applicable to increase in vehicle quantity. Improvements to optics, fire extinguishing system and track; incorporation of Enhanced Position Locating Reporting System (EPLRS) and electronic vs. mechanical transmission controller.
Estimating:	Revised production cost estimates based on more current data; application of revised historical escalation indices; revision of acquisition plan to include competition and multiyear procurement; estimating changes applicable to increase in vehicle quantity; delay in armor tile procurement from FY87 to FY91.
Support:	Changes in initial spares, peculiar support equipment, TMDE requirements, classroom spares; incorporation of BFVS training devices in SAR reporting structure; increases in spares, training devices and TMDE requirements to support increased quantities.

MILCON

Economic:	Revised escalation indices.
Estimating:	MILCON changes to cover BFVS unique sites.
Engineering:	Storage facilities for A2 tiles.

13. Cost Variance Analysis (Cont'd)

c. (1) Current Change Explanations -

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Dec 89 economic rates (Economic)	N/A	+0.7
Prior year deobligation (BY: -.1 TY: -.1); program adjustments (BY: -.5; TY: +.1); prior year inflation offset (BY: +1.1) (Estimating)	+0.5	---
(2) Procurement		
Revised Dec 89 economic rates (Economic)	N/A	+164.4
Increase in vehicle quantity:	+102.6	+449.5
O Increase from 8464 to 8811 vehicles (Quantity)	(+66.7)	(+289.5)
O Engineering changes applicable to increase in vehicle quantity (Engineering)	(+13.0)	(+55.1)
O Estimating changes applicable to increase in vehicle quantity (Estimating)	(+22.9)	(+104.9)
Production schedule acceleration of 60 vehicles to FY89 (Schedule)	---	-12.2
Addition of Digital Turret Distribution Box (DTDB) (Engineering)	+1.5	+6.7
Addition of P-900 armor (Engineering)	+10.2	+41.9
Changes due to the incorporation of the most recent contractual data available. (Estimating)	-35.6	-143.5
Reduction in initial spares cost due to changed method of funding and revised estimates for training devices and TMDE (Support).	+4.1	+21.4
(3) MILCON		
Revised Dec 89 economic rates (Economic)	N/A	-0.2
Revised estimates for storage facilities for A2 tiles (Estimating)	-0.9	-1.0

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14. (U) Program Acquisition Unit Cost (PAUC) History: (Then year dollars in millions)

a. (U) Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
.204	+.098	—	—	+.061	---	---	---	+.159	.363

b. Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
.363	-.034	+.188	+.086	+.270	+.404	+.149	+.002	1.065	1.428

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E — No active major contracts

b. (U) Procurement --

IFV/CFV/MLRS Production (10th Year):
FMC Corporation
San Jose, California
DAAE07-89-C-A026, FFP
Award: July 10, 1989
Definitized: July 10, 1989

	Initial Contract Price		
	Target	Ceiling	Qty
TOTAL:	$323.6	N/A	700
IFV/CFV ONLY:	$304.7	N/A	641

	Current Contract Price			Estimated Price at Completion	
	Target	Ceiling	Qty	Contractor	Program Manager
TOTAL:	$365.0	N/A	700	$417.5	417.5
IFV/CFV Only:	$339.1	N/A	641	$384.9	384.9

For FFP contracts, cost and schedule variances information is not required.

5. (U) Contract Information (cont'd)

IFV/CFV/MLRS Production (9th Year):
FMC Corporation
San Jose, California
DAAE07-88-C-A033, FFP
Award: June 30, 1988
Definitized: June 30, 1988

Initial Contract Price	Target	Ceiling	Qty
TOTAL:	289.9	N/A	594
IFV/CFV ONLY:	271.80	N/A	550

Current Contract Price	Target	Ceiling	Qty	Estimated Price at Completion: Contractor	Program Manager
Total:	$352.3	N/A	624	$360.2	$360.2
IFV/CFV Only:	$318.0	N/A	550	$326.7	$326.7

For FFP contracts, cost and schedule variances information is not required.

Transmission Production (FY's 89-91):
GEOS
Pittsfield, Massachusetts
DAAE07-89-C-A005, FFP
Award: December 7, 1988
Definitized: August 31, 1989

Initial Contract Price	Target	Ceiling	Qty
IFV/CFV ONLY	$148.5	N/A	1852

Current Contract Price	Target	Ceiling	Qty	Estimated Price at Completion: Contractor	Program Manager
Total:	$282.5	N/A	3001	$282.5	$282.5
IFV/CFV Only:	$148.5	N/A	1852	$148.5	$148.5

For FFP contracts, cost and schedule variances information is not required.

Gun Production (FY's 86-90:
McDonnell Douglas Helicopter
Mesa, Arizona
DAAA09-86-C-0438, FFP
Award: February 13, 1986
Definitized: December 11, 1986

Initial Contract Price	Target	Ceiling	Qty
	$29.5	N/A	761

Current Contract Price	Target	Ceiling	Qty	Estimated Price at Completion: Contractor	Program Manager
Total:	$142.0	N/A	3928	$142.0	142.0
IFV/CFV Only	$132.7	N/A	3832	$132.7	132.7

5. (U) Contract Information (cont'd)

Turret Drive System (FY's 88-91):
GEOS
Pittsfield, Massachusetts
DAAA09-88-C-0190, FFP
Award: February 28, 1988
Definitization: April 28, 1989

Initial Contract Price		
Target	Ceiling	Qty
$84.5	N/A	1079

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$125.0	N/A	1753	$125.0	$125.0

For FFP contracts, cost and schedule variances information is not required.

TOW-2 Production (FY88)
Hughes Aircraft Co.
El Segundo, CA
DAAH01-87-C-0582, FFP
Award: April 24, 1987
Definitized: April 22, 1988

Initial Contract Price		
Target	Ceiling	Qty
$122.0	N/A	436

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$122.0	N/A	436	$122.0	$122.0

For FFP contracts, cost and schedule variances information is not required.

---

c. (U) Military Construction --

No active major contracts.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status --

(1) (U) Percent Program Completed: 83.3% (25 yrs/30 yrs)

(2) (U) Percent Program Cost Appropriated: 72.0% (9059.5/12580.5)

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16. (U) Program Funding Summary Cont'd: (Current Estimate in Millions of Dollars)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY66-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-95)	Total
RDT&E	671.3	9.5	7.1	40.8	728.7
PROCUREMENT	7691.6	657.8	715.3	2729.1	11793.8
MILCON	29.3	-	-	28.7	58.0
TOTAL	8392.2	667.3	722.4	2798.6	12580.5

c. (U) Annual Summary ---

FISCAL YEAR	QTY	ROLLAWAY FY72 DOLLARS NONREC	ROLLAWAY FY72 DOLLARS REC	TOTAL BASE YEAR $	TOTAL THEN YEAR $ PROGRAM	TOTAL THEN YEAR $ OBLIGATED	TOTAL THEN YEAR $ EXPENDED	ESCL RATE (%)
APPROPRIATION: RDT&E 1/								
1966				1.5	1.2	1.2	1.2	2.7
1967				6.5	5.3	5.3	5.3	3.2
1968				2.8	2.4	2.4	2.4	3.6
1969				5.4	4.8	4.8	4.8	4.7
1970				1.9	1.8	1.8	1.8	5.5
1971				5.3	5.2	5.2	5.2	5.1
1972				2.1	2.2	2.2	2.2	4.6
1973				9.4	10.1	10.1	10.1	4.3
1974				17.2	20.1	20.1	20.1	8.0
1975				12.9	16.6	16.6	16.6	10.9
1976				24.0	32.8	32.8	32.8	6.6
197T				5.8	8.2	8.2	8.2	2.9
1977				39.9	57.5	57.5	57.5	2.6
1978				32.2	49.9	49.9	49.9	6.8
1979				25.2	43.5	43.5	43.5	8.4

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16. Program Funding Summary: (Current Estimate in Millions of Dollars) (Cont'd)

FISCAL YEAR	QTY	ROLLAWAY FY72 DOLLARS NONREC	ROLLAWAY FY72 DOLLARS REC	TOTAL BASE YEAR $	TOTAL THEN YEAR $ PROGRAM	TOTAL THEN YEAR $ OBLIGATED	TOTAL THEN YEAR $ EXPENDED	ESCL RATE (%)
APPROPRIATION: RDT&E (cont'd) 1/ 2/								
1980				20.6	38.7	38.7	38.7	10.6
1981				20.0	41.5	41.5	41.5	10.6
1982				41.8	92.2	92.2	92.2	7.6
1983				22.8	52.4	52.4	52.4	4.9
1984				12.6	30.1	30.1	30.1	3.8
1985				19.2	47.1	47.1	47.1	3.4
1986				7.9	19.9	19.9	18.0	2.8
1987				17.5	45.6	45.6	45.5	2.7
1988				8.0	21.5	21.5	21.0	3.0
1989				7.4	20.7	20.6	3.7	4.2
1990				3.3	9.5	2.0	0	4.0
1991				2.3	7.1			4.2
1992				1.2	3.8			4.0
1993				8.1	26.5			3.7
1994				3.1	10.5			3.4
SUBTOTAL	21			387.9	728.7	673.2	651.8	
APPROPRIATION: PROCUREMENT 1/ 2/								
1969		.4		.4	.4	.4	.4	2.7
1979		16.2	2.7	18.9	39.2	39.2	39.2	9.0
1980	100	18.5	98.2	125.1	276.7	263.2	262.9	11.8
1981	400	10.2	216.6	264.8	682.3	632.4	627.3	11.6
1982	600	1.4	280.9	319.3	889.3	820.4	810.9	14.3
1983	600	--	214.8	275.9	830.1	774.6	767.9	9.0
1984	600	12.1	220.2	300.0	930.3	853.2	848.6	8.0
1985	655	.6	240.1	289.9	921.4	850.6	841.3	3.4
1986	716	3.2	218.7	250.8	823.4	812.4	780.9	2.8
1987	662	1.5	228.9	255.5	863.4	827.8	753.0	2.7
1988	550	1.4	188.6	204.9	718.1	674.9	446.4	3.0
1989	641	.4	189.7	197.7	717.0	634.6	74.9	4.2
1990	600	1.1	157.1	175.6	657.8	102.0		4.0
1991	600	0	168.4	180.3	715.3			4.2
1992	600	0	183.5	190.6	782.5			4.0
1993	600	0	176.4	183.0	775.6			3.7
1994	600	0	161.1	165.9	724.8			3.4
1995	287	0	97.1	99.0	446.2			
SUBTOTAL	8811	67.0	3043.0	3497.6	11793.8	7285.7	6253.7	

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16. (U) Program Funding Summary (cont'd): (Current Estimate in Millions of $)

FISCAL YEAR	QTY	FY72 DOLLARS NONREC	FY72 DOLLARS REC	TOTAL BASE YEAR $	TOTAL THEN YEAR $ PROGRAM	TOTAL THEN YEAR $ OBLIGATED	TOTAL THEN YEAR $ EXPENDED	ESCL RATE (%)
APPROPRIATION: MILITARY CONSTRUCTION								
1983				3.7	9.4	9.4	9.4	4.9
1984				2.1	5.5	5.5	5.5	3.8
1985				4.1	11.0	11.0	11.0	3.4
1988				1.2	3.4	3.4	3.4	3.0
1993				8.1	28.7	0	0	3.7
SUBTOTAL				19.2	58.0	29.3	29.3	
TOTAL	8832	67.0	3043.0	3904.7	12580.5	7988.2	6934.8	

(U) Footnotes:

1/ Prior year programs were adjusted to finance and accounting records and to actual obligation levels when obligation authority expired.

2/ Obligations and expenditures for initial spares not included in PA total, due to data not being available to PMO, BFVS. MSCs' budget execution system for initial spares does not provide obligations and expenditures by weapon system.

17. (U) Production Rate Data:

a. (U) Annual Production Rates -- (The annualized production rates shown in the current estimate column differ from the annual funded buy quantities because the funded delivery period is 15 months for FY80, 9 months for FY81, and 6 months for FY95.)

Fiscal Year Buy	Production Rates (Quantity/Year) Development Estimate	Production Estimate	Current Estimate	Maximum 1/ Economic
1977	59	N/A		
1978	79	N/A		
1979	465	N/A		
1980	587	100	80	100
1981		400	533	500
1982		600	600	720
1983		617	600	720
1984		1006	600	720
1985		1080	655	750
1986		1080	716	792
1987		1080	662	792
1988		919	550	792
1989			641	792
1990			600	792
1991			600	792
1992			600	792
1993			600	
1994			600	
1995			576	

17. (U) Production Rate Data (Cont'd):

FY89 & prior production procurement are considered sunk; therefore, costing and scheduling for maximum economic production rate is only feasible for FY90 and subsequent procurements.

b. (U) Cost Variance -- Dollars in Millions, (NOTE: Subject to limitations on production rates above.)

Item		Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less MAX)	Maximum Economic
Prog Acq Cost	(BY$)	2475.8	+1428.9	3904.7	+12.1	3892.6
	(TY$)	7682.0	+4898.5	12580.5	+548.0	12032.5
PAUC	(BY$)	.360	+.083	.443	+.001	.442
	(TY$)	1.116	+.312	1.428	+.062	1.366

c. (U) Schedule Variance -- (Note: Subject to the limitations on production rates above.)

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance CE less Max)	Maximum Economic
Start Date (MO/YR)	2/80	NA	2/80	NA	2/80
Durations (in Months)	119	+82	201	+16	185
End Date (Mo/Yr)	12/89	+82	10/96	+16	6/95

d. (U) Deliveries (Plan/Actual) --

	To Date
RDT&E	21/21
Procurement	4691/4639

e. (U) Approved Design-to-Cost Goal--(Average Unit Rollaway Cost)

	Development Estimate	Current Estimate	Latest Approved Threshold
@ Qty 6882			
@ Peak Rate 60/mo			
FY80 Constant $	.543	NA	.597
Then-Year $	.818	NA	.877
@ Qty 8811			
@ Qty Rate 72/mo			
FY80 Constant $	NA		NA
Then-Year $	NA		NA

17. (U) Production Rate Data (Cont'd):

(U) Footnote -

1/ The ability to produce at the maximum economic rate of 792 vehicles is currently achievable and considers all Bradley, FMS, and derivative vehicle production with the existing contractor facilities and equipment. In order for the maximum economic rate not to be attainable, FMS production would have to increase from the planned seven to nine vehicles per month to beyond 15 monthly and derivative vehicle production would have to increase from five to beyond nine monthly.

18. (U) Operating and Support Costs:

a. Assumptions and Ground Rules -- Operating and support costs reflect world wide regular Army activity and are presented as average annual cost per fielded M2A2 and M3A2. These costs assume an average operating tempo of 850 miles per year. The source for the cost estimate is the BFVS Baseline Cost Estimate (BCE), dated August 1989.

b. Costs -- (FY72 Constant (Base-Year) Dollars in Millions)

COST ELEMENT	Avg Annual Cost Per Reg Army M2A2	Avg Annual Cost Per Reg Army M3A2
Spares	.010	.010
Ammunition/Missiles	.008	.008
Depot Maintenance	.005	.005
Replacement Training	.004	.004
Military Personnel	.065	.063
Modification/Kits	.002	.002
Other Sustainment	.003	.003
Total	.097	.095

c. Contractor Support Costs -- (Current (Then Year) Dollars in Millions)

FUNDING	FY1988/ FY1989	FY1990 YEAR	FY1991 YEAR	BALANCE TO COMPLETE	TOTAL
O&M	52.3	37.5	93.4		103.2

A-18 MLRS

SAR-89-118

~~CONFIDENTIAL~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: MLRS (Rocket Sys)

AS OF DATE: December 31, 1989

SUBJECT	PAGE
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1. (U) Designation and Nomenclature (Popular Name): HC/Launcher: M270 (Multiple Launch Rocket System (MLRS))

2. (U) DoD Component: ARMY

(U) Responsible Office and Telephone Number:
MLRS PROJECT OFFICE, ATTN: SAAE-FS-ML
US ARMY MISSILE COMMAND
REDSTONE ARSENAL
Huntsville, AL 35898-5700

COL William F. Hecker, Jr.
Assigned: September 21, 1987
AV 746-1195 COMM 205-876-1195

CLEARED AS AMENDED
FOR OPEN PUBLICATION
MAR 22 1990 21
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

4. (U) Program Elements/Procurement Line Items:
RDT&E: PE 64314A
PROCUREMENT: APPN 2032 ICN C67600/CA0257 (Army)
MILCON: Project Codes 446, 447, 763, 448, 445

5. (U) Related Programs: M77 Munitions, Bradley Fighting Vehicles, Battery Computer System, TACFIRE, 10-Ton Truck/Trailer, Scatterable Mine Warhead (German development), Terminal Guidance Warhead, Field Artillery Meteorological Data System, Test Set AN/USM-410, Binary Chemical Warhead, Sense and Destroy Armor, and Army Tactical Missile System.

Concur in Classification as marked
21 MAR 1990
SECURITY REVIEW, ODCSINT, HQDA

Classified by: Basic MLRS (U) M77 Warhead) SCG, 22 July 88

Declassify on: OADR

(THIS PAGE IS UNCLASSIFIED)

OASD(PA) DFOISR 90-T-0703/1

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6. (U) Mission and Description: a. (U) The MLRS is a multiple launch rocket system designed to supplement cannon weapons available to U.S. division and corps commanders for the delivery of a large volume of firepower in a very short time against critical, time sensitive targets. The MLRS Launcher firing both a dual purpose improved conventional submunition warhead on the M77 Rocket and an improved conventional submunition warhead on the Army TACMS Missile will provide an all weather, indirect fire capability both at midrange and at depth to attack the enemy's indirect fire weapons, air defense systems, and light material and personnel targets, especially during surge conditions when the threat's forces present targets in sufficient quantities and density to saturate available cannon weapon fire support. The system has the growth potential to adapt follow-on warheads such as terminal homing munitions, scatterable antitank mines, and chemical, to be fired on rockets, ballistic missiles and cruise missiles.

b. (U) The system consists of an MLRS Launcher, two disposable pods containing either six rockets or one Army TACMS missile each, a fire control system, and an azimuth/position reference unit. The carrier is a derivative of the Bradley/Fighting Vehicle (BFV) which used the same engine, transmission, and other mechanical systems. The carrier, when configured for MLRS, is designated M993. The rockets/missiles are loaded in the launch pods at the factory, shipped and stored in the pods, and [redacted]ed from the pods. Fuse settings are accomplished automatically by the [redacted]e control system.

(b)(1) [redacted]

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- (1) The Department of the Army (DA) approved a letter of agreement (LOA) for MLRS in September 1975. In January 1977, the Defense System Acquisition Review Council I (DSARC I) approved MLRS to enter validation with two competitive contractors and an option to later enter maturation/low rate production (LRP) with either one or two primes. In September 1977 Boeing, Seattle and Vought, Dallas were awarded the competitive validation contract for a period of 29 months which was later extended to a 32 month effort with in January 1978 to incorporate design changes to satisfy the German requirement for a scatterable mine warhead. In July 1979, a memorandum of understanding (MOU) on a cooperative program was signed by France, Germany, United Kingdom, and the United States. In 1982, Italy was admitted as an associate member of the basic MLRS program. The validation phase of the program successfully completed on schedule, within cost, and within DCP development test (DT)/operational test (OT) thresholds. The

7. [redacted] Program Highlights (Cont'd):

DSARC III held in May 1980 gave approval for MLRS to proceed into maturation, LRP, and initial production facilitization with a full-scale production decision in March 1983. The terminal guidance warhead and binary chemical warhead follow-on programs were initiated with approved LOA's October 1980 and March 1981, respectively.

(2) A General Officer Program Review (GOPR) conducted in March 1983 led to a full-scale production decision in April 1983. MLRS was also type classified Standard in April 1983. The initial operational capability (IOC) MLRS battery was fielded in March 1983 at Fort Riley, KS. The first overseas unit was deployed to Europe in September 1983 at Baumholder, Germany. The first multiyear contract was awarded in September 1983 to LTV Aerospace and Defense Company (LTVAD) to cover a 5-year firm fixed price contract (with economic price adjustment clause) with a negotiated two year option (FY88/FY89).

(3) The second multiyear procurement contract was awarded 30 June 1989 for a 5-year period (FY89-FY93).

b. [redacted] Significant Developments Since Last Report -- (1) The fly-to-buy program continues to successfully provide adequate ammunition support program requirements and MLRS fieldings. Sufficient Deep ack (DA) launchers were delivered from the contractor to meet first DA lding at Ft. Sill, OK.

(2) MLRS is expected to satisfy the mission requirement.

c. [redacted] Changes Since As of Date -- None.

8. [redacted] Threshold Breaches: There are currently no AAE Program Baseline (26 February 1990) Breaches.

9. [redacted] Schedule:

a. [redacted] Milestones --

	Planning Estimate	Approved Program	Current Estimate
Validation Contracts Awards(2)	SEP 77	N/A	SEP 77

9. [redacted] Schedule (Cont'd):

a. [redacted] Milestones --

	Planning Estimate	Approved Program	Current Estimate
DT/OTI (Government)			
Start	NOV 79	N/A	NOV 79
Complete	FEB 80	N/A	FEB 80
Initial Production Dlvry-Rckt	JAN 82	N/A	MAY 82
Initial Production Dlvry-Lnchr	FEB 82	N/A	SEP 82
TRADOC Deployment (FUE)	N/A	FEB 83	FEB 83
FORSCOM Deployment (FUE)	N/A	MAR 83	MAR 83
USAREUR Deployment (FUE)	N/A	AUG 83	AUG 83
Full-Scale Production Contract Award (Multiyear I 83-89)	N/A	SEP 83	SEP 83
EUSA Deployment (FUE)	N/A	JUN 84	JUN 84
First Delivery MYP I	N/A	FEB 85	FEB 85
USACEGE Deployment (FUE)	N/A	MAR 86	MAR 86
MYP-I Option III Award	N/A	DEC 87	DEC 87
ARNG Deployment (FUE)	N/A	SEP 89	SEP 89
MYP-I Option IV Award	N/A	NOV 88	NOV 88
First Delivery MYP-I Option III	N/A	JUN 89	JUN 89
First Delivery MYP-I Option IV	N/A	N/A	JUN 90
MYP-II Contract Award, FY89-93			
PY1 Award	N/A	JUN 89	JUN 89
PY2 Award	N/A	DEC 89	DEC 89
PY3 Award	N/A	OCT 90	NOV 90(Ch-1)
PY4 Award	N/A	OCT 91	NOV 91(Ch-1)
PY5 Award	N/A	OCT 92	NOV 92(Ch-1)
First Delivery MYP-II PY1	N/A	DEC 90	DEC 90
First Delivery MYP-II PY2	N/A	APR 91	APR 91
First Delivery MYP-II PY3	N/A	APR 92	APR 92
First Delivery MYP-II PY4	N/A	APR 93	APR 93
First Delivery MYP-II PY5	N/A	APR 94	APR 94
Milestone I	JAN 77	N/A	JAN 77
Milestone IIIA	MAY 80	N/A	MAY 80
Milestone IIIB	NOV 82	MAR 83	MAR 83
Milestone IOC	NOV 82	MAR 83	MAR 83

b. [redacted] Previous Change Explanations --

(1) The schedule variances for milestones Initial Production Delivery through IOC are due to the FMC strike which resulted in a 4-month slip in the MLRS program schedule. ASARC IIIb was downgraded to a General Officer Program Review (GOPR) by the Army which satisfied Milestone IIIb requirements.

(2) Realigned schedule milestone IAW DAE Program Baseline, dated 2 March 1989.

9. (U) Schedule (Cont'd):

b. (U) Previous Change Explanations --

(3) Delay in multiyear contract award (from March 1989 to June 1989) was due to change in requirements, quantity increases, and difficulty encountered with finalization of contract negotiations.

c. (U) Current Change Explanations --

(Ch-1) Changed from October to November to reflect a more realistic estimate of contract awards based on fund availability.

d. (U) References --

Planning Estimate: DCP No. 165, 15 May 1979.

Approved Program: AAE approved Program Baseline, dtd 26 February 1990.

10. (U) Technical/Operational Characteristics:

Development Characteristics	Plan Est	Approved Program Goal/Threshold		Demonstrated Perf	Current Estimate
a. (U) Technical --					
(U) System Accuracy (mils)	(b)(1)				
Maximum Range (km)	35	N/A	N/A	31.8	31.8
b. (U) Operational --					
(U) Reliability					
Rocket Preflight, Launch, & In-Flight	0.97	N/A	N/A	0.94	0.96
Launcher	0.92	N/A	N/A	0.87	0.87
(U) Maintainability					
Launcher (Mean Time to Repair (MTTR)					
Organizational	1.0	1.0	2.3	2.3	2.3
Direct/General	4.0	4.0	2.4	2.4	2.4

10. [redacted] Technical/Operational Characteristics (Cont'd):

b. [redacted] Operational --	Plan Est	Approved Program Goal/Threshold		Demon-strated Perf	Current Estimate
[redacted] Availability					
Operational	N/A	0.78	0.78	0.78	0.78
Essential Unscheduled Maintenance Actions Per 1000 hours of Launcher Module operation	N/A	23	23	23	23
Percent of Items Removed with no Evidence of Failure	N/A	7%	7%	7.2%	7%
[redacted] Reaction Time (mins)	(b)(1) [redacted]				
Prepare to Fire					
Displace					
Total Mission					

Production Hardware Characteristics

Acceptance Criteria					
Rocket Fly-to-Buy (FTB) 2/					
Reliability	N/A	0.89	0.89		0.96(CH-1)
[redacted] Precision Accuracy 3/					
At 24-26 km		(b)(1) [redacted]			
Range	N/A				
Deflection	N/A				
At 22-24 km					
Range	N/A				
Deflection	N/A				
[redacted] Launchers - Production Reliability Acceptance Test (PRAT) (Fire Missions w/o failure) 4/	N/A	40	40		40

c. [redacted] Previous Change Explanations --

(1) [redacted] Maximum range decrease of 3km (35km to 31.8km) meets the System Threshold. It is not cost effective to go from 32km to 35km because 16.5% of the munitions must be given up to reach only 1.9% more targets.

(2) [redacted] Demonstrated performance data based upon DT/OT III results. System accuracy changed from (b)(1) [redacted] based on test data acquired through 1984.

10. (U) Technical/Operational Characteristics (Cont'd):

(3) (U) Fly-to-Buy reliability current estimate changed from 0.94 to 0.95. FTB change based on update of fly-to-buy test results.

d. (U) Current Change Explanations --

Ch-1 (U) FTB reliability Current Estimate changed from .95 to .96 based on current FTB tests.

(b)(1)

Footnotes:
1/ Launcher reliability was expressed in the required operational capability (ROC) as the probability of successfully completing an operational mission. the range of this probability was from 0.88 to 0.92 for total launcher reliability. MFCBF and MKBF are variables included in overall launcher reliability, but there are many combinations of these two values that can meet the overall launcher reliability and, in fact, the value of MFCBF of 250 and MKBF of 750 would exceed launcher reliability requirements of the ROC. Therefore, launcher reliability was measured and reported against the total launcher mission reliability requirement of 0.88 to 9.92.

2/ Approved Program based on production contract rocket FTB Acceptance Requirements. FTB performed on each lot of rockets (1 month production, but not more than 500 rockets).

3/ Precision error standard deviation of a ripple firing of 6 rockets.

4/ Approved Program based on production contract launcher PRAT Acceptance Requirements.

e. (U) References --

Planning Estimate: DCP No. 165, 15 May 1979.

Approved Program: AAE Approved Program Baseline, 26 February 1990.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Planning Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	261.0	267.7	267.7
Procurement	1971.3	2703.0	2703.0
M77	(1624.6)	(1652.3)	(1652.3)
Practice Rounds	(97.9)	(120.0)	(120.0)
Launchers	(118.9)	(797.8)	(797.8)
Total Flyaway	(1841.4)	(2570.1)	(2570.1)
Other Wpn Sys Cost	(123.0)	(20.5)	(20.5)
Peculiar Support	(0.0)	(0.0)	(0.0)
Initial Spares	(6.9)	(112.4)	(112.4)
Construction	0.0	44.7	44.7
Ops. and Maint. (O&M)	0.0	0.0	0.0
Total FY 78 Base-Year $	2232.3	3015.4	3015.4
Escalation	1221.7	3312.9	3312.9
Development (RDT&E)	(39.2)	(66.7)	(66.7)
Procurement	(1182.5)	(3205.4)	(3205.4)
Construction (MILCON)	(0.0)	(40.8)	(40.8)
Ops. and Maint. (O&M)	(0.0)	(0.0)	(0.0)
Total Then-Year $	3454.0	6328.3	6328.3
b. Quantities --			
Development (RDT&E)	10	10	10
Procurement	173	840	840
Construction (MILCON)	0	0	0
Ops. and Maint. (O&M)	0	0	0
Total	183	850	850

Paragraph 11 Comments:

11a RDT&E cost does not include $37.6 (escalated) funding by MOU participants.

The quantities shown in 11b are for launchers. The corresponding values for rockets are as follows:

	Planning Estimate	Approved Program	Current Estimate
Development (RDT&E)			
Rounds	654	504	504
Procurement			
M77 Rounds	362,832	517,110	517,110
Practice Rounds	27,648	50,418	50,418
Total	391,134	568,032	568,032

11. (U) Program Acquisition Cost (Cont'd)

c. (U) Foreign Military Sales -- Sales to date to codevelopment partners, Netherlands, Turkey, Bahrain, NATO Maintenance and Supply Agency (NAMSA) and Special Defense Acquisition Fund (SDAF) equal $378.4M.

d. (U) Nuclear Costs -- None.

e. (U) References --

Planning Estimate: DCP No. 165, 15 May 1979.

Approved Program: AAE Approved Program Baseline, 26 February 1990.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. (U) Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1) Cost	6328.3	5836.1	6328.3
(2) Quantity	850.0	687.0	850.0
(3) Unit Cost	7.445	8.495	7.445
b. (U) Current Procurement	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	517.5	517.5	373.5
Less CY Adv Proc	63.4	63.4	59.6
Plus PY Adv Proc	32.9	32.9	35.4
Net Total	487.0	487.0	349.3
(2) Quantity	68.0	68.0	66.0
(3) Unit Cost	7.162	7.162	5.292

13. (U) Cost Variance Analysis:

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	300.2	3153.8	0.0	3454.0
Previous Changes:				
Economic	+18.2	+742.5	+2.2	+762.9
Quantity	-	+2041.8	-	+2041.8
Schedule	-	-2.0	-	-2.0
Engineering	-	-	-	-
Estimating	+6.4	-295.3	+83.3	-205.6
Other	+9.5	+9.1	-	+18.6
Support	-	+86.4	-	+86.4
Subtotal	+34.1	+2582.5	+85.5	+2702.1
Current Changes:				
Economic	-	+103.9	-	+103.9
Quantity	-	+163.7	-	+163.7
Schedule	-	+0.5	-	+0.5
Engineering	-	-	-	-
Estimating	-	-72.0	-	-72.0
Other	-	-	-	-
Support	-	-23.9	-	-23.9
Subtotal	-	+172.2	-	+172.2
Total Changes	+34.1	+2754.7	+85.5	+2874.3
Current Estimate	334.3	5908.5	85.5	6328.3

(U) Cost Variance Analysis (Cont'd):

(FY 1978 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	261.0	1971.3	0.0	2232.3
Previous Changes:				
Quantity	-	+864.0	-	+864.0
Schedule	-	-27.5	-	-27.5
Engineering	-	-	-	-
Estimating	+3.2	-153.5	+44.7	-105.6
Other	+3.5	+6.5	-	+10.0
Support	-	+16.0	-	+16.0
Subtotal	+6.7	+705.5	+44.7	+756.9
Current Changes:				
Quantity	-	+68.5	-	+68.5
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-31.9	-	-31.9
Other	-	-	-	-
Support	-	-10.4	-	-10.4
Subtotal	-	+26.2	-	+26.2
Total Changes	+6.7	+731.7	+44.7	+783.1
Current Estimate	267.7	2703.0	44.7	3015.4

b. (U) Previous Change Explanations --

RDT&E

Economic: Revised escalation indices.

Estimating: Increase in cost based on validation phase (VP) program; deletion of RDTE effort funded by MOU contribution; adjustment in prior year escalation and deletion of anticipated reprogramming. Residual RDTE requirements resulting from operational testing and development of test program sets for system automatic test equipment. Conversion of prior base year dollars to then year and cost growth on finalization of R&D contract.

Other: 11-week strike at FMC resulting in 4-month slip in the program schedule.

13. (U) Cost Variance Analysis (Cont'd):

b. (U) Previous Change Explanations -- (Cont'd)

PROCUREMENT

Economic:	Revised escalation indices.
Quantity:	+ 103 Launchers for force structure changes; + 57 Launchers for POMCUS; + 60 Launchers for POMCUS, net reduction of 45 Launchers in FY86 Budget; + 143 Launchers; + 101 Launchers, reduction of 3 Launchers in FY90 + 88 Launchers in FY93 and FY94; additional 163 launchers to replace battalion artillery; 137490 tactical rockets, 19344 practice rockets, for expanded MLRS force structure.
Schedule:	Restoration of production rate; establishment of multiyear procurement.
Estimating:	Revised round and launcher cost based on VP program. Revised cost estimate for maturation phase changes to LRP hardware. Adjustment in prior year escalation; deletion of anticipated reprogramming. Increase in base year dollars; realignment of advanced materials funding. estimate associated with quantity changes and reduction of administrative services; reduction in cost of submunitions and revised EPA forecast for multiyear contract. Additional funds for competition-quality. Expanded MLRS force structure. Variance between actual cost and baseline cost of additional launchers.
Other:	11-week strike at FMC resulting in 4-month slip in the program schedule.
Support:	Refinement of funding requirement for initial spares. Additional spares required to support expanded force structure.

MILCON

Economic:	Revised escalation indices.
Estimating:	Addition of MCA funding requirements to SAR reporting; revised estimate, increase in construction requirements. Economic escalation rates. Refinements of MILCON requirements.

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
(2) PROCUREMENT		
Revised escalation indices - (Economic)	0	+103.9

131 [redacted] Cost Variance Analysis (Cont'd):

c. [redacted] Current Change Explanations -- (Cont'd)

	(Dollars in Millions) Base-Year	Then-Year
Congressional direction to purchase an additional 16,788 tactical rounds, plus the purchase of an additional 3426 practice rocket in FY 90. (Quantity)	+68.5	+163.7
The increased rocket purchases mentioned above (Quantity) and a required Ammonium Perchlorate surcharge resulted in the deferment of the purchase of 9 launchers (2 in FY 90, 7 in FY 91) to FY 92 thru FY 94. (3 additional in each year) (Schedule)	0	+.5
Expansion of program requirements. These deltas relect the current cost variance as applied to the 1980 Learning Curve indicating better performance than the Learning curve predicted and also includes the additional quantities of tactical and practice rockets. (Estimating)	-31.9	-72.0
Initial spares in FY 91 and FY 92 will be purchased with Army Stock Fund. (Support)	-10.4	-23.9

(3) MILCON

14. [redacted] Program Acquisition Unit Cost (PAUC) History: (Then-Year Dollars in Millions)

a. [redacted] Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial) SAR Est)	Changes								PAUC (Prod Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
18.90	--	--	--	--	--	--	--	--	18.90

b. [redacted] Current Baseline Estimate to Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
8.90	+1.020	-12.24	-0.002	--	-0.327	+0.022	+0.074	-11.45	7.445

15. [redacted] Contract Information: (Then-Year Dollars in Millions)

a. [redacted] Procurement

MLRS: LNCHR/TACT/PRAC

LTV Aerospace & Defense Co.
Dallas, TX
DAAH01-83-C-A107, FFP
Award: September 1, 1983
Definitized: September 1 , 1983

Initial Contract Price		
Target	Ceiling	Qty
See Information Below		

Current Contract Price		
Target	Ceiling	Qty
See information below		

Estimated Price At Completion	
Contractor	Program Manager
See information below	

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Varianaces To Date	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: LTV Aerospace & Defense Co.
DAAH01-83-A107, FFP

INITIAL CONTRACT PRICE
($M)

	TARGET	CEILING	QUANTITY LAUNCHER/TACTICAL/PRACTICE
MYP-1	$ 89.9	N/A	0/ 229/110
MYP-2	415.0	N/A	76/ 6000/658
MYP-3	316.8	N/A	44/ 8412/658
MYP-4	300.7	N/A	29/12000/658
MYP-5	253.0	N/A	0/12000/658
OPT-3	263.2	N/A	0/12000/658
OPT-4	127.7	N/A	0/ 5085/660

CURRENT CONTRACT PRICE

	TARGET	CEILING	QUANTITY LAUNCHER/TACTICAL/PRACTICE	ESTIMATED PRICE AT COMPLETION CONTR	PM
MYP-1	$ 89.8	N/A	0/ 229/110	$ 89.8	$ 89.8
MYP-2	398.9	N/A	76/ 6000/658	398.9	398.9
MYP-3	289.7	N/A	44/ 8412/658	289.7	289.7
MYP-4	262.5	N/A	29/12000/658	262.5	262.5
MYP-5	214.6	N/A	0/12000/658	214.6	214.6
OPT-3	215.7	N/A	0/12000/658	236.6	215.7
OPT-4	111.5	N/A	0/ 5085/660	111.5	111.5

[redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

MLRS: LAUNCHER

LTV Aerospace & Defense Co.
Dallas, TX
DAAH01-87-C-0220, FFP
Award: June 1, 1987
Definitized: January 1, 1988

Initial Contract Price		
Target	Ceiling	Qty
$41.3	$0.0	44.0

Current Contract Price		
Target	Ceiling	Qty
$79.8	$0.0	70.0

Estimated Price At Completion	
Contractor	Program Manager
$79.8	$79.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: N/A

MLRS: LNCHR/TACT/PRAC

LTV Aerospace & Defense Co.
Dallas, TX
[redacted]01-89-C-0336, FFP
[redacted]d: June 30, 1989
[redacted]nitized: June 30, 1989

Initial Contract Price		
Target	Ceiling	Qty
See information below		

Current Contract Price		
Target	Ceiling	Qty
$0.0	$0.0	0.0

Estimating Price At Completion	
Contractor	Program Manager
$0.0	$0.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: LTV Aerospace & Defense Co.
DAAH01-87-C-0220, FFP

INITIAL CONTRACT PRICE
($M)

	TARGET	CEILING	QUANTITY LAUNCHER/TACTICAL/PRACTICE
MYP-1	$176.1	N/A	62/17490/ 570
MYP-2	198.7	N/A	41/24000/ 120
FY90 OPT	137.2	N/A	27/16788/3756
MYP-3	210.6	N/A	44/24000/1878
MYP-4	174.0	N/A	44/24000/5592
MYP-5	182.5	N/A	44/24000/5592

16. [redacted] Program Funding Summary:

a. [redacted] Program Status --

(1) Percent Program Completed: 78.9% (15 yrs/19 yrs)

(2) Percent Program Cost Appropriated: 73.0% ($4621.4 / $6328.3)

b. [redacted] Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY76-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-94)	Total
RDT&E	334.3	-	-	-	334.3
Procurement	3684.1	517.5	373.5	1333.4	5908.5
MILCON	85.5	-	-	-	85.5
Total	4103.9	517.5	373.5	1333.4	6328.3

c. [redacted] Annual Summary --

Fiscal Year	Qty	Flyaway FY78 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-Pended	
Appropriation: 2040 Research, Development, Test & Eval, Army								
1976				1.1	1.0	1.0	1.0	6.9
197T				0.4	0.4	0.4	0.4	2.9
1977				7.2	6.9	6.9	6.9	2.6

16. (U) Program Funding Summary (Cont'd):

c. (U) Annual Summary --

Fiscal Year	Qty	Flyaway FY78 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-Pended	
Appropriation: 2040 Research, Development, Test & Eval, Army (Cont'd)								
1978				44.9	46.4	46.4	46.4	7.0
1979				61.7	70.9	70.9	70.9	8.4
1980				54.2	67.8	67.8	67.8	9.4
1981				50.8	70.0	70.0	70.0	11.9
1982				27.3	40.0	40.0	39.9	7.6
1983				16.9	25.9	25.9	25.4	4.9
1984				2.0	3.2	3.2	3.2	3.8
1985				1.2	1.8	1.8	1.4	3.4
Subtot	10			267.7	334.3	334.3	333.3	
Appropriation: 2032 Missile Procurement, Army								
1980	12	14.7	33.0	49.0	66.9	65.5	65.3	9.7
1981	32	15.7	56.8	74.4	117.9	114.5	113.3	11.9

[redacted] Program Funding Summary (Cont'd):

Fiscal Year	Qty	Flyaway FY78 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-Pended	
Appropriation: 2032 Missile Procurement, Army (Cont'd)								
1982	68	10.0	90.2	108.3	189.8	172.7	170.8	14.3
1983	72	11.6	201.5	231.0	436.1	421.4	418.5	9.0
1984	76		269.8	277.4	537.0	507.7	487.5	8.0
1985	44		249.7	262.4	527.5	491.5	385.0	3.4
1986	44		220.6	232.1	477.5	470.5	352.8	2.8
987	44		206.7	213.6	456.5	455.1	436.6	2.7
1988	24		178.4	189.0	419.2	416.7	348.5	3.1
1989	62		186.2	198.0	455.7	445.1	73.3	4.2
1990	68		206.3	216.0	517.5	179.0		4.0
1991	66		149.4	150.2	373.5			4.2
1992	76		150.7	151.5	389.5			4.0
1993	76		159.7	171.8	456.0			3.7
1994	76		159.2	178.3	487.9			3.4
[redacted]btot	840	52.0	2518.2	2703.0	5908.5	3739.7	2852.1	

Program Funding Summary (Cont'd):

Fiscal Year	Qty	Flyaway FY78 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-Pended	
Appropriation: 2050 Military Construction, Army								
1982				9.4	16.4			7.6
1983				14.0	26.4			4.9
1984				9.6	18.5			3.8
1985				4.7	9.4			3.4
1986				5.4	11.1			2.8
1987								2.7
1988								3.1
1989				1.6	3.7			4.2
1990								
Subtot	0			44.7	85.5			
Total	850	52.0	2518.2	3015.4	6328.3	4074.0	3185.4	

[redacted] Production Rate Data:

a. [redacted] Annualized Production Rates --

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1980	36	12	12	12
1981	48	32	32	32
1982	68	68	68	68
1983	72	72	72	72
1984	76	76	76	76
1985	48	44	44	44
1986	70	29	44	44
1987	0	0	44	44
1988	0	33	24	24
1989	0	27	62	62
1990	0	0	68	68
1991	0	0	66	73
1992	0	0	76	76
1993	0	0	76	76
1994	0	0	76	76

(U) Production Rate Data (Cont'd):

b. (U) Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Acq. Cost (BY $)	2216.0	+ 799.4	3015.4	0.0	3015.4
(TY $)	4302.7	+2,025.6	6328.3	0.0	6328.3
PAUC Cost (BY $)	5.5	-1.953	3.547	0.000	3.547
(TY $)	10.7	-3.255	7.445	0.000	7.445

c. (U) Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date(Mo/Yr)	APR 80	N/A	APR 80	N/A	APR 80
Duration(in mon)	92	+103	195	0.0	195
End Date (Mo/Yr)	Dec 87	+103	JUL 96	N/A	JUL 96

d. (U) Deliveries (Plan/Actual) --

	To Date
RDT&E	10/10
Procurement	374/372
MILCON	0/0
O&M	0/0

(U) Production Rate Data (Cont'd):

e. (U) Approved Design-to-Cost Goal --

	Planning Estimate	Current Estimate	Latest Approved Threshold
	(Average Unit Flyaway Cost)		
@ Qty 393 - @ Peak Rate:	10/mo		
FY 80 Base-Year $	1.2	1.2	1.5
Then Year $	2.0	2.0	0.0
@ Qty 0 (1st three years) - @ Peak Rate:		0/mo	
FY 80 Base-Year $	0.0	0.0	0.0
Then Year $	0.0	0.0	0.0

Paragraph 17 Comments:

17a. Annual Production Rates (Cont'd)
Annual Production Rates (M77 Rounds)

	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1980	1832	1374	1374	1374
1981	2552	2340	2340	2340
1982	3328	2496	2496	2496
1983	21821	23640	23640	23640
1984	33230	36000	36000	36000
1985	50472	50472	50472	50472
1986	72000	72000	72000	72000
1987	72000	72000	72000	72000
1988	72000	72000	72000	72000
1989	61020	30510	48000	48000
1990			40788	40788
1991			24000	72000
1992			24000	72000
1993			24000	
1994			24000	

17b. NONE

17c. Schedule Variance (Cont'd)
Schedule Variance (M77 Rounds)

	Production Estimate	Variance (CE-PdE)	Current Estimate	Variance (CE - Max)	Max. Econ.
Start Date (Mo/Yr)	APR 80	N/A	APR 80	N/A	APR 80
Duration (Months)	126	+62	188	+36	152
End Date (Mo/Yr)	OCT 90	N/A	DEC 95	N/A	DEC 92

[redacted] Production Rate Data (Cont'd):

17d. Deliveries (Plan/Actual) (Cont'd)

		PLAN	ACTUAL	
RDT&E	Rockets	504	470	1/
PROCUREMENT	Tactical Rockets	302322	324432	
	Practice Rockets	21780	22242	

17e. Approved Design-to-Cost Goal (Cont'd)

(Average Unit Flyaway Cost)

	M77 Rnds.	Pract. Rnds.	Launchers
M77 Rounds Qty. Totals:	362,832	27,648	393
Peak Rates:	6,000	330	10

		APPROVED PROGRAM	CURRENT ESTIMATE	LATEST APPROVED THRESHOLD
M77 Rnds.	Constant FY80$:	.004	.004	.007
	Then-Year $:	.008	.007	
Pract. Rnds.	Constant FY80$:	.003	.003	
	Then-Year $:	.005	.005	
Launcher:	Constant FY80$:	1.249	1.157	1.499
	Then-Year $:	1.980	2.050	

1/ LTV delected 17 rockets from their program due to cost ceiling placed on contract on 10 April 1979 (validation phase). An additional 17 rockets were deleted from maturation phase in June 1981 due to restructuring of the test program.

18. [redacted] Operating and Support Costs:

a. [redacted] Assumptions and Ground Rules --

The unit for tracking O&S costs is a firing battery. The O&S costs are estimated in an annual Baseline Cost Estimate (BCE) (Latest validated Dec 89) update. The BCE updates operating tempo, reliability/maintainability, maintenance concept, manning and logistics policies. This BCE information is integrated into the annual update of the MLRS O&S Cost Reduction Program and provides the methodology to portray the O&S costs per battery. A typical operating year is selected from the annual BCE update and divided by the number of MLRS batteries deployed to give an O&S cost per battery. This typical operating year is a point in time after completion of fielding, when the operating and support costs are neither increasing or decreasing in magnitude due to fielding changes.

[redacted]

18 (U) Operating and Support Costs (Cont'd):

b. (U) Costs -- (FY 1978 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per Battery	Avg Annual Cost Per (Antecedent)
Battery	3.0	0.0
Total	3.0	0.0

c. (U) Contractor Support Costs -- (Current (Then-Year) Dollars in Millions)

Funding	FY1990 & Prior	FY1991		Balance To Complete	Total
O&M	4.4	3.8	---	---	8.2
Industrial Fund	---	---	---	---	---
Total	4.4	3.8	---	---	8.2

Paragraph 18 Comments:
Average O&S cost per battery for FY 2001 equals $6.626M (FY90 constant dollars) based on the Nov 89 Basic BCE.

(L)

N-18 HARM

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SAR-89-022

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: HARM (AGM-88A/B/C)

AS OF DATE: December 31, 1989

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1. (U) Designation/Nomenclature (Popular Name): AGM-88A/B/C High Speed Anti-Radiation Missile (HARM)

2. (U) DoD Component: U.S. Navy (Executive Service) and U.S. Air Force

3. (U) Responsible Office and Telephone Number:

Defense Suppression Systems
Program Office
Naval Air Systems Command
Washington, D.C. 20361

PM: CAPT L. D. Pfitzenmaier, USN
Assigned: 17 March 1989
AUTOVON 222-7563
Commercial: (202) 692-7563

4. (U) Program Elements:

RDT&E: 0603313N (W1188, W1189); 0603363N (WSH07) (Shared funding)
0604360N (W0553, W1240); 0205601N (W1780) (Shared funding)
0603320N (W1807); 0603303N (W1807) (Shared funding)
0207162F (642330); 0603320F (643327)
Procurement: APPN 1507 ICN 302227
APPN 3020 ICN M88AAG

5. (U) Related Programs: None.

No Security Objection to Open Publication
Office of the Chief of Naval Operations
Dept. of the Navy
90 C 0635

~~Classified by: OPNAVINST 5513.2A-30~~
~~Review on: OADR~~
~~AS AMENDED~~

MAR 21 1990 22

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6. (U) Mission and Description: HARM is a tactical air-to-surface missile designed to suppress or destroy land and sea based radars which direct enemy air defense systems. HARM is a design evolution of older ARM weapons (SHRIKE and STANDARD ARM) and is replacing them in the Navy and Air Force inventory. HARM is fully operational on the A-7E, EA-6B, F/A-18, A-6E and F-4G aircraft, and is being integrated on the F-16C/D and F-14D aircraft. Performance characteristics include: high speed, large footprint, high sensitivity to weak signals, and threat reactive software reprogrammability. HARM weighs 807 lbs, is 164 inches long and 10 inches in diameter.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- (U) DCP 93 dated July 1972 recommended development of the HARM Weapon System. A DSARC I Management Review in October 1972 authorized Advanced Development. In May 1974, Texas Instruments (TI), Dallas, TX, won a competitive source selection for integration of the weapon system. At a HARM DSARC II in January 1977 the program was directed to remain in Advanced Development to prototype an expanded capability (EXCAP) in frequency and aerodynamic maneuverability. A DSARC IIA in February 1978 directed the HARM program to proceed to Full Scale Engineering Development with the EXCAP version. The Secretary of Defense notified Congress of readiness for production on 8 December 1980.

(U) DSARC III was on 30 March 1983. The Secretary of Defense on 20 April 1983 approved full-scale production. FY 84 Congressional action directed the initiation of the HARM Low Cost Seeker (LCS) program.

(U) A hardware change to incorporate a reprogrammable guidance computer memory was initiated to provide a capability for field reprogramming of missile tactical software (missile designation AGM-88B).

(U) HARM missiles were first used in combat against Libya in March/April 1986. A total of 40 HARMs were fired with very successful results.

(U) A HARM Improvement Plan (HIP) to expand the anti-radiation industrial base and provide improved missile performance to meet new surface-to-air threats in the 1990's was forwarded to Congress in 1987. HIP used two competing guidance section designs - Block IV and Low Cost Seeker (LCS) (designated the AGM-88C1 and C2 respectively).

(U) The HARM Block IV is a TI upgrade to the existing guidance section. Per congressional language, TI is paying the development costs with the government providing support funding and government furnished equipment. The Low Cost Seeker is a new design for the guidance section that originated at NAVWPNCEN, using microwave and signal processing technology. FY87 Congressional language directed that NAVAIRSYSCOM assume program management of LCS.

(U) Ford Aerospace and Communications Corp. received a fixed price (incentive) contract award in Feb 1988 for delivery and testing of 45 pre-production missile (PPM) seekers.

(U) Texas Instruments completed and successfully qualification tested demonstration Block IV guidance sections.

(U) Block III software completed the design, code and validation phase. Concurrent development and operational testing will continue to projected completion in the first quarter of FY1990.

(U) An improved HARM warhead is undergoing qualification testing was phased into production in FY1989.

b. (U) Significant Developments Since Last Report -- (U) LCS commenced contractor testing with engineering models. Ford has started fabrication of 45 pre-production models.

(U) Block IV completed contractor testing with all 5 firings successful.

(U) Block III successfully completed testing in first quarter FY90. First deliveries to the government are scheduled in April 1990.

(U) The improved warhead required redesign which will cause its production to slide to FY91.

(U) HARM is expected to satisfy the mission requirement.

c. (U) changes since "As Of" Date --

8. (U) Threshold Breaches: There are currently no DAE baseline (dated 31 December 1988) breaches.

9. [redacted] Schedule:

a. Milestones -- [redacted]

	Development Estimate	Approved Program	Current Estimate
DSARC I	Oct 72	Oct 72	Oct 72
Weapon Systems Integration Contract Award	May 74	May 74	May 74
Contractor Initial Guided Missile Firing	Oct 76	Oct 76	Oct 76
DSARC IIA	Feb 78	Feb 78	Feb 78
Demonstrate Increased Maneuverability	Feb 79	Feb 79	Feb 79
Prototype Phase DT&E			
Start	Mar 78	Mar 78	Mar 78
Complete	Dec 79	Oct 80	Oct 80
DSARC IIB	Sep 79	Nov 80	Nov 80
Navy Test Evaluation (NTE)			
Start	Apr 80	May 81	May 81
Complete	Sep 80	Oct 81	Oct 81
Joint Navy OPEVAL/Air Force IOT&E			
Start	Dec 80	Nov 81	Nov 81
Complete	Jul 81	Nov 82	Nov 82
Initial Production Contract (Definitized)	N/A	Dec 81	Dec 81
Full-Scale Production Contract (Definitized)	N/A	Sep 82	Sep 82
DSARC III (Full Rate Production)	Sep 81	Mar 83	Mar 83
Navy IOC (A-7E)	Sep 81	Nov 83	Nov 83
Air Force IOC (F-4G)	Aug 82	Sep 84	Sep 84
IOC on F/A-18 Aircraft (Navy)	N/A	Jan 85	Jan 85
IOC on EA-6B Aircraft (Navy)	N/A	Aug 86	Aug 86
IOC on A-6E Aircraft (Navy)	N/A	N/A	Jul 88
NPDM II (LCS)	N/A	N/A	Jan 88
NPDM IIIA (LCS)	N/A	Jul 90	Jun 91(Ch-1)
NPDM IIIB (LCS)	N/A	Jul 92	May 92
NPDM III (Block IV)	N/A	N/A	Apr 91
IOC (LCS)	N/A	Apr 92	Aug 93(Ch-2)

b. Previous Change Explanations -- (U) The NTE schedule changes were the result of contractor delay in delivering missiles for TECHEVAL and additional delays required to validate new software. Changes in the Joint Navy OPEVAL/Air Force IOT&E date were caused by: contractor's late delivery of TECHEVAL missiles; adverse weather and certain hardware shortages to support NTE; completion of corrective action for problems discovered early in OPEVAL; interfacing problems with the A-7 avionics; and correction of missile technical problems. The DSARC III delays were caused by efforts to resolve OPEVAL/IOT&E testing, and the extension of operational testing. The Navy IOC (A-7E) was delayed because of difficulties in reaching a contract agreement for the FY81 production program, and the extension of operational testing. The Air Force IOC (F-4G) change reflects revised production rates and delivery schedule. The new milestone entries reflect the addition of Low Cost Seeker and HARM Block IV to the program. LCS NPDM IIIA/B revised due to FSED hardware delivery schedule and time required for operational testing.

c. Current Change Explanations --

(Ch-1) - Current Estimate of NPDM IIIA (LCS) revised from May 1990 to June 1991 to gain authorization of LRIP for the "second lot" production. Pilot production authorized at NPDM II.

(Ch-2) - Current Estimate of IOC (LCS) revised from April 1992 to August 1993; change due to the reduced quantity of LCS's approved for pilot production at the NPDM (100 vice 200). This reduced quantity can not support both OT-IIB and IOC requirements. Accordingly, IOC is rescheduled until after a sufficient quantity of missles from LRIP are delivered to meet IOC requirements.

d. References --

Development Estimate: DCP 93A dated 10 July 1978. NDCP dated 6 August 1987.
Approved Program: DAE Baseline dated 31 December 1988.

10. (U) Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
a. Technical --				
(U) Length (ft)	13	13.7 /13.7	13.7	13.7
(U) Weight (lbs)	780	796 /796	807	807
(U) Diameter (in)	10	10 /10	10	10
(U) Frequency Coverage (Band)	(b)(1)			
b. Operational --				
Launch Envelope (Aircraft)				
(U) Altitude (feet MSL)	(b)(1)			
(U) Speed (Mach)				
Target Azimuth (relative to launch aircraft)				
(U) Self protect mode	(b)(1)			
(U) Target of opportunity mode/prebrief mode				
Velocity (avg over first 10 NM)				
(U) Feet per Second (FPS)	(b)(1)			
(U) Time to Target (seconds)				
Max Range (Level launch) (NM)				
(U) 5000 ft. altitude				
(U) 30000 ft. altitude				
Guidance Accuracy				
(U) Median CPA in feet				
Reliability				
(U) Missile Free Flight	.95	.95 /.95	.91	.95
(U) MTBF Missile Captive Carry (Hrs)	125	125 /125	225	225
(U) MTBF Navy Avionics(AWG25)	351	700 /700		700
(U) MTBF Navy Avionics (CP-1001)	351	351 /351		351
(U) Missile Storage (5 yrs/90% conf)	.90	.90 /.90	TBD	.90
(U) Probability of fault detection using BIT (BIT Circuitry only) (98% conf)				
(U) Avionics and missile	(b)(1)			
Maintainability				
(U) Mean time to fault locate using BIT (sec)	20	14 /14	14	14
(U) Mean time to repair (min)				
(U) Avionics "O" Level	55	30 /30	30	30
(U) Avionics "I" Level	60	60 /60	60	60
(U) Missile "O" Level	20	20 /20	20	20
(U) Missile "I" Level	60	55 /55	55	55

c. Previous Change Explanations --

Technical -- (U) Weight (lbs), Current Estimate: Change 780 to 807. Incorporation of hardware to facilitate DSARC II direction to expand capability (EXCAP) in frequency and aerodynamic maneuverability.

Operational -- (c) Launch Envelope (Aircraft) Altitude, Current Estimate: Change SL to [redacted] Results of operational testing.

(c) Velocity, FPS, Current Estimate: Change [redacted] Extrapolated from prototype flight tests.

(c) Velocity, Time to Target (seconds), Current Estimate: Change [redacted] Projected from performance of prototype missiles.

(c) Max Range (Level Launch) (NM), Current Estimate: At [redacted] Projected from performance of prototype missile.

(c) Reliability: Missile captive carry MTBF, Current Estimate: revised on basis of inventory usage data through September 1987.

(c) Maintainability, Mean time to fault locate using BIT (sec), Current Estimate: Change 20 to 14. Results of operational testing.

(c) Maintainability, Mean time to repair (min), Avionics "O" level, Current Estimate: Change 55 to 30. Results of operational testing.

(c) Maintainability, Mean time to repair (min), Missile "I" level, Current Estimate: Change 60 to 55. Results of operational testing.

d. Current Change Explanations -- None.

e. References --

Development Estimate: DCP 93A dated 10 July 1978.
Approved Program: DAE Baseline dated 31 December 1988.

11. (U) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	$ 226.8	$ 478.1	$ 478.3
Procurement	1455.0	2855.2	2881.8
Hardware	(1064.7)	(2378.8)	(2319.5)
Prod Support	(220.9)	(282.6)	(361.2)
Total Flyaway	(1285.6)	(2661.4)	(2680.7)
Fleet Support	(80.5)	(129.8)	(133.9)
Initial Spares	(88.9)	(64.0)	(67.2)
Construction (MILCON)	0.0	4.3	4.2
Total FY 78 Base-Year $	1681.8	3337.6	3364.3
Escalation	728.1	3539.1	3738.4
Development (RDT&E)	(12.1)	(185.1)	(187.3)
Procurement	(716.0)	(3349.6)	(3546.7)
Construction (MILCON)	0.0	4.2	(4.4)
Total Then-Year $	$2409.9	$6876.7	$7102.7
b. Quantities --			
Development (RDT&E)	99	99	99
Procurement	13754	22046	22657
Total	13853	22145	22756

c. (U) Foreign Military Sales --

Federal Republic of Germany:

Letters of Offer and Acceptance (LOA): FMS Case GY-P-AHD was accepted on 6 December 1985 for 368 tactical missiles. Amendment no. 1 to the LOA signed 11 November 1986 provides for an additional 576 tactical missiles. Estimated total FMS cost is $280,178,425. FMS Case GY-P-AJP, accepted on 30 April 1987, provides for additional spare components and support equipment items. Case value is $550,608. FMS Case GY-P-BNV, accepted on 27 November 1987, provides for the procurement of HARM telemetry sections. Case value is $8,047,390. FMS

Spain:

Letter of Offer and Acceptance (LOA): FMS Case SP-P-AKM was signed on 28 December 1989 for the purchase of 80 tactical missiles. Case value at approximately $36,000,000.

d. Nuclear Costs -- None.

e. References --

Development Estimate: DCP 93A dated 10 July 1978.
Approved Program: DAE Baseline dated 31 December 1988.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then Year) Dollars in Millions)

	Current Est	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition --	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	7102.7	6876.7	7102.7
(2) Quantity	22756	22157	22756
(3) Unit Cost	.312	.312	.313
b. Current Procurement --	(FY90)	(FY90)	(FY91)
(1) Cost	376.5	376.5	373.3
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	376.5	376.5	373.3
(2) Quantity	1488	1488	1440
(3) Unit Cost	.253	.253	.259

13. (U) Cost Variance Analysis:

a. Summary -- (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	238.9	2171.0	-	2409.9
Previous Changes:				
Economic	-6.4	+351.8	-	+345.4
Quantity	-	+1554.2	-	+1554.2
Schedule	+28.5	+1826.5	-	+1855.0
Engineering	+250.6	+14.0	-	+264.6
Estimating	+151.8	+178.7	+8.5	+339.0
Other	-	-	-	-
Support	-	+108.6	-	+108.6
Subtotal	+424.5	+4033.8	+8.5	+4466.8
Current Changes:				
Economic	+1.7	+128.5	+0.2	+130.4
Quantity	-	+139.4	-	+139.4
Schedule	-	+36.8	-	+36.8
Engineering	-	-	-	-
Estimating	+0.5	-100.2	-0.1	-99.8
Other	-	-	-	-
Support	-	+19.2	-	+19.2
Subtotal	+2.2	+223.7	+0.1	+226.0
Total Changes	+426.7	+4257.5	+8.6	+4692.8
Current Estimate	+665.6	+6428.5	+8.6	+7102.7

(FY 1978 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	226.8	1455.0	-	1681.8
Previous Changes:				
Quantity	-	+664.0	-	+664.0
Schedule	+20.0	+584.7	-	+604.7
Engineering	+148.9	+7.1	-	+156.0
Estimating	+82.4	+98.8	+4.3	+185.5
Other	-	-	-	-
Support	-	+45.6	-	+45.6
Subtotal	+251.3	+1400.2	+4.3	+1655.8
Current Changes:				
Quantity	-	+51.7	-	+51.7
Schedule	-	+11.5	-	+11.5
Engineering	-	-	-	-
Estimating	+.2	-43.9	-0.1	-43.8
Other	-	-	-	-
Support	-	+7.3	-	+7.3
Subtotal	+.2	+26.6	-0.1	+26.7
Total Changes	+251.5	+1426.8	+4.2	+1682.5
Current Estimate	+478.3	+2881.8	+4.2	+3364.3

13. (U) Cost Variance Analysis (Cont'd):

b. Previous Change Explanations --

RDT&E

Economic: Revised escalation indices.

Schedule: Increase in initial manufacturing cost due to delay in prototype effort; increased hardware lead times, and delay of A-6E/HARM integration by one year.

Engineering: FY 80 thru FY 82 cost increase for A-6E/HARM integration and FY 80 cost increase for HARM design improvements and addition of HARM C (Block IV/LCS) program.

Estimating: Increased contractor costs for prototype development; deletion of FY 80 Initial Production funds; increased cost for 45 pilot production missiles; Congressional addition to start second source development; funding of operational deficiencies in FY 84 thru FY 86; transfer of Project W1240 (A-6E) FY 83 program to airframe program manager; Congressional adjustments and escalation reductions; additional funds for deficiency corrections through FYDP; transfer of project W1780 ($47.2M) to Low Cost Seeker program; correction to the base year $ calculation of prior year's SAR baseline; elimination of RDT&E funds from FY88 through FY91 reduction of FY87 funds to address Low Cost Seeker development and revision of program estimate through adaption of Navy escalation indices for combined SAR. Increased funding for LCS and HIP.

Procurement

Economic: Revised escalation indices.

Quantity: Changes to program objective: FY 81/FY 82, -463 missiles; FY 83, +1782 missiles; FY 84, -1002 missiles; FY 86, +551 missiles; FY 87, -68 missiles; FY88, -181 missiles. Addition of HARM C program, 7620 missiles.

Schedule: One year delay in initial production; stretch out of Navy procurement offset by approval of second source allowing larger annual procurement quantities, and one year less stretch in program; and Congressional action on FY 83 appropriations; program rephasing in January FY 85 FYDP; decrease in rate tooling. Addition of HARM C program.

Engineering: Procurement of Improved HARM Warhead FY90-FY94.

Estimating: Increases in estimate to adjust for actual cost data derived from contract negotiations; funds for second source development; 1982 cost study revised estimate; deletion of second source fund coincident with Congressional direction to continue as sole source program; decrease in unit cost trend attributable to credible threat of competition (dual source initiative) and other cost reduction initiatives; multiyear procurement savings; higher cost estimates due to reductions of Air Force quantities; adaption of Navy escalation factors for combined SAR. Addition of HARM C program.

Support: Decrease in PGSE and ILS requirements associated with decrease in 1002 missiles and implementation of a comprehensive warranty; increase in spares and fleet support in FY87 through FY91 for depot initiatives.

13. (U) Cost Variance Analysis (Cont'd):

MILCON
Estimating: Increase in storage requirements.

c. Current Change Explanations --

	(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E		
Revised escalation rates. (Economic)	N/A	+1.7
Increased funding for Block IV. (Estimating)	+0.2	+0.5
(2) Procurement		
Revised escalation rates. (Economic)	N/A	+128.5
Addition of 599 USAF missiles to program.	+53.0	+142.3
- Baseline (DE) value of increasing 599 missiles to meet inventory requirements. (Quantity)	(+51.7)	(+139.4)
- Schedule changes applicable to 599 missiles since Baseline. (Schedule)	(+1.1)	(+2.6)
- Estimating changes applicable to 599 missiles since Baseline. (Estimating)	(+0.2)	(+0.3)
Revised procurement: (Schedule)	+10.4	+34.2
(3) MILCON		
Revised escalation rates. (Economic)	N/A	+0.2
Revised estimate. (Estimating)	-0.1	-0.1

	88	89	90	91	92	93	94	95
Prior	2297	2200	1488	1600	2300	2300	2300	0
New	2356	2200	1488	1440	2425	2304	2331	640

14. (U) Program Acquisition Unit Cost (PAUC) History: (Then Year Dollars in Millions)

a. Initial SAR/Development Estimate to Current Estimate --

PAUC Init SAR/ Dev Est.	Changes								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
.174	+.021	+.007	+.083	+.012	+.010	+.006	--	+.139	.313

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. RDT&E -- None.

b. Procurement -- HARM All-Up-Round

Texas Instruments, Inc. (FY88 Buy)
Lewisville, TX
N00019-86-C-0326, FFP
Award/Definitization: January 8, 1988

Initial Contract Price

Target	Ceiling	Quantity
$499.3	N/A	2,248

Current Contract Price

Target	Ceiling	Quantity
$545.4	N/A	2,356

Estimated Price At Completion

Contractor	Program Manager
$545.4	$545.4

Texas Instruments, Inc. (FY89 Buy)
Lewisville, TX
N00019-88-C-0156, FFP
Award/Definitization: January 31, 1989

Initial Contract Price

Target	Ceiling	Quantity
$425.5	N/A	2,200

Current Contract Price

Target	Ceiling	Quantity
$425.5	N/A	2,200

Estimated Price At Completion

Contractor	Program Manager
$425.5	$425.5

Texas Instruments, Inc. (FY90 Buy)
Lewisville, TX
N00019-88-C-0156, FFP
Award/Definitization: December 26, 1989

Initial Contract Price

Target	Ceiling	Quantity
$266.1	N/A	1,400

Current Contract Price

Target	Ceiling	Quantity
$266.1	N/A	1,400

Estimated Price At Completion

Contractor	Program Manager
$266.1	$266.1

Note: CPR report not required on FFP contracts.

16. (U) Program Funding Summary:

a. Program Status --
(1) Percent Program Completed: 80.0% (20 yrs/25 yrs)
(2) Percent Program Cost Appropriated: 67.5% ($4793.0/7102.7)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY72-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-95)	Total
RDT&E	604.9	26.7	10.9	23.1	665.6
Procurement	3778.9	376.5	373.3	1899.8	6428.5
MILCON	3.1	2.9	0.0	2.6	8.6
Total	4386.9	406.1	384.2	1925.5	7102.7

c. Annual Summary -- Total Program (Navy and Air Force)

Fiscal Year	Qty	Flyaway FY78 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1972				2.1	2.1	2.1	2.1	4.6
1973				6.7	6.7	6.7	6.7	4.4
1974				9.7	9.7	9.7	9.7	8.0
1975				14.3	14.3	14.3	14.3	10.9
1976	13			27.4	27.4	27.4	27.4	6.6
197T				3.9	3.9	3.9	3.9	2.9
1977	16			31.9	31.9	31.9	31.9	2.6
1978	25			32.3	33.7	33.7	33.7	6.8
1979				40.7	46.9	46.9	46.8	8.4
1980	45			51.6	65.7	65.7	65.5	10.6
1981				59.3	82.3	82.3	82.1	10.6
1982				18.1	26.5	26.5	26.4	7.6
1983				6.8	10.4	10.4	10.2	4.9
1984				30.6	48.4	48.4	48.2	3.8
1985				22.2	36.3	36.3	36.2	3.4
1986				23.6	39.7	39.5	39.2	2.8
1987				35.1	60.7	60.6	51.0	2.7
1988				17.5	31.4	31.1	20.7	3.0
1989				14.5	26.9	22.9	9.1	4.2
1990				13.8	26.7	11.2		4.0
1991				5.4	10.9			4.2
1992				3.6	7.5			4.0
1993				3.6	7.7			3.7
1994				3.6	7.9			3.4
Subtotal	99			478.3	665.6	611.5	533.2	
Appropriation: Procurement								
1981	80	7.8	57.4	74.9	120.2	120.2	120.2	11.6
1982	236	20.0	82.7	121.5	211.8	207.7	207.7	14.3
1983	283	3.0	76.7	88.8	163.7	157.6	156.6	9.0
1984	635	35.5	128.5	193.2	370.5	363.2	362.8	8.0
1985	1684	23.8	255.4	299.5	591.2	580.5	573.5	3.4
1986	2151	10.4	281.7	300.8	614.3	615.6	595.2	2.8
1987	2504	1.6	275.3	292.9	619.8	607.8	554.8	2.7
1988	2356	.5	240.7	256.5	564.4	556.4	169.1	3.0
1989	2200	4.0	209.4	228.3	522.9	483.2	22.6	4.2
1990	1488	5.4	144.9	158.0	376.5	260.4	.1	4.0
1991	1440	3.4	140.4	151.0	373.3			4.2
1992	2425	5.3	207.5	235.1	601.7			4.0
1993	2304	2.3	193.9	207.4	548.0			3.7
1994	2231	2.3	203.2	213.2	579.4			3.4
1995	640	.8	57.0	60.9	170.8			3.1
Subtotal	22657	126.2	2554.7	2881.8	6428.5	3158.2	2156.6	

c. Annual Summary -- Total Program (Navy and Air Force) (Cont'd)

Fiscal Year	Qty	Flyaway FY78 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: MILCON								
1989				1.6	3.1			4.2
1990				1.4	2.9			4.0
1991				0.0	0.0			4.2
1992				1.2	2.6			4.0
Subtotal				4.2	8.6			
TOTAL	22756	126.2	2554.7	3364.3	7102.7	3728.2	2689.1	

c. Annual Summary (Cont'd) -- Navy

Fiscal Year	Qty	Flyaway FY78 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1972				2.1	2.1	2.1	2.1	4.6
1973				6.7	6.7	6.7	6.7	4.4
1974				9.7	9.7	9.7	9.7	8.0
1975				14.3	14.3	14.3	14.3	10.9
1976	13			27.4	27.4	27.4	27.4	6.6
197T				3.9	3.9	3.9	3.9	2.9
1977	16			31.4	31.4	31.4	31.4	2.6
1978	25			28.5	29.7	29.7	29.7	6.8
1979				38.7	44.6	44.6	44.6	8.4
1980	45			50.1	63.8	63.8	63.8	10.6
1981				52.3	72.6	72.6	72.6	10.6
1982				15.2	22.2	22.2	22.2	7.6
1983				3.7	5.7	5.7	5.7	4.9
1984				24.5	38.8	38.8	38.8	3.8
1985				19.4	31.6	31.6	31.6	3.4
1986				13.1	22.0	22.0	21.9	2.8
1987				24.2	41.9	41.9	33.0	2.7
1988				8.9	16.1	15.8	11.6	3.0
1989				5.8	10.8	10.8	7.1	4.2
1990				8.6	16.6	8.4		4.0
1991				5.2	10.4			4.2
1992				3.6	7.5			4.0
1993				3.6	7.7			3.7
1994				3.6	7.9			3.4
1995				0.0	0.0			
Subtotal	99			404.5	545.4	503.4	478.1	
Appropriation: Procurement								
1981	80	7.8	57.4	74.9	120.2	120.2	120.2	11.6
1982	118	10.5	42.2	64.3	112.0	112.0	112.0	14.3
1983	160	0.0	42.2	47.7	88.0	88.0	88.0	9.0
1984	318	18.6	63.7	102.1	195.9	195.9	195.9	8.0
1985	813	10.8	122.8	144.9	286.1	286.1	281.9	3.4
1986	767	1.0	100.3	105.6	215.7	219.8	205.2	2.8
1987	994	0.7	110.4	117.1	247.9	247.9	239.4	2.7
1988	766	0.2	81.0	88.6	195.1	196.5	55.0	3.0
1989	1307	0.8	124.9	132.8	304.1	290.7	19.0	4.2
1990	1162	4.4	114.0	124.1	295.5	209.6	.1	4.0
1991	1320	3.1	129.6	137.9	340.9			4.2
1992	1900	4.4	164.9	188.0	480.7			4.0
1993	1260	1.6	114.9	121.8	321.7			3.7
1994	1260	1.6	131.6	138.1	375.7			3.4
1995	560	.7	50.2	53.6	150.2			3.1
Subtotal	12785	66.2	1450.1	1641.5	3729.8	1966.7	1316.7	

c. Annual Summary (Cont'd) -- Navy (Con't)

Fiscal Year	Qty	Flyaway FY78 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: MILCON								
1989				1.6	3.1			4.2
1990				1.4	2.9			4.0
1991				0.0	0.0			4.2
1992				1.2	2.6			4.0
Subtotal				4.2	8.6			
TOTAL	12884	66.2	1450.1	2050.2	4283.8	2470.1	1794.8	

c. Annual Summary (Cont'd) -- Air Force

Fiscal Year	Qty	Flyaway FY78 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1977				0.5	0.5	0.5	0.5	2.6
1978				3.8	4.0	4.0	4.0	6.8
1979				2.0	2.3	2.3	2.2	8.4
1980				1.5	1.9	1.9	1.7	10.6
1981				7.0	9.7	9.7	9.5	10.6
1982				2.9	4.3	4.3	4.2	7.6
1983				3.1	4.7	4.7	4.5	4.9
1984				6.1	9.6	9.6	9.4	3.8
1985				2.9	4.7	4.7	4.6	3.4
1986				10.5	17.7	17.5	17.3	2.8
1987				10.9	18.8	18.7	18.0	2.7
1988				8.6	15.3	15.3	9.1	3.0
1989				8.6	16.1	12.1	2.0	4.2
1990				5.2	10.1	2.8		4.0
1991				.2	.5			4.2
Subtotal	0			73.8	120.2	108.1	87.0	
Appropriation: Procurement								
1982	118	9.5	40.3	57.2	99.8	95.7	95.7	14.3
1983	123	3.0	32.0	41.1	75.7	69.6	68.6	9.0
1984	317	16.9	64.9	91.0	174.6	167.3	166.9	8.0
1985	871	12.9	131.2	154.6	305.1	294.4	291.6	3.4
1986	1384	9.4	181.4	195.2	398.6	395.8	390.0	2.8
1987	1510	0.9	164.9	175.7	371.9	359.9	315.4	2.7
1988	1590	0.7	162.5	167.8	369.3	359.9	114.1	3.0
1989	893	3.2	84.0	95.5	218.8	192.5	3.6	4.2
1990	326	0.2	31.1	34.0	81.0	50.8		4.0
1991	120	0.2	11.5	13.1	32.4			4.2
1992	525	1.0	42.6	47.3	121.0			4.0
1993	1044	0.7	78.9	85.6	226.3			3.7
1994	971	0.7	71.6	74.9	203.7			3.4
1995	80	.1	6.7	7.3	20.5			3.1
Subtotal	9872	59.4	1103.6	1240.3	2698.7	1985.9	1445.9	
TOTAL	9872	59.4	1103.6	1314.1	2818.9	2094.0	1532.9	

MILCON: None

17. (U) Production Rate Data:

a. Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate(1)	Production Estimate	Current Estimate(2)	Maximum Economic
1981		80	80	80
1982		236	236	236
1983		289	283	283
1984		722	635	635
1985		1674	1684	1684
1986		2461	2151	2331
1987		3275	2504	2692
1988		3761	2356	2477
1989		3084	2200	2380
1990		1778	1488	1704
1991		0	1440	1440
1992		0	2425	2425
1993		0	2304	2304
1994		0	2231	2231
1995		0	640	640

Note (1) -- Not Available.
Note (2) -- Current estimate includes Navy and Air Force quantities.

b. Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost (BY $)	3211.1	+153.2	3364.3	0	3364.3
(TY $)	6363.4	+739.3	7102.7	0	7102.7
PAUC (BY $)	.183	-.035	.148	0	.148
(TY $)	.363	-.050	.313	0	.313

c. Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start date (Mo/Yr)	11/82	0	11/82	0	11/82
Duration (in Months)	120	+60	180	0	180
End date (Mo/Yr)	11/92	+60	11/97	0	11/97

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	99/99
Procurement	7974/7964

e. Approved Design to Cost Goal -- (Average Unit Flyaway Cost)

	Dev Estimate/ Appr Program	Current Estimate	Latest Appr Threshold
@ Qty: 5000 - @ Peak Rate: 185/mo			
FY 78 Base-Year $	93.3/198.3	175.0	200.0
Then-Year $	127.8/372.1	337.0	375.2

18. (U) Operating and Support Costs:

a. N/A

b. N/A

c. Contractor Support Costs -- (Then-Year Dollars in Millions)

Funding	FY1989 & Prior	FY1990	FY1991	Bal to Complete	Total
O&M	1.2	0.2	0.5	-	1.9
NIF	0.5	0.3	0.3	-	1.1
TOTAL	1.7	0.5	0.8	-	3.0

SAR-89-023

N-19 HARPOON

~~CONFIDENTIAL~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)

PROGRAM: HARPOON (AGM/RGM/UGM-84A/C/D)

as of December 31, 1989

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1. Designation/Nomenclature (Popular Name) AGM-84A,C,D/ RGM-84 A, C, D/ UGM-84 A, C, D/ Harpoon

2. DOD Component: U. S. Navy

3. Responsible Office and Telephone Number:

Anti-Ship Weapon Systems Program Office
PMA-258
Naval Air Systems Command
Washington, DC 20361-1258

PM: Capt D. L. Finch
Assigned: June 18, 1986
Telephone: (202) 692-3340
Autovon: 223-3340

4. Program Elements:

RDT&E, N: 0603312N , 0604364N- Development of AGM-84/RGM-84
0603364N - Development of UGM-84
0205603N - Harpoon Improvements (FY79 only)
0603306N - Standoff Land Attack Missile (SLAM); Project 1958. (Shared Funding)

PROCUREMENT: APPN 1507 ICN 2224 024229N
024271N
024284N

AS AMENDED

MAR 21 1990

5. Related Programs: TOMAHAWK

~~Classified by: OPNAVINST S5513.2 (31)~~
~~Declassify on: OADR~~

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6. (U) Mission and Description: Ship/Air/Submarine launched all-weather anti-ship missile effective against enemy destroyers, light cruisers, surfaced submarines, patrol craft and other (E.G., merchant, surveillance etc) enemy shipping. The Standoff Land Attack Missile (SLAM) is effective against fixed targets and ships in harbor.

The Harpoon utilizes altitude reference mid-course guidance with an active or passive seeker for target acquisition and terminal guidance. Missile is capable of being launched from the following platforms:

Ships:	FF-1052, DDG, CG, CGN, PHM, DD-963, FFG-7, BB.
Air:	P-3, A-6, F-18, S-3, B-52 (USAF)
Submarine:	SSN-594/637/688 Class.

7. (U) Program Highlights:

a. (U) Significant Historical Developments - The Weapon System Development phase was completed in July 1975. The OPEVAL phase was completed March 1977 and PASU was granted 18 July 1977. DNSARC reviewed the program July 1977 resulting in the approval to procure 225 US plus 229 FMS missiles in FY 1977, not to exceed production of 40 missiles per month. DT&E of seeker changes (Block 1A) that improve performance against countermeasures was completed January 1978. OPEVAL (OT&E) was completed June 1978 with successful results and the final report was released by OPTEVFOR in August 1979.

(U) OPEVAL was conducted by OPTEVFOR on the Harpoon Weapon System installed on a A-6E aircraft beginning in July 1980. Captive Carry Tests were conducted to determine performance against ECM, system reliability and assure other A-6E systems were not degraded. OPTEVFOR recommended approval for service use. Follow-on OPEVAL of the HWS Captive Carry phase OT-IIIC was successfully completed in August 1980. Approval for service use was granted February 1981. OPTEVFOR recommended production of Block 1B Harpoon missiles in December 1981. Further Harpoon improvements are provided by the Block 1C missile for additional survivability enhancement and targeting selection flexibility. Block 1C also incorporated a fuel change which increases missile flight

(b)(1) [redacted]

(U) Test and evaluation of Block 1C has been completed and Approval for Limited Production (ALP) was received June 83. A second ALP of Block 1C was received September 1984. (Approval for full production to be granted upon successful completion of the Block 1C missile with the improved command and launch system (AN/SWG-1A) was completed). All testing of the improved seeker for the Harpoon missile (3700-4) was completed. A third ALP of Block 1C was received November 1987.

(U) Approval for Full Production (AFP) for Harpoon Block 1C and 3700-4 Seeker program granted August 88. 5000th Harpoon missile delivered in Dec 88. Standoff Land Attack Missile (SLAM) NavyProgram Decision Memorandum NPDM (May 88) received FY-88 Approval for Limited Production (ALP). SLAM missile TECHEVAL commenced. TECHEVAL completed on the AWW-13 Advanced Data Link (ADL) Pod. Improved Harpoon Program Management Proposal approved by the Undersecretary of the Navy 25 Nov 88.

(U) The Harpoon Missile has met or exceeded all mission requirements.

b. Significant Developments Since Last Report: First Harpoon 3700-4 Seeker deliveries began Mar 1989. Standoff Land Attack Missile (SLAM) successfully completed TECHEVAL Dec 1989. Block 1D Harpoon development contract awarded Sept 1989. Ship launch SLAM demonstration contract awarded Sept 1989.

c. Changes Since "As Of" Date - All new Harpoon missile procurements in FY-90 and FY-91 will be SLAM variants.

8. Threshold Breaches - There are currently breaches of the DAE baseline dated December 1988.

9. Schedule

a. Milestones	Dev Est	Approved Program	Current Estimate
Initiate Development (Validation Phase)	Mar 70	Mar 70	Mar 70
Award Design Phase Contract	Jun 71	NA	Jun 71
Complete 4 Successful Guidance Test Vehicle Launches	Mar 73	NA	Mar 73
Award Weapon System Development Contract	Jun 73	Jun 73	Jun 73
First Prototype Missile Launch	Feb 74	NA	Mar 74
Award Pilot Line Production Contract	Jun 74	Jul 74	Jul 74
Start Navy Technical Evaluation	Dec 74	NA	Nov 74
Start OPEVAL (Missile,P-3,FF-1052)	Jul 75	NA	Aug 75
Complete OPEVAL (P-3, FF-1052)	Dec 75	NA	Mar 77
Approval for Service Use	Dec 75	Feb 81	Feb 81
First Delivery to the Fleet	Dec 75	Jul 77	Jul 77
IOC (FF-1052)	Jul 76	Jul 77	Jul 77
Definitization First Production Contract	Mar 76	NA	Nov 76
IOC (Submarine)	Apr 76	NA	Jul 77
IOC (P-3 Aircraft)	Jun 76	Aug 79	Aug 79
IOC (A-6 Aircraft)	Oct 81	Oct 81	Oct 81
Block 1C Missile - ALP	Nov 82	NA	Jun 83
2nd Block 1C ALP	Jun 84	NA	Sep 84
3rd Block 1C ALP	Jun 87	NA	Nov 87
Block 1C Missile - AFP	Jun 87	Aug 87	Aug 88
SLAM Missile			
Milestone II	NA	Jun 87	Jun 86
Milestone IIIA(ALRIP)	NA	May 86	May 86
Milestone IIIB(ALRIP)	NA	May 88	May 88
Milestone IIIC(AFRP)	NA	Jan 89	May 90(CH-1)

b. Previous Change Explanations - Integration testing at the section and assembly level required more time than planned. Incorporation of design improvements for the engine, fuel control and electrical power delayed sustainer delivery. 3rd ALP granted by NPDM 11/87 and AFP rescheduled to 8/88. Incorporated milestones for SLAM program. Data for SLAM Milestone II corrected. ALP received 5/88. Milestone slip does not affect IOC date for the SLAM.

c. Current Change Explanations -
CH-1 = Milestone IIIC AFRP was delayed due to software problems. Instead ALRIP was granted 1/89. AFRP is expected 5/90 after completion of OPEVAL.

d. References -

Development Estimate - Decision Coordinating Paper (DCP) No. 77 of May 16, 1973 amended by DSARC IIB, June 25, 1974 and DSARC IIIB Sep 1977.

Approved Program - DAE baseline 31 Dec 1988.

10. [redacted] Operational Characteristics:

	DEV EST	APPROVED PROGRAM GOAL/THRESHOLD	DEMO. PERF.	CURRENT ESTIMATE
a. [redacted] Operational				
([redacted]) Speed (Mach)	0.8	0.8/0.8	0.8	0.8
([redacted]) Range(nm)(Max-min)		(b)(1)		
([redacted]) Block1/1B				
([redacted]) Block 1C				
([redacted]) Altitudes/Launch Depth (ft)				
([redacted]) Max Launch (Air)		(b)(1)		
([redacted]) Min Launch (Air)				
([redacted]) Max Launch (Sub)				
([redacted]) Min Launch (Sub) (periscope depth)				
[redacted] Reliability				
Missile (Free flt %)	90	90/90	91	91 (CH-1)
Missile (Ready storage, ship 6 mo)	.90	.90/.90	.93	.93 (CH-2)
A/C C&L sys (MTBF hrs)	150	251/251	251	251
Ship C&L sys (MTBF hrs)	150	500.5/500.5	500.5	500.5
Missile (Air carry MTBF hrs)				
P-3	250	250/250	381	381 (CH-3)
A-6	250	250/250	148	250
[redacted] Hit Probability				
([redacted]) DD/60nm		(b)(1)		
([redacted]) KOMAR/30nm				CH-4)

b. [redacted] Previous change explanations - Variances are due to results of captive-carry program, other tests and actual fleet experience.

c. [redacted] Current Changes Explanations -

(CH-1) Based on actual fleet experience
(CH-2) Based on actual fleet experience
(CH-3) Based on actual fleet experience
(CH-4) Based on actual fleet experience

d. [redacted] References -

Development Estimate: Decision Coordinating Paper No 77 dated May 16, 1973 amended by DSARC IIB June 25, 1974 and DSARC IIIB dated Sep 1977.

Approved Program: DAE baseline 31 Dec 1988.

PROGRAM ACQUISITION COSTS
SYSTEM: HARPOON (AGM/RGM/UGM-84A/C/D)

11. PROGRAM ACQUISITION COSTS (Current Estimate in Millions of Dollars)

	Development estimate	Approved Program	Current Estimate
a. Cost			
Development (RDT&E)	272.0	287.8	280.9
Procurement	523.0	1429.6	1238.1
Fly-a-way	(457.6)	(1192.0)	(1038.2)
Fleet Support/Spares	(65.4)	(237.6)	(199.9)
Construction	0.0	2.5	2.4
Total Constant FY 70$	795.0	1719.9	1521.4
Escalation	236.8	2719.6	2187.6
Development (RDT&E)	(43.9)	(105.7)	(119.2)
Procurement	(192.9)	(2607.6)	(2061.9)
Construction	(0.0)	(6.3)	(6.5)
TOTAL THEN YEAR $	1031.8	4439.5	3709.0
b.Quantities			
Development (RDT&E)	52	52	52
Procurement	2870	4397	3766
TOTAL	2922	4449	3818

c. [redacted] Foreign Military Sales: Sales to date total 2,194 for an estimated cost of $1,588M; R & D recoupment to date is $85M. Australia - 95 at $60M; Canada - 70 at $65M; Denmark 96 at $73M; Egypt - 18 at $15M; Germany - 132 at $73M; Greece - 98 at $63M; Indonesia - 8 at $6M; Iran 14 at $7M; Japan - 454 at $395M; Kuwait - 42 at $38M; Netherlands - 41 at $23M; (b)(1) [redacted] S. Korea - 208 at $143M; Spain - 100 at $75M; Thailand - 23 at $18M; Turkey - 74 at $42M; United Kingdom - 360 at $311M; (b)(1) [redacted] (b)(1) [redacted]

d. Nuclear Costs - - None

e. References -

Development Estimate: Decision Coordinating Paper No. 77 of May 16, 1973 amended by DSARC IIB June 25, 1974 and DSARC IIIB Sep 1977.

Approved Program: DAE baseline 31 Dec 1988.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current, (Then Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est. (DEC 89 SAR)	UCR Baseline (DEC 88 SAR)	UCR Baseline (Dec 89 SAR)
a. Program Acquisition			
(1) Cost	3709.0	4439.5	3709.0
(2) Quantity	3818	4449	3818
(3) Unit Cost	0.971	.998	.971
b. Current Procurement -			
	(FY-1990)	(FY-1990)	(FY-1991)
(1) Cost	217.9	217.9	244.3
Less CY Adv Pr	N/A	N/A	N/A
Plus PY Adv Pr	N/A	N/A	N/A
Net Total	217.9	217.9	244.3
(2) Quantity	190	190	215
(3) Unit Cost	1.147	1.147	1.136

13. Cost Variance Analysis:
    a. Summary - (Current (Then Year) Dollars in millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Estimate (DE)	+315.9	+715.9		+1031.8
Previous Changes				
Economics	+0.1	+115.2		+115.3
Quantity		+998.8		+998.8
Schedule		+335.2		+335.2
Engineering	+73.3	+42.9		+116.2
Estimating	+4.2	+1254.2		+1258.4
Other				
Support		+575.0	+8.8	+583.8
Subtotal	+77.6	+3321.3	+8.8	+3407.7
Current Changes				
Economics	+7.8	+176.5		+184.3
Quantity		-1097.5		-1097.5
Schedule		+37.5		+37.5
Engineering	-4.6	-2.4		-7.0
Estimating	+3.4	+280.7		+284.1
Other				
Support		-132.0	+0.1	-131.9
Subtotal	+6.6	-737.2	+0.1	-730.5
Total Changes	+84.2	+2584.1	+8.9	+2677.2
Current Estimates	+400.1	+3300.0	+8.9	+3709.0

(FY 1970 Constant Dollars (Base Year) In Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Estimate (DE)	+272.0	+523.0		+795.0
Previous Changes				
Quantity		+317.1		+317.1
Schedule		+89.0		+89.0
Engineering	+14.3	+11.6		+25.9
Estimating	+1.5	+304.6		+306.1
Other				
Support		+184.3	+2.5	+186.8
Subtotal	+15.8	+906.6	+2.5	+924.9
Current Changes				
Quantity		-343.0		-343.0
Schedule		-11.4		-11.4
Engineering	+30.8	-0.7		+30.1
Estimating	-37.7	+213.3		+175.6
Other				
Support		-49.7	-0.1	-49.8
Subtotal	-6.9	-191.5	-0.1	-198.5
Total Changes	+8.9	+715.1	+2.4	+726.4
Current Estimate	+280.9	+1238.1	+2.4	+1521.4

b. Previous Change Explanations -

RDT&E

Engineering:	Revised escalation rates.
Estimating:	Prior Yr funding adjustments. Revision of T & E Program.

PROCUREMENT

Economics:	Revised escalation rates indices
Quantity	Addition of 754 missiles
	Addition of 426 missiles due to increased inventory objective
Schedule:	Revision of procurement to earlier FY.
	Reduced missile qty FY88 (15) due to missile unit cost increase. Change of SLAM schedule to 4 vice 1 yr. Reduced FY89 (19) to fund Improved Harpoon startup costs.
Engineering:	Added Reliability/quality Assurance Requirements.
	Increased Seeker Improvements.
	Implemented Product Improvements.
	Incorporation of -4 Seeker ECP (PMP #84-1)
	Improved Harpoon program engineering changes.
Estimating:	Increase due to under estimation of Rate Tooling.
	Increase in Govt. In-house and Govt. Testing costs.
	Prior year funding adjustments.
	Revision of cost. (Congressional Budget for 1986 SAR based on Multi-yr procurement. Congressional disapproval required repricing of 1987 SAR)
	Underestimation of SLAM engineering costs.
	Underestimation of ECP costs.
Support:	Spares/Fleet support changes due quantity change of missiles.
	Program stretched two years.
	Logistic Audit Review citing areas of support underfunded. PMA increased costs to fully fund LFRP's.
	Increased spares due to increased requirements.(Missile qty)
Milcon:	Building modification at NWS, Concord in FY 1979.

c. Current Changes Explanations -

(1) RDT&E		Base Year	Then Year
Economics	Revised escalation rates.	0	+0.2
Estimating	Increased SLAM testing costs.	+2.0	+6.4
	Correction of errors in prior SARs (Note 1)		
	Economic	0	+7.6
	Engineering	+30.8	-4.6
	Estimating	-39.7	-3.0

(2) PROCUREMENT

Economics:	Revised escalation rates	0	+64.1
Quantity:	Decrease in total procurement by 631 missiles.	-150.7	-632.1
Schedule:	Increase in FY91 procurement by 31 missiles from FY92.	+49.6	+197.1
Estimating:	Procurement of all SLAMs in FY90 & FY91	-63.2	-253.8
Support:	Support requirements decrease caused by reduction in total procurement of 631 missiles.	-27.3	-112.5

Correction of errors in prior SARs (Note 1)

Economic	0	+112.4
Quantity	-192.3	-465.4
Schedule	-61.0	-159.6
Engineering	-0.7	-2.4
Estimating	+276.5	+534.5
Support	-22.4	-19.5

(3) MILCON

Support	-0.1	+0.1

Note (1) Changes verified and approved during Dec 1, 1989 review with OSD.

- Development Estimate: Decision Coordinating Paper No 77 of May 16, 1973 amended by DSARC IIB June 25, 1974 and DSARC IIIB Sep 1977.

- Approved Program: DAE baseline 31 Dec 1988.

14. Program Acquisition Unit Cost (PAUC) History:

a. Initial Sar Estimate To Current Baseline Estimate
First Authorization: FY 1970
Program Acquisition Unit Cost
First Authorization: .251
Development Estimate: .353

b. Current Baseline Estimate to Current Estimate

PAUC (Development Estimate)	Changes (Then Year Dollars in Millions)								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
.353	.078	-.109	.098	.029	.404	.118		.618	.971

15. Contract Information: (Then Year Dollars in Millions)
a. RDT&E

Missile

McDonnell Douglas Missile Systems Company
St. Charles, Mo.
NOOO19-87-C-0020/FFP (RDT&E)&(WPN)
Awarded: Sep 1989
Definitized: Sep 1989

Initial Contract Price		
Target	Ceiling	Qty
$33.4	N/A	0

Current Contract Price		
Target	Ceiling	Qty
$172.6	N/A	112

Estimate Price at Completion	
Contractor	Program Manager
342.6	342.6

	Cost Variance	Schedule Variance
Previous Cumulative Variance	N/A	N/A
Cumulative Variance to Date	N/A	N/A
Net Change	N/A	N/A

Explanation of Change: Not reportable for FFP contracts

b. PROCUREMENT

Missile

McDonnell Douglas Missile Systems Company
St. Charles, Mo.
N0OO19-87-C-0103/FFP
Awarded: Aug 1989
Definitized: Aug 1989

Initial Contract Price		
Target	Ceiling	Qty
$81.0	N/A	68

Current Contract Price		
Target	Ceiling	Qty
$119.0	N/A	130

Estimate Price at Completion	
Contractor	Program Manager
$131.8	$131.8

	Cost Variance	Schedule Variance
Previous Cumulative Variance	N/A	N/A
Cumulative Variance to Date	N/A	N/A
Net Change	N/A	N/A

Explanation of Change: Not reportable for FFP contracts.

Contracts N00019-86-C-0308 and N00019-85-C-0415 are greater than 90% complete and have been deleted from this report.

16 Program Funding Summary:

a. Program Status Summary

(1) Percent Program Complete: 95.5% (21/22 Yrs)

(2) Percent Program Cost Appropriated: 93.3% ($3460.0/3709.0)

APPROP	PRIOR YRS (FY70-89)	BUDGET YEAR (FY-90)	BUDGET YEAR (FY-91)	TO COMP	TOTAL
RDT & E	$397.1	$3.0	- -	- -	$400.1
PROCUREMENT	$2,837.8	$217.9	$244.3	- -	$3,300.0
MILCON	$0.7	$3.5	- -	$4.7	$8.9
TOTAL	$3,235.6	$224.4	$244.3	$4.7	$3,709.0

16. Program Funding Summary (Cont'd) (Current Estimate in Millions of Dollars)

c. Annual Summary

Fiscal Year	Qty	FY 70 Base-Year Dollars			Then-Year Dollars			Esc Rate
		Flyaway						
		Nonrec	Rec	Total	Program	Obligated	Expended	%
Appropriation: RDT&E								
1970	--	--	--	4.9	5.1	5.1	5.1	5.51
1971	12	--	--	17.8	19.2	18.9	18.9	5.14
1972	--	--	--	37.5	42.3	42.3	42.3	4.61
1973	--	--	--	60.2	71.8	71.8	71.7	4.35
1974	40	--	--	70.9	92.0	91.9	91.8	7.97
1975	--	--	--	48.9	69.1	69.1	68.7	10.94
1976	--	--	--	13.2	19.7	19.7	16.7	6.61
1979	--	--	--	0.8	1.5	1.5	1.5	8.40
1987	--	--	--	6.6	18.9	18.9	16.6	2.70
1988	--	--	--	10.7	31.5	31.5	28.3	3.00
1989	--	--	--	8.5	26.0	26.0	16.6	4.20
1990	--	--	--	0.9	3.0	0.9	0.0	4.00
TOTAL	52	0	0	280.9	400.1	397.6	378.2	
Appropriation: Procurement								
1975	100	7.0	47.8	57.7	81.6	81.6	81.5	8.81
1976	170	7.4	73.4	88.6	134.8	134.8	134.8	6.59
197T	66	1.0	23.2	27.4	43.6	43.6	43.6	3.56
1977	220	--	76.4	89.3	150.7	150.7	149.0	3.78
1978	234	--	63.6	73.7	139.1	139.1	136.7	6.80
1979	240	--	59.4	65.9	137.0	137.0	136.1	8.72
1980	240	--	56.2	64.0	146.7	146.7	146.7	11.80
1981	240	--	61.0	82.9	211.9	211.8	208.0	11.60
1982	240	--	67.7	81.5	226.3	226.3	224.2	14.30
1983	223	--	60.7	77.0	226.0	225.9	216.0	9.00
1984	315	--	77.8	94.4	288.2	288.1	276.8	8.00
1985	354	--	78.7	94.5	297.0	297.0	283.7	3.40
1986	395	6.1	77.2	92.0	299.1	299.1	286.9	2.80
1987	96	3.9	24.3	38.6	129.9	129.3	114.9	2.70
1988	109	3.2	31.6	43.0	150.8	149.7	121.4	3.00
1989	119	6.6	29.8	48.0	175.1	168.4	61.5	4.20
1990	190	2.3	41.6	57.5	217.9	6.5	0.4	4.00
1991	215	3.5	44.8	62.1	244.3	0.0	0.0	4.20
1992	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
1993	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
1994	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
TOTAL	3766	41.0	997.2	1238.1	3300.0	2835.6	2622.2	
Appropriation: Milcon								
1979	--	--	--	0.3	0.7	0.7	0.7	9.31
1990				0.9	3.5			4.00
1992				1.2	4.7			4.00
TOTAL	0	0	0	2.4	8.9	0.7	0.7	

17. Production Rate Data:

a. Annual Production Rates: (NOTE: Maximum rate is attainable only with additional customer participation.)

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Original Production Estimate	Current Estimate	Maximum Economic
1990			190	615
1991			215	
1992	N/A	NOTE 1	0	
1993			0	
1994			0	

*Note 1 - Original SAR production estimate after Milestone III extended only to 1981.

b. Cost Variance (Subject to the limitations on production rate above)

Item		Production Estimate	Variance CE less PdE	Current Estimate	Variance CE less Max	Maximum Economic
Program Acq Cost	(BY$)	+795.0	+726.4	+1521.4	+17.2	+1504.2
	(TY$)	+1031.8	+2677.2	+3709.0	+65.2	+3643.8
PAUC	(BY$)	+0.272	+0.126	+0.398	+0.004	+0.394
	(TY$)	+0.353	+0.618	+0.971	+0.017	+0.954

c. Schedule (Subject to the limitations on production rates above)
(Data based on procurement year 1976-1982)

	Production Estimate	Variance CE less PdE	Current Estimate	Variance DE less Max	Maximum Economic
Start Date (MO/YR)	Dec-75	NONE	Dec-75	NONE	Dec-75
Duration (In Months)	84	129	213	12	201
End Date (MO/YR)	Dec-82	10yrs 9mo	Sep-93	1yr	Sep-92

d. Deliveries (plan/actual)-- To Date

RDT&E	52/52
Procurement	3166/3141

18. Operating and Support Costs:

a. Assumptions and Ground Rules N/A

b. Costs N/A

c. Contractor Support Costs

	FY 1989 and Prior	FY 1990 Year	FY 1991 Year	Balance to Complete	Total
O&M (N)	30.5	6.5	8.7	0	45.7
Industrial Fund	0.6	0.4	0.3	0	1.3
Total	31.1	6.9	9.0	0	47.0

~~CONFIDENTIAL~~

SAR-89-024

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)

PROGRAM: LAMPS MK III

N-20 LAMPS MK III

AS OF DATE: December 31, 1989

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1. ~~(U)~~ Designation and Nomenclature (Popular Name): Light Airborne Multi-Purpose System (LAMPS MK III)

2. ~~(U)~~ DoD Component: U.S. Navy

3. ~~(U)~~ Responsible Office and Telephone Number:

Commander, Naval Air Systems Command
Naval Air Systems Command Headquarters
PMA-266
Washington, DC 20361-1266

PM: CAPT B. D. Strong
Assigned: August 8, 1988
AV 286-1534; COMM (202)746-1534

4. ~~(U)~~ Program Elements/Procurement Line Items:

RDT&E,N: PE 0604212N Project W1707 (Shared Funding)
PROCUREMENT: APPN 1506 ICN 0180 PE 0204243N, PE 0204262N
APPN 1810 ICN 4255 PE 0204243N

5. ~~(U)~~ Related Programs: Army UH-60A BLACK HAWK; Army EH-60A Quickfix; Air Force HH-60A NIGHT HAWK combat SAR Helicopter; Kidd Class Guided Missile Destroyer (DDG-993 Class); Arleigh Burke Class Guided Missile Destroyer (DDG-51 Class); Perry Class Guided Missile Frigate (FFG-7 Class); Spruance Class Destroyer (DD-963 Class); Ticonderoga Class Aegis Cruiser (CG-47 Class); Shipboard Sonar System AN/SQQ-89; Penguin Missile Program; Aircraft Carrier Inner Zone Anti-Submarine Warfare Helo (SH-60F); Helicopter Combat Support (HCS) (HH-60H)/Coast Guard Medium Range Recovery (MRR) (HH-60J) Helicopter.

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6. (U) Mission and Description: The Light Airborne Multi-Purpose System (LAMPS MK III) is a computer integrated ship/helicopter system that increases the effectiveness of surface combatants. It is their main battery and is optimized for Anti-Submarine Warfare (ASW) and Anti-Ship Surveillance and Targeting (ASST). Secondary missions include Search and Rescue (SAR), Medical Evacuation (MEDEVAC), Vertical Replenishment (VERTREP), and Communications Relay (COMM). Incorporation of Penguin air-to-surface missile launch capability will also allow LAMPS MK III to perform an Anti-Surface Warfare (ASUW) mission. The ship provides sensor processing, command and control, integrates LAMPS MK III information gained with other sensors, and provides the landing and traversing system, visual landing aids, and maintenance and support facilities for the aircraft. The helicopter provides a remote platform for deployment of sonobuoys and torpedoes, processing of acoustic and Magnetic Anomaly Detection (MAD) sensor information and an elevated platform for radar and Electronic Warfare Support Measures (ESM). LAMPS MK III supplements but does not replace any existing defense systems. The LAMPS MK III system is expected to meet all mission requirements.

7. (U) Program Highlights:

a. Significant Historical Developments -- Development of the LAMPS Program was initiated in 1969 with the requirement for a manned helicopter aboard destroyer-class ships to enhance ASW and ASST. The Validation Phase was completed in December 1976. Authorization was granted at DSARC IIC, in February 1978, to proceed with Full Scale Development. The first flight of the SH-60B helicopter was conducted in December 1979, followed by a successful total weapon system demonstration in May 1980. Following the installation of LAMPS MK III ship equipments in USS MCINERNEY (FFG-8), weapon system testing at sea was successfully conducted. Provisional Approval for Service Use (PASU) was granted in September 1981 following a successful OPEVAL of the Helicopter Landing System (HLS) and exercise of the entire weapon system in various operational scenarios. A Secretary of Defense Decision Memorandum (SDDM) in November 1981 provided guidance to proceed with limited production and directed that specific goal and threshold parameters be addressed at DSARC III. ASU was granted for the HLS and the Sonar Signal Processing System (AN/SQQ-28) on June 25, 1982. PASU was granted for the LAMPS MK III Weapon System and the Radio Terminal Set (AN/SRQ-4). DSARC Milestone III was conducted on June 29, 1982. A SDDM was issued on December 8, 1982, granting approval for production.

The baseline program estimated procurement of 204 aircraft over a four year period and procurement of 110 ship systems. The December 1982 SAR estimate extended the aircraft procurement to an eleven year period and reduced ship systems to 94. The December 1983 SAR estimate increased ship systems to 97. With the addition of the reserve FFG-7 class ships and the DDG-51 class ships the total number of ship systems to be procured is 142.

The first production aircraft was delivered in September 1983, one month ahead of schedule. The first LAMPS MK III training squadron was established at Naval Air Station, North Island on January 21, 1983. Initial Operational Capability was achieved in July 1984.

A Chief of Naval Operations Executive Board (CEB) decision made in April 1984 will add an ASUW capability to the LAMPS MK III weapon system by incorporating the Norwegian manufactured PENGUIN anti-ship missile.

7. (U) Program Highlights (Cont'd):

In June 1987 in response to Persian Gulf initiatives, CNO authorized 25 SH-60B aircraft to be modified for the Middle East Force with the following self-protection equipment: ARC-182 UHF/VHF radio, M-60 machine guns, ALE-39 Chaff/Flare dispenser, and ALQ-144(VP) dual phase IR jammer. Self-protection for the SH-60B, commencing with FY 1988 production aircraft, was directed by Congress in December 1987. For SAR reporting purposes, the SRQ-4 and SQQ-28 were transferred to PMS-411 in December 1986 in accordance with NAVCOMPT letter dated 18 November 1986. NAVCOMPT directed that both the SRQ-4 and SRQ-28 be reported in the SQQ-89 SAR. Twelve aircraft were configured with ALQ-156 Pulse Doppler Radar by December 1988.

b. Significant Developments Since Last Report — As of December 31, 1989, the Navy has accepted a total of 128 production SH-60B airframes, 124 full avionics populated SEAHAWKS, and 90 HLSs for ship installation. In May 1989, HSL-42 Det 6 on USS Moosbrugger (DD-980) set a new record for a one aircraft detachment of 261 flight hours in one month of operation. Upon completion of their deployment in June 1989, they became the first single aircraft detachment to exceed 1000 hours in a deployment. Also in June the largest number of LAMPS MK III ships, 21, and SH-60B aircraft, 28, were engaged in extended deployments (6th and 7th Fleet). In September 1989 HSL-48 was stood up at NAS Mayport. In November 1989 USS Roberts (FFG-58) was back at sea with HSL-44 Det 5 following repairs for damage by a Persian Gulf mine. Based on current projections, LAMPS MK III is expected to fulfill all mission requirements.

c. Changes Since "As Of" Date — N/A

8. (U) Threshold Breaches:

a. The mean flight hours between failures (MFHBF) and operational availability thresholds currently breach the DAE Baseline of 31 December 1988. Causal factors for both are higher than expected failure rates of main rotorhead and engine power management components. Main rotor head damper allowed operating time has been extended by incorporation of design improvements. An evaluation to further extend service life is on-going. Engine power management components are being improved by ECP replacement of corrosion prone anti-ice start bleed valves and correcting shorting alternators. In addition, improved O-ring seals are being installed on engine hydro-mechanical units to improve their reliability and service life.

9. (U) Schedule:

a. Milestones	Dev Estimate	Approved Program	Current Estimate
Program Initiated (TSOR issued)	Feb 69	Feb 69	Feb 69
DSARC I/II	Jun 72	Jun 72	Jun 72
DSARC IIA	Jul 73	Jul 73	Jul 73
Select System Prime Contractor (Phase I System Integration)	Apr 74	Apr 74	Apr 74
DSARC IIB	May 76	May 76	May 76
Award Full Scale Development Sustaining Engineering Contracts (Prototype System)	Sep 77	Sep 77	Sep 77

9. (U) Schedule (cont'd):

DSARC IIC	Feb 78	Feb 78	Feb 78
First Prototype Aircraft Flight	N/A	Dec 79	Dec 79
First Prototype Aircraft Delivery	Nov 79	Jan 80	Jan 80
Complete Protoype Ship System Installation	Oct 80	Nov 80	Nov 80
Complete OT IIA, HLS OPEVAL	N/A	Jun 81	Jun 81
Program Review	Aug 81	Sep 81	Sep 81
Award Aircraft Pilot Production Contract	Oct 81	Oct 81	Oct 81
Complete Initial Operational Evaluation	Jan 82	Feb 82	Feb 82
Complete Initial Board of Inspection and Survey Trials	Jan 82	Sep 82	Sep 82
DSARC III	Apr 82	Jun 82	Jun 82
Award Full Scale Production Contracts	Oct 82	Dec 82	Dec 82
First Production Ship ASW System Delivery	Jul 83	Jun 83	Jun 83
First Pilot Production Aircraft Delivery	Oct 83	Sep 83	Sep 83
CEB Decision on PENGUIN Missile	Apr 84	Apr 84	Apr 84
Initial Operational Capability (IOC)	Jul 84	Jul 84	Jul 84
Navy Support Date (NSD)	Dec 87	Dec 87	Dec 87

b. Previous Change Explanations —On September 22, 1981, a Program Review versus the planned DSARC IIIA was conducted on the LAMPS MK III Weapon System by the Under Secretary of Defense for Research and Engineering. Board of Inspection and Survey Initial Trials were delayed due to non-availability of aircraft and OPEVAL concurrency. Scope was reduced to eliminate duplications of test effort. DSARC III was completed on June 29, 1982.

c. Current Change Explanations -- None

d. References —
Development Estimate: DCP No. 85 dated March 5, 1979.
Approved Program: DAE Baseline signed 31 December 1988.

10. (U) Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
a. (U) Technical —				
(U) Weight (lbs) (Maximum Gross)	20,829	21,884/21,884	21,884	21,884
(U) Dimensions				
(U) Length (Ft) - Overall	64.8	64.8/64.8	64.8	64.8
Folded	41.1	41.1/41.1	41.1	41.1
(U) Width (Ft)				
Normal (W/O Main Rotor)	14.3	14.3/14.3	14.3	14.3
Folded	10.8	10.8/10.8	10.8	10.8
(U) Height (Ft) - Normal	17.2	17.0/17.0	17.0	17.0
Folded	13.3	13.2/13.2	13.2	13.2
b. (U) Operational -				
(U) System Performance -				
(U) Operate in Sea State	5	5/5	5	5
(U) Data Transfer Reliability (%)	(b)(1)			
(U) ASW at 100nm				
(U) ASST at 40nm				

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10. (U) Technical/Operational Characteristics (Cont'd):

	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate	
b. (U) Operational (Cont'd) --					
(U) Mission Reliability					
(U) ASW Probability of Success (Total System) (%)	(b)(1)				
(U) ASST Probability of Success (Total System) (%)					
(U) Mean Flight Hours Between Failures					
SH-60B SEAHAWK					
(Air Vehicle w/Minimum Avionics)	2.0	5.0/2.3	1.6	1.6	(Ch-1)
(Mission Avioinics)	N/A	9.0/4.9	N/A	9.0	
(U) Maintainability					
(U) Direct Maintenance Man-Hours/ Flight Hour SH-60B SEAHAWK (O-Level Total)	N/A	15.9/15.9	8.1	13.6	(Ch-2)
(U) Mean Time to Repair (Hrs) (Elapsed Maintenance Time/ Maintenance Action)					
Air Vehicle	1.0	2.0/2.0	1.3	1.9	(Ch-3)
Ship Electronics	1.5	2.0/2.0	2.0	2.0	
(U) Operational Availability (%) (Total System)	(b)(1)				
(U) Aircraft Performance					
(U) Endurance - ASW at 100nm (Hrs) ASST at 40nm (Hrs)					
(U) Speed - Mission Dash (Kts)					

c. (U) Previous Change Explanations -- The increase in aircraft maximum gross weight is the result of incorporating approved Engineering Change Proposals. The decrease in MFHBF SH-60B SEAHAWK is the result of a broader statistical base. The changes in DMMH/FH SH-60B SEAHAWK and MTTR Air Vehicle are derived from maintenance statistics and indicate performance less than prior estimates. MFHBF SH-60B SEAHAWK Air Vehicle & Minimum Avionics, DMMH/FH SH-60B SEAHAWK (O-Level Repair) and Operational Availability based upon current 3M data.

d. (U) Current Change Explanations --

(Ch-1) (U) MFHBF SH-60B SEAHAWK Air Vehicle changed to separate Air Vehicle and Mission Avionics. The current estimate changed from 10.1 to 1.6 based on current 3M data and correction of calculation from previous reports. See section 8.d. for explanation.

(Ch-2) (U) DMMH/FH SH-60B SEAHAWK (O-Level Repair) changed from 16.7 to 13.6 based on current 3M data.

(Ch-3) (U) MTTR (Air Vehicle) changed from 2.0 to 1.9 based on current 3M data.

(Ch-4) (U) (b)(1) See section 8.d. for explanation.

e. (U) References --

Development Estimate: DCP No. 85 dated March 5, 1979.

Approved Program: DAE Baseline signed 31 December 1988.

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11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. Cost —	Development Estimate	Approved Program	Current Estimate
Development (RDT&E,N)	$579.7	$615.7	$614.6
Procurement (Aircraft)	1482.8	1999.6	2035.1
Airframe & Changes	(342.1)	(557.2)	(562.8)
Engine	(67.9)	(99.2)	(95.2)
Electronics & Comm.	(399.6)	(137.7)	(155.8)
Armament & Other GFE	(18.1)	(13.1)	(14.3)
Weapons System Integration	(62.2)	(498.3)	(503.4)
Total Flyaway	(889.9)	(1305.5)	(1331.5)
Peculiar Support Eq.	(169.9)	(154.3)	(155.7)
Other Support	(269.6)	(363.8)	(355.9)
Total Support	(439.5)	(518.1)	(511.6)
Initial Spares	(153.4)	(176.0)	(192.0)
Procurement (Ship Systems)	325.2	156.8	151.4
Equipment (OPN)			
Sailaway *	(124.4)	(0.0)	(0.0)
Support. **	(40.3)	(68.4)	(62.8)
Spares	(36.0)	(2.7)	(2.7)
Total (OPN)	(200.7)	(71.1)	(65.5)
Installation (O&MN) (FMP) ***	(124.5)	(85.7)	(85.9)
Construction (MILCON)	9.0	12.3	9.8
Total FY 76 Base-Year	2396.7	2784.4	2810.9
Escalation	1510.9	3160.4	3361.0
Development (RDT&E)	(142.1)	(242.1)	(247.0)
Procurement	(1362.4)	(2909.1)	(3106.7)
Construction (MILCON)	(6.4)	(9.2)	(7.3)
Total Then-Year $ ****	$3907.6	$5944.8	$6171.9
b. Quantities —			
Aircraft only			
Development (RDT&E,N)	5	5	5
Procurement	204	204	204
Total	209	209	209

c. Foreign Military Sales — Spanish Letter of Offer and Acceptance was signed January 15, 1985, for an estimated total cost of $177.1M for the purchase of six (6) LAMPS MK III helicopters and associated spares, support equipment, training and services. Four (4) Helicopter Landing Systems (HLS) at approximately $6.5 are being procured under a separate Spanish FMS case. The Australian government has purchased six (6) HLS at approximately $9.1M through FMS.

d. Nuclear Costs — None.

11. Program Acquisition Cost: (Continued)

e. References —

Development Estimate: DCP No. 85 dated March 5, 1979.
Approved Program: DAE Baseline signed 31 December 1988.

* Sailaway costs not applicable due to transfer of SQQ-28 and SRQ-4 SAR reporting responsibilities to PMS-411. Quantities no longer applicable.
** Includes trainers and MLS costs.
*** FMP - Fleet Modernization Program.
**** Excludes SCN costs of $474.2M for 47 ship systems (20 FFG-7 class ships, 25 CG-47 class ships, and 2 Trainers). The applicable systems/costs are reported in the FFG-7, CG-47, and DDG-51 Selected Acquisition Reports. RDT&E,N costs of $15.2M (included in PE 0604212N, WI902) for the Penguin Missile are also excluded.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

THIS SECTION NOW CONTAINS COSTS FOR ACQUISITION OF BOTH AIRCRAFT AND SHIP SYSTEMS COMBINED. QUANTITIES SHOWN ARE AIRCRAFT SYSTEMS ONLY, SHIP SYSTEMS NOT QUANTITY RELATED.

	Current Year		Budget Year
	SAR Current Estimate Dec 89	UCR Baseline Estimate Dec 88	UCR Baseline Estimate Dec 89
a. Program Acquisition —			
(1) Cost	6171.9	5944.8	6171.9
(2) Quantity	209	209	209
(3) Unit Cost	29.5	28.4	29.5
b. Current Procurement —	(FY 1990)	(FY 1990) APPN ACT	(FY 1991)
(1) Cost	209.8	209.8	169.5
Less CY Adv Proc	(-41.9)	(-41.9)	(-40.3)
Plus PY Adv Proc	(+21.5)	(+21.5)	(+34.1)
Net Total	189.4	189.4	163.3
(2) Quantity	6	6	6
(3) Unit Cost	31.6	31.6	27.2

13. [redacted] Cost Variance Analysis:

a. Summary — (Current (Then-Year) Dollars in Millions)

	RDT&E,N	PROC	MILCON	TOTAL
Development Estimate	721.8	3170.4	15.4	3907.6
Previous Changes:				
Economic	+23.1	-304.1	+1.1	-279.9
Quantity	-	-228.9	-	-228.9
Schedule	-	+1603.7	-	+1603.7
Engineering	+92.3	+256.5	-	+348.8
Estimating	+19.0	+310.5	+5.0	+334.5
Other	-	-	-	-
Support	+1.6	+257.4	-	+259.0
Subtotal	136.0	+1895.1	+6.1	+2037.2
Current Changes:				
Economic	+6.3	+119.2	-	+125.5
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-2.5	+92.5	-4.4	+85.6
Other	-	-	-	-
Support	-	+16.0	-	+16.0
Subtotal	+3.8	+227.7	-4.4	+227.1
Total Changes	+139.8	+2122.8	+1.7	+2264.3
Current Estimate	861.6	5293.2	17.1	6171.9

(FY 76 Constant (Base-Year) Dollars in Millions)

	RDT&E,N	PROC	MILCON	TOTAL
Development Estimate	579.7	1808.0	9.0	2396.7
Previous Changes:				
Quantity	-	-119.8	-	-119.8
Schedule	-	+208.7	-	+208.7
Engineering	+44.0	+82.6	-	+126.6
Estimating	-9.2	+209.6	+3.3	+203.7
Other	-	-	-	-
Support	+1.2	-32.7	-	-31.5
Subtotal	+36.0	+348.4	+3.3	+387.7
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-1.1	+26.0	-2.5	+22.4
Other	-	-	-	-
Support	-	+4.1	-	+4.1
Subtotal	-1.1	+30.1	-2.5	+26.5
Total Changes	+34.9	+378.5	+0.8	+414.2
Current Estimate	614.6	2186.5	9.8	2810.9

13. (U) Cost Variance Analysis: (Cont'd)

b. Previous Change Explanations —

(1) RDT&E,N
Economic: revised escalation indices
Estimating: reconfiguration of test and evaluation ship; addition and refinement of Preplanned Product Improvement (P^3I) Program and transfer of SQQ-28 and SRQ-4 to PMS-411 for SAR reporting responsibilities. Addition of Block II Upgrade funding.
Support: cost change to fund tasks directed by Office of the Secretary of Defense relating to availability

(2) Procurement
Economic: revised escalation indices.
Quantity: deletion of fourteen (14) FFG class ships from LAMPS MK III backfit program (OPN/OMSN(FMP))
Schedule: revised aircraft procurement production schedules (APN) and ship installation schedules; revised procurement schedule; SQQ-28 slipped buy; SRQ-4 accelerated buy; HLS accelerated buy (OPN/OMSN(FMP)); revised procurement schedule in outyears.
Engineering: design engineering for production tooling; engineering testing; production impact of development-derived improvements to aircraft, avionics, and engine; incorporation of an approved ECP matrix; and ECPs required to revise Block II Upgrade; Mid East Forces ECP for electronics, armament and installation
Estimating: impact of projected change in Army's BLACK HAWK procurement plan; refinement of prior estimates to reflect contract actuals and additional procurement data; impact of six Spanish FMS aircraft; refinement of estimates based on multi-year procurement (APN); refinement of ship electronics and HLS procurement; refinement of installation cost estimates; realignment of ship installations (OPN/OMSN(FMP))
Support: refinement of support requirements, equipment and spares to support revised aircraft procurement schedules and based on more accurate cost history and procurement data; refinement of estimates for pubs/ technical data ; reprogramming of support and spares (APN); refinement of support and spares to support revised ship procurement schedules and transfer of SQQ-28 and SRQ-4 to PMS-411 for SAR reporting responsibilities (OPN)

(3) MILCON
Economic: revised escalation indices
Estimating: refinement of requirements for Applied Instruction Building and Operational/Maintenance Trainer Building

13. (U) Cost Variance Analysis (Cont'd):

c. Current Changes Explanations —

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E,N — None.		
Revised escalation indices. (Economic)	N/A	+6.3
Refinement of prior estimates. (Estimating)	-1.1	-2.5
(2) Procurement		
Revised escalation indices and renegotiated labor rates. (Economic)	N/A	+119.2
Increase in negotiated overhead rates of major contractor and refinement of prior estimates based on additional procurement data. (Estimating)	+26.2	+92.5
Reprogramming of support equipment and spares; refinement of cost estimates based on additional procurement data. (Support)	+4.1	+16.0
(3) MILCON -		
Transfer of ship related milcon costs to PMS-411. (Estimating)	-2.5	-4.4

(U) Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

a. Current Baseline Estimate to Current Estimate —

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
18.697	-0.739	-1.093	+7.672	+1.669	+2.010	—	+1.315	+10.834	29.531

Note: This includes aircraft and ship associated equipment which was not included in the 1988 SAR.

15. ~~(U)~~ Contract Information: (Then-Year Dollars in Millions)

a. RDT&E,N -- Not Applicable
b. Procurement --

System Integration	Target	Ceiling	Qty
1. IBM Corporation, Owego, NY, N00019-85-C-0403, Lot VI, FFP, Award: February 1986 Definitized: June 30, 1987	$ 78.0	N/A	17

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$79.7	N/A	17	$79.7	$79.7

Cost/schedule variance is not applicable to firm fixed price contract. The current estimates at completion include anticipated engineering change proposals.

Airframe:	Target	Ceiling	Qty
1. Sikorsky Aircraft Division, Stratford, CT, N00019-85-C-0444, Lot VI, FFP, Award: February 1986 Definitized: June 5, 1987	$ 86.4	N/A	17

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$89.3	N/A	17	$89.3	$89.3

Cost/schedule variance is not applicable to firm fixed price contract. The current estimates at completion include anticipated engineering change proposals.

c. MILCON -- Not Applicable.

16. ~~(U)~~ Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 73.3% (22 yrs/30 yrs)
(2) Percent Program Cost Appropriated: 70.3% ($4336.5/$6171.9)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY69-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-2000)	Total
RDT&E,N	715.5	0.1	21.6	124.4	861.6
PROCUREMENT	3364.2	239.6	191.9	1497.5	5293.2
MILCON	17.1	--	--	--	17.1
Total	4096.8	239.7	213.5	1621.9	6171.9

16. ~~(U)~~ Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary —

Fiscal Year	Qty	Flyaway FY76 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E,N 1/								
1969				0.8	0.8	0.8	0.8	
1970				3.0	3.0	3.0	3.0	
1971				3.4	3.4	3.4	3.4	
1972				22.7	22.7	22.7	22.7	
1973				18.6	18.6	18.6	18.6	
1974				9.5	9.5	9.5	9.5	
1975				16.1	16.1	16.1	16.1	
1976				20.9	20.9	20.9	20.9	
197T				3.1	3.3	3.3	3.3	2.9
1977				60.6	66.1	66.1	66.1	2.6
1978				106.3	124.9	124.9	124.9	6.8
1979				67.0	87.0	87.0	87.0	8.4
1980				113.9	163.4	163.4	163.4	10.6
1981				58.6	91.8	91.8	91.8	10.6
1982				39.6	65.3	65.3	65.3	7.6
1983				4.8	8.3	8.3	8.3	4.9
1984				0.8	1.4	1.4	1.4	3.8
1985				0.0	0.0	0.0	0.0	3.4
1986				0.9	1.7	1.7	1.7	2.8
1987				1.0	1.9	1.9	1.9	2.7
1988				1.7	3.5	3.5	3.2	3.0
1989				0.9	1.9	1.9	1.7	4.2
1990				0.1	0.1	-	-	4.0
1991				9.5	21.6	-	-	4.2
1992				13.1	30.8	-	-	4.0
1993				19.1	46.6	-	-	3.7
1994				18.6	47.0	-	-	3.4
Subtotal				614.6	861.6	715.5	715.0	

16. [redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary — (Continued)

Fiscal Year	Qty	Flyaway FY76 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: APN								
1981				52.5	104.4	104.4	104.4	11.6
1982	18	40.7	205.9	350.3	703.8	703.8	703.8	14.3
1983	27	8.6	181.4	347.4	736.6	736.6	736.6	9.0
1984	21		102.0	222.7	491.4	491.4	491.4	8.0
1985	24	8.0	121.4	178.3	405.2	405.2	405.2	3.4
1986	18	2.1	88.1	111.8	262.3	262.3	262.3	2.8
1987	17	0.8	85.2	93.5	226.6	226.6	198.8	2.7
1988	6	1.0	31.9	52.4	133.1	132.0	91.2	3.0
1989	6	0.8	32.3	44.9	118.5	104.4	27.7	4.2
1990	6	8.7	34.2	74.8	205.8	65.0	-	4.0
1991	6	1.0	32.4	58.8	168.3	-	-	4.2
1992	12		59.8	79.3	233.7	-	-	4.0
1993	12		58.5	72.6	220.9	-	-	3.7
1994	12		60.9	74.1	232.5	-	-	3.4
1995	12	20.4	93.8	138.9	448.2	-	-	3.1
1996	7		50.9	59.6	197.9	-	-	3.1
[redacted]997				11.6	39.7	-	-	3.1
[redacted]998				11.6	41.0	-	-	3.1
Subtotal	204	92.1	1238.7	2035.1	4969.9	3231.8	3021.5	
Appropriation: OPN 2/								
1982				10.3	18.1	18.1	16.8	7.6
1983				13.9	25.5	25.5	23.3	4.9
1984				9.0	17.0	17.0	16.2	3.8
1985				9.4	18.2	18.2	16.5	3.4
1986				10.3	20.6	20.6	18.4	2.8
1987				3.0	6.2	6.2	4.1	2.7
1988				3.5	7.7	7.6	5.9	3.0
1989				1.2	2.8	2.8	1.8	4.2
1990				1.7	4.0	1.0	-	4.0
1991				0.5	1.2	-	-	4.2
1992				0.6	1.5	-	-	4.0
1993				1.8	4.6	-	-	3.7
1994				0.3	0.8	-	-	3.4
Subtotal				65.5	128.2	117.0	103.0	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary — (Continued)

Fiscal Year	Qty	Flyaway FY76 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: OM&N (FMP) 2/								
1984				0.0	0.0			3.8
1985				4.3	8.1			3.4
1986				3.0	6.0			2.8
1987				16.7	33.6			2.7
1988				1.4	2.9			3.0
1989				7.2	15.6			4.2
1990				13.2	29.8			4.0
1991				9.6	22.4			4.2
1992				6.6	16.1			4.0
1993				17.5	44.0			3.7
1994				6.4	16.6			3.4
Subtotal				85.9	195.1			
Appropriation: MILCON 3/								
1982				5.8	10.0	10.0	10.0	7.6
1983				4.0	7.1	7.1	7.1	4.9
Subtotal				9.8	17.1	17.1	17.1	
TOTAL				2810.9	6171.9			

1/ Excludes RDT&E,N costs for the Penguin missile, SRQ-4 and SQQ-28. Includes 5 aircraft and 3 ship systems which were incrementally funded with no annual procurement quantities identified.
2/ Excludes cost for SRQ-4 and SQQ-28.
3/ Excludes cost for SRQ-4 and SQQ-28. Transfer of ship related milcon costs to PMS-411.

17. (U) Production Rate Data:

a. Annual Production Rates — The maximum economic production rate is 60 aircraft per year. This includes the SH-60B, SH-60F, HH-60H, HH-60J, S-70C(M) (Taiwan) and S-70B-2 (Australia) and is attainable. The maximum economic production rate excludes the UH-60A BLACKHAWK.

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1982	16	18	18	60
1983	48	48	27	60
1984	48	64	21	60
1985	48	74	24	60
1986	44		18	60
1987			17	60
1988			6	60
1989			6	60
1990			6	60
1991			6	60
1992			12	60
1993			12	60
1994			12	60
1995			12	60
1996			7	60

b. Cost Variance — Dollars in Millions

Item	Production Estimate *	Variance (CE Less PdE) *	Current Estimate	Variance (CE Less Max)	Maximum Economic **
Prog Acq Cost (BY $)	2396.7	+414.2	2810.9	N/A	2391.0
(TY $)	3907.6	+2264.3	6171.9	N/A	4679.5
PAUC (BY $)	9.7	+3.7	13.4	N/A	11.4
(TY $)	15.5	+14.0	29.5	N/A	22.4

* Development Estimate used.
** Maximum economic cost profile is for aircraft only, production and current estimates are for aircraft and ship systems.

c. Schedule Variance —

Item	Production Estimate	Variance (CE Less PdE)	Current Estimate	Variance (CE Less Max)	Maximum Economic
Start Date (mo/yr)	10/81	N/A	10/81	N/A	10/81
Duration (in months)	83	121	204	139	65
End Date (mo/yr)	8/88	N/A	9/98	N/A	2/87

* Development Estimate used.

17. ¶¶ Production Rate Data: (Continued)

d. Deliveries (Plan/Actual) —

Aircraft:	To Date
RDT&E,N	5/5
Procurement	124/124

e. Approved Design to Cost Goal — Aircraft only

	(Average Unit Flyaway Cost) Dev Estimate/ Appr Program	Current Estimate	Latest Approved Threshold
@ Qty: 204			
@ Peak Rate: 5/mo			
FY 76 Base-Year $	4.4/N/A	6.3	N/A
Then-Year $	7.6/N/A	15.0	N/A

18. ¶¶ Operating and Support Costs:

a. Ground Rules and Rules — SH-60B operating and support costs are calculated based on a squadron consisting of thirteen aircraft with each aircraft flying 51.9 hours per month.

b. Costs — (FY 1976 Constant (Base-Year) Dollars in Milions)

Cost Element	SH-60B SQD/YEAR
Personnel	6.344
O&S Consumables	1.362
Direct Depot Maintenance	2.301
Sustaining Investment	0.784
Other Direct Costs	-
Indirect Costs	0.248
TOTAL	11.040

c. Contractor Support Services —

	(Then-Year Dollars in Dollars) FY 1989 & Prior*	FY 1990 Year	FY 1991 Year	Balance To Complete	Total
O&M,N	5.6	1.4	3.4		10.4
Industrial Fund	0.0	0.0	0.0	___	10.4
Total	5.6	1.4	3.4		10.4

* Includes FY 1988 and FY 1989 only. FY 1987 and prior years not available.

AF-14 IR MAVERICK SAR-89-056

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: AGM-65D & AGM-65G
IR MAVERICK
AS OF DATE: DECEMBER 31, 1989

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FOR OPEN PUBLICATION
MAR 01 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD—PA)
DEPARTMENT OF DEFENSE
24

1. Designation and Nomenclature (Popular Name): AGM-65 D/G IR Maverick

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

Maverick Program Office
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433

Mr Frank O. Tuck
Assigned: June 4, 1989
AV 785-4523; COMM (513) 255-4523

4. Program Elements/Procurement Line Items:

RDT&E: PE0604608F
PROCUREMENT: PE0207313F APPN 3020 ICN M65DAG

5. Related Programs: IR GBU-15 (V)/B Cruciform Wing Weapon
P-4D/E, A-7D, A-10A, F-16, F-15E, F-4G
NAVY IR Maverick (AGM-65F), USMC Laser Maverick (AGM-65E)

6. Mission and Description:

The AGM-65D is a rocket propelled, air-to-surface precision guided missile that develops tracking signals from the naturally occurring thermal energy of the target. It is designed to destroy small hard tactical targets during day or night even under limited adverse weather conditions in the counter-air, interdiction, and close air support operations of the tactical air forces. The AGM-65D will be compatible with F-4D/E, A-7D, A-10A, F-16, F-15E and F-4G aircraft. It will increase the capability of the Maverick Weapon System by providing a day or night launch and leave mission capability and complements the capabilities of the AGM-65A and B missiles. It does not replace any existing Air Force missile system. The AGM-65G, the Maverick Alternate Warhead Missile,

SAF/PAS
90-099 -T
#24

6. Mission and Description (Cont'd):

contains the same guidance and control hardware and is designed to destroy specific hardened targets.

7. Program Highlights :

a. Significant Historical Developments - The IR Maverick Development Estimate assumed start of engineering development in April 1977. Congress denied FY78 funding for IR Maverick with direction to use FY77 funds for additional advanced development and testing of an IR Centroid Tracker. Extensive captive flight tests were completed at Fort Polk, Louisiana and in Germany in 1977 and 1978. Engineering development was initiated in October 1978. The IR Maverick Preliminary Design Review was in June 1979 and the Critical Design Review was conducted in June 1980. The DT&E/IOT&E for the AGM-65D began in early FY81 and concluded in August 1982. During this test program, 334 captive missions and 26 actual launches were accomplished. Of the 26 firings, 20 were direct hits. AFOTEC IOT&E results were reported during the September 1982 AFSARC/OSD Review cycle. Operational Effectiveness was reported as satisfactory and Operational Suitability as deficient. OSD directed the production of 200 missiles with FY82 funds. The next OSD Review, held in April 1983, approved the FY83 buy of 900 missiles. Test data from the Reliability Maintainability Validation Program (RMVP) presented at this review showed a favorable improvement in reliability.

Part 1 of FOT&E took place at Eglin AFB from May-Oct 1984 and consisted of captive carry and launch missions with F-111F and F-16 aircraft. A total of 220.3 captive carry hours were recorded along with 17 missile launches. Part 2 consisted of 211.8 captive carry hours (no launches) with the emphasis on target acquisition and delivery aircraft survivability.

Phase 1, Part 3 of FOT&E concluded on the 6 Sep 85. Twelve launches of the post-ECP 604 producibility version of the IR Maverick were completed at Nellis AFB from A-10 launch aircraft against a variety of targets. This was an AFOTEC piggy-back test effort with TAC FOT&E Phase II. Out of 12 launches, 11 direct hits were accomplished.

The TAC Phase II of FOT&E was conducted on 20 Nov 85 with 13 hits for 13 launches.

The eighth launch on 4 Dec 85 concluded the Raytheon qualification phase and set in motion the final efforts to award the production option for 800 missiles that were delivered on schedule between May 1987 through Nov 1988. IOC was attained in Feb 86, followed by a March 86 DSARC review that gave the Maverick program a decision for full production.

From July 1986 through December 1986 the AGM-65D was fired during operational training and LANTIRN testing with a very high success rate. The AGM-65G captive flight test program was completed on 17 Oct 86.

The new Hughes guidance and control manufacturing facility in La Grange, GA, started guidance section deliveries in July 86 with GBU-15 deliveries. The first Maverick guidance and control units were built in Nov 86.

7. Program Highlights (Cont'd):

The Raytheon QT&E efforts have produced 10 AGM-65D launchers with 8 hits. The last of these shots was conducted on 17 Mar 88.

A Subsequent Application Review was held at Raytheon, Bristol, TN on the production contract C/SCSC system in September 1986. The system was found to be satisfactory.

The five-shot AGM-65G flight test program was completed in 1988. The AGM-65G Flight Test Program began on 29 Oct 87 with the first launch scoring a direct hit on an idling tank. The second launch on 13 Nov 87 was a direct hit on an aircraft shelter. Third launch conducted 9 Feb 88 in forced correlate mode against a shelter resulted in a hit. Launch four, in shiptrack mode against a 65ft tugboat, on 4 May 88 was a miss due to a hard over fin caused by an actuation system malfunction. Launch five, in shiptrack mode against a simulated ship, on 29 Jul 88 resulted in a hit.

The Department has reduced the procurement program from 60,664 weapons through FY97 to 23,496 weapons through FY92.

(b) Significant Developments Since Last Report

Production Reliability Acceptance Tests (PRAT) are conducted on at least three guidance sections per contractor per month. The current cumulative Mean Time Between Failures (MTBF) is 149 hours after 80 PRAT lots. Raytheon and Hughes both are counted in this total. Both contractors use a confidence level of 80%. This far exceeds TAC's requirement of 36 hours MTBF.

As of 17 Nov 89, the Air Force IR Maverick has been fired 646 times scoring 538 hits. Hit rate is now 83.3%

Hughes Aircraft Company delivered 7328 D tactical missiles, 646 G tactical missiles, 824 D training guided missiles of which 51 are TGM 65Gs, and 363 spare guidance sections through 31 Dec 89. Two Quality Assurance Disassembly Inspections (QADI) were held with no significant faults discovered.

Raytheon Company delivered 1842 missiles through 31 Dec 89. Raytheon will complete delivery of the 1203 lot production in Jan 90. Two QADI's were performed during 1989 at Raytheon, with no significant findings.

The FY91 Amended President's Budget eliminated IR Maverick procurement for FY90 and FY91. This resulted in total USAF IR Maverick production of 19,733.

The IR Maverick continues to meet mission requirements.

(c) Change since "As Of" date - N/A

8. Threshold Breaches: There are currently no DAE baseline (dated 31 Dec 88) breaches.

9. Schedule:

a. Milestones

	Development Estimate	Approved Program	Current Estimate
DSARC II (JRMB)	Sep 76	Sep 76	Sep 76
Engineering Development Contract Award	Apr 77	N/A	Oct 78
DT&E/IOT&E Flight Tests Start	Nov 78	N/A	Jun 80
Demonstration Milestones	May 79	N/A	N/A
DSARC III A (JRMB) (Pilot Prod. Partial Release)	Jun 79	Mar 82	Mar 82
Complete DT&E/IOT&E	Jan 80	N/A	Aug 82
DSARC III B(JRMB)(Pilot Production Full Go-Ahead)	Mar 80	Sep 82	Sep 82
DSARC III (JRMB)	N/A	N/A	N/A
IOC	Jun 81	Feb 86	Feb 86
OSD Review (Reliability/Maintainability Review)	N/A	N/A	Apr 83
OSD Review (Full Production go-ahead)	N/A	Mar 86	Mar 86

b. Previous Change Explanations:

A PBD cut of $16.2M in FY78 RDT&E funds, Congressional action to delete all FY78 funds, and additional IR centroid tracker advanced development and testing caused the following schedule milestone changes: Engineering Development Contract Award to Oct 78, DT&E/IOT&E Flight Test Start Date to Apr 79, Demonstration Milestones to Dec 80, and DSARC IIIA to Jan 81, DT&E/IOT&E Complete to Jul 81, and IOC to Mar 83.

Late missile deliveries impacted DT&E completion; unusually warm weather in winter 81 delayed winter site tests for one year. Based on a revised DT&E/IOT&E completion forecast date of Mar 82, Production Decision milestones were restructured to allow a pilot production start decision in Jan 82 and a follow-on full scale pilot production decision in May 82.

Demonstration Milestones was deleted when the DSARC III (JRMB) milestone was created. Further, the need for the DSARC III milestone was satisifed by holding DSARC IIIA and DSARC IIIB.

Limited test resources further delayed DT&E/IOT&E completion until Aug 82. DSARC IIIA was held 2 Mar 82 and DSARC IIIB occurred on 21 Sep 82.

IOC similarly slipped with the delays in DT&E/IOT&E. A plant shutdown to review quality assurance caused hardware delivery delays and thus further moved IOC out from Apr 85 to Sep 85 and then again to Feb 86.

The Reliability and Maintainability Review was held in Apr 83. A decision of this Review was that the next one should not occur until FOT&E completion. Because of the delays previously mentioned, full production go-ahead slipped from Aug 85 to Mar 86.

9. Schedule (Cont'd):

c. Current Change Explanations -- None

d. References --

Development Estimate: DCP 154, dated September 20, 1976, subject "Imaging Infrared Maverick Missile System.

Approved Program: DAE Baseline dated 31 December 1988.

10. Technical/Operational Characteristics:

a. Technical	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
Minimum Trackable Temperature (MTT) (Delta)				
1/4 milliradian (mr) Target	10.0	N/A	3.5	3.5
1/2 milliradian (mr) Target	2.5	N/A	1.6	1.6
Minimum Resolvable Temperature (MRT) (Delta)				
1/4 milliradian spatial half period	.77	N/A	.77	.77
Boresight Accuracy (mr)	4.0	N/A	4.0	4.0
b. Operational				
Minimum Launch Range (ft) (0.2 Mach, 15 degree offset)	2,500	4,000 /4,000	3,500 at .3 Mach 10 offset	2,500
Maximum Launch Range (ft) (1.2 Mach, 0 degree offset)	85,000	65,000 /65,000	73,000 at .9	85,000
Lookdown Offset (Degrees below LOS)	15	15/15	15	15
Launch Range (ft) (exercised tank target, forward hemisphere 5KM visibility, 400 ft/mm Abs humidity, Night)	22,000-30,000	22,000-/22,000-30,000/30,000	23,000	30,000
Probability of Hit	.87	.75/.75	.85	.87
Mission Success Probability	.80	.80/.69	.83	.80

10. Technical/Operational Characteristics (Cont'd):

c. Previous Change Explanations

Change in the Demonstrated Performance of Mission Success Probability from .77 to .83 reflect cumulative results through completion of FOT&E.

Change in the Current Estimate of Probability of Hit from .86 to .87 is attributable to FOT&E results.

d. Current Change Explanations -- None

e. References --

Development Estimate: DCP 154, dated September 20, 1976, subject "Imaging Infrared Maverick Missile System."

Approved Program: DAE Baseline dated 31 December 1988.

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Development Estimate (FY75-86)	Approved Program	Current Estimate (FY75-92)
a. Cost --			
Development (RDT&E)	$ 100.0	$ 106.7	$ 106.7
Procurement	895.1	1204.6	1069.3
Total Flyaway	(792.1)	(1066.0)	(926.6)
Peculiar Support	(99.1)	(116.9) 1/	(126.9) 1/
Other Weapon System Cost	---		---
Initial Spares	(3.9)	(21.7)	(15.8)
Construction(MILCON)	---		---
Total Constant FY75 $	995.1	1311.3	1176.0
Escalation	597.8	1888.8	1640.6
Development (RDT&E)	(34.4)	(61.3)	(61.3)
Procurement	(563.4)	(1827.5)	(1579.3)
Total Program Cost (TY$)	1592.9	3200.1	2816.6

1/ Includes $57.8 in recurring flyaway costs for 891 training missiles.

b. Quantities --

Development (RDT&E)	35	33	33
Procurement	31078	23496	19733
Total	31113	23529	19766

11. Program Acquisition Cost (Cont'd):

c. Foreign Military Sales - Commitments to date are as follows:

1. 25 AGM-65D missiles and related support equipment to the Government of Bahrain for a total of $7.9 million.

2. 144 AGM-65 D missiles and related support equipment to the Government of the Arab Republic of Eygpt for a total of $24.5 million.

3. 300 AGM-65 G missiles and related support equipment to the Government of Kuwait for a total of $50.7 million.

4. Support equipment to the Government of the Republic of Korea for a total of $0.2 million.

5. Support equipment and spares to the Government of New Zealand for a total of $0.6 million.

6. 5 AGM-65D missiles and related support equipment to the Government of Portugal for a total of $1.0 million.

7. 250 AGM-65G missiles and related support equipment to the Government of Spain for a total of $36.3 million.

8. 3 AGM-65D and 5 AGM-65G missiles to the Government of Switzerland for a total of $1.2 million.

9. 25 AGM-65D missiles and related support equipment to the Government of Thailand for a total of $5.3 million.

d. Nuclear Costs -- N/A

e. References - -

Development Estimate: DCP 154, dated September 20, 1976, subject "Imaging Infrared Maverick Missile System."

Approved Program: DAE Baselines dated 31 December 1988.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then Year) Dollars in Millions)

	Current Estimate Dec 89 SAR	Current Year UCR Baseline Dec 88 SAR	Budget Year UCR Baseline Dec 89 SAR
a. Program Acquisition --			
(1) Cost	2816.6	3200.1	2816.6
(2) Quantity *	19733	23496	19733
(3) Unit Cost	.143	.136	.143
b. Current Procurement--	(FY 1990)	**(FY 1990) APPN	(FY 1991)
(1) Cost	173.5	173.5	7.3
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	173.5	173.5	7.3
(2) Quantity	2270	2270	0
(3) Unit Cost	.076	.076	NA

*This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of any calculations.

**Adjusted to reflect the FY90 Appropriations Act.

13. Cost Variance Analysis:
a. Summary--(Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	TOTAL
Development Estimate	134.4	1458.5	1592.9
Previous Changes			
Economic	+10.4	-202.4	-192.0
Quantity	-1.1	-755.0	-756.1
Schedule	+18.6	+1847.1	+1865.7
Engineering	0.0	+24.2	+24.2
Estimating	-0.2	+ 528.6	+ 528.4
Other	0.0	0	0
Support	+5.9	+131.1	+137.0
Subtotal	+33.6	+1573.6	+1607.2
Current Changes			
Economic	0.0	+25.9	+25.9
Quantity	0.0	-275.8	-275.8
Schedule	0.0	-50.9	-50.9
Engineering	0.0	-1.7	- 1.7
Estimating	0.0	-92.6	-92.6
Other	0.0	0.0	0.0
Support	0.0	+11.6	+11.6
Subtotal	0.0	-383.5	-383.5
Total Changes	+33.6	+1190.1	+1223.7
Current Estimate	168.0	2648.6	2816.6

13. Cost Variance Analysis (Cont'd):

a. Summary--(FY1975 Constant Dollars (Base Year) In Millions)

	RDT&E	PROC	TOTAL
Development Estimate	100.0	895.1	995.1
Previous Changes			
Quantity	-0.7	-229.5	-230.2
Schedule	+6.4	+274.1	+280.5
Engineering	0.0	+ 8.7	+ 8.7
Estimating	-2.5	+220.6	+218.1
Other	0.0	0	0
Support	+3.5	+35.6	+39.1
Subtotal	+6.7	+309.5	+316.2
Current Changes			
Quantity	0.0	- 90.1	- 90.1
Schedule	0.0	- 16.2	- 16.2
Engineering	0.0	-0.6	-0.6
Estimating	0.0	- 32.5	-32.5
Other	0.0	0.0	0.0
Support	0.0	+ 4.1	+ 4.1
Subtotal	0.0	- 135.3	- 135.3
Total Changes	+6.7	+ 174.2	+180.9
Current Estimate	106.7	1069.3	1176.0

13. Cost Variance Analysis (Cont'd):

b. Previous Change Explanations --

RDT&E

Economic:	Revised Economic Escalation indices.
Quantity:	RDT&E change from 35 missiles to 33.
Schedule:	PBD changes, cancellation of FY78 funds.
Estimating:	Definitization of FSD Contract, restoration of IR test and second source, prior year inflation adjustment, prior year program amounts aligned to actual obligations, and completion of Rapid Fire II effort.
Support:	Addition of initial support items.

PROCUREMENT

Economic:	Revised Economic Escalation Indices.
Quantity:	Procurement change from 60,664 to 23,496.
Schedule:	PBD changes, cancellation of FY78 funds, realignment and reduction of buy quantities, production start changed from FY81 to FY82, loss in production efficiency due to rescheduling units to FY90, program schedule extended due to amendments to FY85 PB, procurement delay due to out-year budget cuts, created a four year extension to the program.
Engineering:	Engineering change on 1800 units to modify them to AGM-65Gs, addition of VECP 718, rate of acceleration meter (ROAM) resulted in savings in hardware costs.
Estimating:	Revised estimate from definitization of Segment I and from DSARC III ICA, recategorization of containers from Support to Flyaway, and 300 unit increase in Raytheon pilot production for FY86. Estimate updated using contract data and Hughes productivity plan, adjustment for prior year escalation, one-time change resulting from correction to methodology for computing inflation on advance procurement funding, cost impact to unit prices and fixed costs caused by schedule delays and budgeting reductions. Re-estimates based on changing acquisition strategies ie . . split annual buys vs single source multiyear.
Support:	Deletion of FDT, addition of initial spares and support items, recategorization of containers from Support to Flyaway, Plant 44 environmental clean-up, reduction of initial spares due to funding cuts and quantity reductions. Estimate updates based on contract data, additional peculiar support equipment for missile inventory build-up in FY88, additional data for second source, change in reporting of initial spares requirements to include replenishment spares, additional data needed due to extension of the program, impact of prior year inflation adjustment and spares schedule changes.

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanations: (Dollars in Millions)

	Base Year $	Then Year $
(1) RDT&E NONE		
(2) PROCUREMENT		
	Base Year $	Then Year $
Revised Escalation Indices. (Economic)	---	+27.9
Change due to reduction in authorized quantity from 23,496 missiles to 19,733 missiles.	(-123.0)	(-374.5)
-Reduction of 3763 missiles (Quantity)	-90.1	-275.8
-Adjusted escalation cost associated with reduction of 3763 missiles. (Economic)		-2.0
-Adjusted schedule costs associated with missile reduction. (Schedule)	-16.2	-47.5
-Adjusted estimating costs associated with missile reduction. (Estimating)	-13.2	-38.7
-Adjusted engineering costs associated with missile reduction. (Engineering)	-.6	-1.7
-Reduced spares buy as a result of total program reduction. (Support)	- 2.9	- 8.8
Schedule changes due to procurement of additional 230 missiles with FY88 funds. (Schedule)		- 3.4
Adjustment for current and prior year inflation offset. (Estimating)	- 3.0	- 9.0
Incorporation of Competitive Price Data (Estimating)	- 10.3	- 29.8
Correction to prior SARs:		
- Refinement and recategorization (Flyaway to Support) of prior year costs. (Estimating)	- 6.0	- 15.1
- Refinement and recategorization (Flyaway to Support) of prior year costs. (Support)	+ 2.1	+ 5.2

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanations (Cont'd):

Correction to prior SARs:		
_ Recategorization of outyear funds (Flyaway to Support) to provide for costs associated with close-out of the program. (Support)	+ 4.9	+ 15.2

14. Program Acquisition Unit Cost (PAUC) History:

Initial SAR Estimate to Current Baseline Estimate

Changes (Then-Year Dollars in Millions)									
PAUC Initial SAR Development Estimate *	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	PAUC Current Estimate
.051	-.008	-.022	.092	.001	.022	.007	0	.092	.143

*This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of any calculations.

15. Contract Information: (Dollars in Millions)

a. RDT&E - N/A

b. Procurement

Missile:

Hughes Aircraft Company, Tucson, AZ*
#F33657-86-C-0130, FFP
Award: 20 Apr 87

Initial Contract Price

Target	Ceiling	Qty
$230.6	N/A	2156

Current Contract Price

Target	Ceiling	Qty
$237.7	N/A	2156

Estimated Price at Completion

Contractor	Program Manager
$237.7	$237.7

Note: Contract price includes $27.8M of Navy funds and $.1M of AFLC funds.

Missile:

Raytheon Co., MSD, Bristol, TN*
#F33657-86-C-0131, FFP
Award: 20 Apr 87

Initial Contract Price

Target	Ceiling	Qty
$147.7	N/A	1203

Current Contract Price

Target	Ceiling	Qty
$149.1	N/A	1203

Estimated Price At Completion

Contractor	Program Manager
$149.1	$149.1

Note: Contract price includes $5.7M of AFLC funds.
*CPR data is not required on FFP contracts.

15. Contract Information (Cont'd):

Missile:
Hughes Aircraft Company, Tucson, AZ*
#F33657-88-C-0032, FFP
Award: 4 May 88

Initial Contract Price

Target	Ceiling	Qty
$132.2	N/A	1069

Current Contract Price

Target	Ceiling	Qty
$165.6	N/A	1281

Estimated Price at Completion

Contractor	Program Manager
$165.6	$165.6

Note: Current quantity includes 84 credit missiles resulting from a reduction in initial unit cost as a result of the exercise of an option for additional missiles. Contract price includes $22.6M of Navy funds, $8.5M of AFLC funds, and $1.3M of FMS funds.

Missile:
Raytheon Co. MSD, Bristol, TN *
#F33657-88-C-0033, FFP
Award: 4 May 88

Initial Contract Price

Target	Ceiling	Qty
$150.2	N/A	1871

Current Contract Price

Target	Ceiling	Qty
$199.0	N/A	2137

Estimated Price at Completion

Contractor	Program Manager
$199.0	$199.0

Note: Current quantity includes 72 credit missiles resulting from a reduction in initial unit cost as a result of the exercise of an option for additional missiles. Contract price includes $28.4M of Navy funds and $1.4M of FMS funds.

Missile:
Hughes Aircraft Company, Tucson AZ *
F33657-89-C-0003, FFP
Award: 10 April 1989

Initial Contract Price

Target	Ceiling	Qty
$170.9	N/A	1692

Current Contract Price

Target	Ceiling	Qty
$204.7	N/A	1692

Estimated Price At Completion

Contractor	Program Manager
$204.7	$204.7

Note: Contract Price includes $37.1M of Navy funds, $23.1M of FMS funds, $25.0M of SDAF funds, and $1.6M of AFLC funds.

Missile:
Raytheon Co., MSD, Bristol, TN*
#F33657-89-C-0004, FFP
Award: 10 April 1989

Initial Contract Price

Target	Ceiling	Qty
$134.8	N/A	1078

Current Contract Price

Target	Ceiling	Qty
$160.5	N/A	1078

Estimated Price At Completion

Contractor	Program Manager
$160.5	$160.5

Note: Contract price includes $31.5M of Navy funds, $19.8M of SDAF funds, $18.7M of FMS funds, and $6.1M of AFLC funds.

* CPR data is not required on FFP contracts.

15. Contract Information (Cont'd):

c. MILCON - N/A

16. Program Funding Summary: (Current Estimate in Millions of dollars)

a. Program Status--

(1) Percent Program Completed: 88.9% (16/18)

(2) Percent Program Cost Appropriated: 99.4% (2799.3/2816.6)

b. Appropriation Summary --

(Then Year Dollars in Millions)

Appropriation	Prior Years (FY75-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92)	Total
RDT&E	$ 168.0	$ 0.0	$ 0.0	$ 0.0	$ 168.0
Procurement	$ 2457.8	$ 173.5	$ 7.3	$ 10.0	$ 2648.6
MILCON	$ ---	$ ---	$ ---	$ ---	$ ---
	$ 2625.8	$ 173.5	$ 7.3	$ 10.0	$ 2816.6

16. Program Funding Summary (Cont'd):

c. Annual Summary

FISCAL YEAR	FY75 BASE-YEAR DOLLARS QTY	FLYAWAY NONREC	FLYAWAY REC	TOTAL	THEN-YEAR DOLLARS PROGRAM	OBLIGATED *	EXPENDED *	ESCL RATE 1/
APPROPRIATION: RDT&E								
1975	--	--	--	3.6	3.9	3.9	3.9	9.6
1976	--	--	--	3.7	4.3	4.3	4.3	9.6
1977	--	--	--	8.2	10.2	10.2	10.2	9.9
1978	--	--	--	--	--	--	--	7.4
1979	--	--	--	29.8	43.4	43.4	43.4	8.4
1980	--	--	--	30.6	49.5	49.5	49.5	9.4
1981	--	--	--	21.9	39.3	39.3	39.3	11.9
1982	--	--	--	6.1	11.6	11.6	11.6	9.4
1983	--	--	--	2.0	4.1	4.1	4.1	4.9
1984	--	--	--	0.8	1.7	1.7	1.7	3.8
SUBTTL	33			106.7	168.0	168.0	168.0	---
APPROPRIATION: PROCUREMENT								
1982	200	14.3	62.2	104.7	220.9	220.9	218.0	9.6
1983	900	30.3	58.5	109.9	245.8	245.8	238.0	9.0
1984	1980	6.5	99.7	129.1	301.0	301.0	298.3	8.0
1985	2600	0.4	117.5	151.8	362.4	362.4	352.4	3.4
1986	2837	8.1	145.6	168.7	418.2	418.2	377.3	2.8
1987	3224	0.0	134.0	138.0	355.3	355.3	337.0	2.7
1988	3182	0.0	106.0	109.5	293.1	286.9	92.1	3.1
1989	2540	2.1	85.1	92.7	261.1	213.0	9.0	4.2
1990	2270	0.0	56.2	59.3	173.5	0.0	0.0	4.0
1991	0	0.0	0	2.4	7.3	0.0	0.0	4.2
1992	0	0.0	0	3.2	10.0	0.0	0.0	4.0
SUBTTL	19733	61.7	864.8	1069.3	2648.6	2403.5	1922.1	---
TOTAL	19766			1176.0	2816.6	2571.5	2090.1	---

1/ Since outlay rates are not shown, the escalation rates cannot be used to verify the composite indices.

*Reflects program office records as of 31 Dec 89.

17. Production Rate Data:

a. Annual Production Rates -- The annual production rates shown differ from the annual funded quantity buys because the funded delivery period is 21 months for FY82, 10 months for FY83 and FY84. For FY86 the delivery period is 19 months due to the introduction of the second source. For FY87 the delivery period is 12 months.

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	*Maximum
1979	240			
1980	3100			
1981	5400			
1982	6000	114	114	1800
1983	6000	1080	1080	4200
1984	6000	2376	2376	4200
1985	4338	2600	2600	4200
1986		1642	1792	6000
1987		4700	3224	0
1988		7000	3182	0
1989		7000	2540	0
1990		7000	2270	0
1991		7000	0	0
1992		10000	0	0

*Based on available tooling.

b. Cost Variance -- Dollars in Millions

Item		Development Estimate	Variance (CE less DE)	Current Estimate	Variance (CE less Max)	*Maximum
Prog Acq Cost	(BY$)	995.1	+ 180.9	1176.0	+ 423.9	752.1
	(TY$)	1592.9	+1223.7	2816.6	+1146.8	1669.8
PAUC**	(BY$)	.032	+.028	.060	+ .022	.038
	(TY$)	.051	+.092	.143	+.058	.085

*FY89 and prior years based on actuals, outyears based on maximum production rates.

**This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of any calculations.

17. Production Rate Data(Cont'd):

c. Schedule Variance --

	Development Estimate	Variance (CE less DE)	Current Estimate	Variance (CE less Max)	Maximum
Start Date (Mo/Yr)	11/81	N/A	12/82	N/A	12/82
Duration (in Months)	73	+47	120	+37	83
End Date (Mo/Yr)	12/87	N/A	11/92	N/A	11/89

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	33/33
Procurement	11044/10801

e. Approved Design-to-Cost Goal --

	(Average Unit Flyaway Cost) Development Estimate	Current Estimate	Latest Approved Threshold
@ Qty: 14740 - @ Peak rate: 500/Mo.			
FY 75 Base - Year $	0.032	0.053	0.032
Then - Year $	0.050	0.128	0.050

18. Operating and Support Costs

a. Assumptions and Groundrules --

The IR Maverick D & G model missiles will be supported by a two-level maintenance concept. The O&S costs collected were those required to operate, support, and maintain the AGM-65 D&G models of Maverick missile family. This included the O&S costs of both the Tactical Guided Missile (AGM) & Training Guided Missile (TGM). O&S costs included organizational level inspection of the All-Up-Round. It included fault isolation to the Shop Replacable Unit (SRU) and separation of the failed SRU at the Intermediate Maintenance Facility. The O&S costs also included depot repair of the SRU; transportation to and from the depot/organization; organizational and depot training; maintenance of organizational and depot support equipment; management of new parts entered into the support system; maintenance and reproduction of technical orders; maintenance of real property; maintenance/update of software; replenishment spares and consumables.

b. Costs -- (FY87 Constant Dollars in Millions)

Cost Element	Avg Annual Cost (29 years)
Personnel	$2.9
Organization Support	.8
Depot Maintenance	7.0
Depot Supply	.7
Transportation	.6
Training	.2
Sustaining Investment	5.9
Total	$18.1M per year

Note: These costs represent the O&S requirements developed for the FY87 ICA/Annual Estimate. These requirements do not reflect the quantity reduction from 60664 to 19733 missiles and the termination of production in FY90 vs FY99. Therefore, this estimate no longer represents current Maverick O&S requirements.

c. Contractor Support Costs -- N/A

Q N-26 MK 48 ADCAP ~~SECRET~~ SECRET SAR-89-031

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: MK-48 ADCAP

AS OF DATE: December 31, 1989

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1. [redacted] Designation and Nomenclature (Popular Name): Torpedo MK 48 ADCAP Program

2. ([redacted]) DoD Component: NAVY

([redacted]) Responsible Office and Telephone Number:
Torpedo MK48 Weapon Systems Program — CAPT Dennis L. Witzenburg
Naval Sea Systems Command — Assigned: December 15,1989
(PMS402) — AV 222-0610 COMM 202-602-0610
Washington, DC 20362-5101

4. [redacted] Program Elements/Procurement Line Items:
RDT&E:
PE 0603691N Project S0366
PROCUREMENT:
APPN 1507 ICN 3111 (Navy)
APPN ICN 5120
MILCON:
PE 242896N

5. [redacted] Related Programs: Submarine Fire Control and Launch Systems, Mobile ASW Target

AS AMENDED

MAR 22 1990

90-L-0676

No Security Objection to Open Publication (AS AMENDED) MAR 22 [redacted]
Office of the Chief of Naval Operations
Dept. of the Navy

[redacted] Multiple Sources
Classified by:
Declassify on:

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OASD(PA) DFOISR 90 -T- 0691/10

6. [redacted] Mission and Description: (b)(1)

(b)(1) [redacted]

7. [redacted] Program Highlights:

a. [redacted] Significant Historical Developments -- In October 1975, CNO established an operational requirement for the Torpedo MK 48 ADCAP, citing need for improvements in ASW and ASUW. Prior to formal approval of this program, emergence of a new Soviet class of submarine caused an increase in program scope. This broader program was reviewed and approved in September 1979 after DNSARC I. Cost and schedule problems identified in 1981 resulted in restructuring in January 1982 in accordance with recommendations of the NAVMAT review team. In November 1981, the program was assigned a BRICKBAT, DX priority rating. A production readiness review in March 1984 certified readiness to enter initial production. An Approval for Limited Production (ALP) review in September 1985 authorized FY85 WPN funding for fabrication of 28 torpedoes. OT-IIA was successfully completed in August 1987. In September 1987, the Navy Program Decision Meeting (NPDM) authorized FY86 and FY87 WPN funding for 123 limited production torpedoes for Hughes and 50 pilot production torpedoes for Westinghouse Oceanics Division (formerly Gould). OPEVAL was completed in May 1988. In September 1988, the NPDM authorized FY88 WPN funding for 102 torpedoes. On 23 Jan 1989, the Navy granted approval for ADCAP full production after DEPSECDEF submitted to Congress the Live Fire Test Report and the Director, Operational Test and Evaluation (D, OT&E) report.

b. [redacted] Significant Developments Since Last Report -- In December 1989, Westinghouse Oceanics Division delivered the first two follower pilot production torpedoes.

c. [redacted] Changes Since As Of Date -- None.

8. [redacted] Threshold Breaches: None. DAE Baseline dated July 14, 1989

9. [redacted] Schedule:

a. [redacted] Milestones --

	Production Estimate	Approved Program	Current Estimate
DNSARC I	SEP 79	SEP 79	SEP 79
FSED Contract Award	AUG 82	AUG 82	AUG 82
DNSARC II	SEP 82	SEP 82	SEP 82
Critical Design Review	AUG 84	AUG 84	AUG 84

a.( )Milestones -- Continued	Production Estimate	Approved Program	Current Estimate
LRIP Contract Award	MAR 85	MAR 85	MAR 85
OPEVAL Completion	MAY 88	MAY 88	MAY 88
Milestone IIIC	JAN 89	JAN 89	JAN 89
IOC 1/	AUG 88	AUG 88	AUG 88
Milestone IIIA	SEP 85	SEP 85	SEP 85
Milestone IIIB	SEP 87	SEP 87	SEP 87

b.( )Previous Change Explanations -- None.

c.( )Current Change Explanations --

No current changes.

Footnotes: 1/ IOC is defined as the initial delivery of L1 production contract MK 48 ADCAP Warshot Torpedoes for loadout under type commander (TYCOM).

d.( )References --

Production Estimate: NDCP Rev. 2, dated 6 Sep 88, subject 'Navy Decision Coordinating Paper (NDCP) for Torpedo MK 48 ADCAP Program.' DAE Program Baseline dated 14 July 1989.

Approved Program: DAE Program Baseline, dated 14 July 1989.

[redacted] Technical/Operational Characteristics:

a.(C)Technical --	Prod Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
(b)(1) [redacted]				

[redacted]

(S) Technical/Operational Characteristics (Cont'd):

a. (S) Technical --	Prod Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
(b)(1)				

c. (U) Previous Change Explanations -- None.

d. (U) Current Change Explanations --

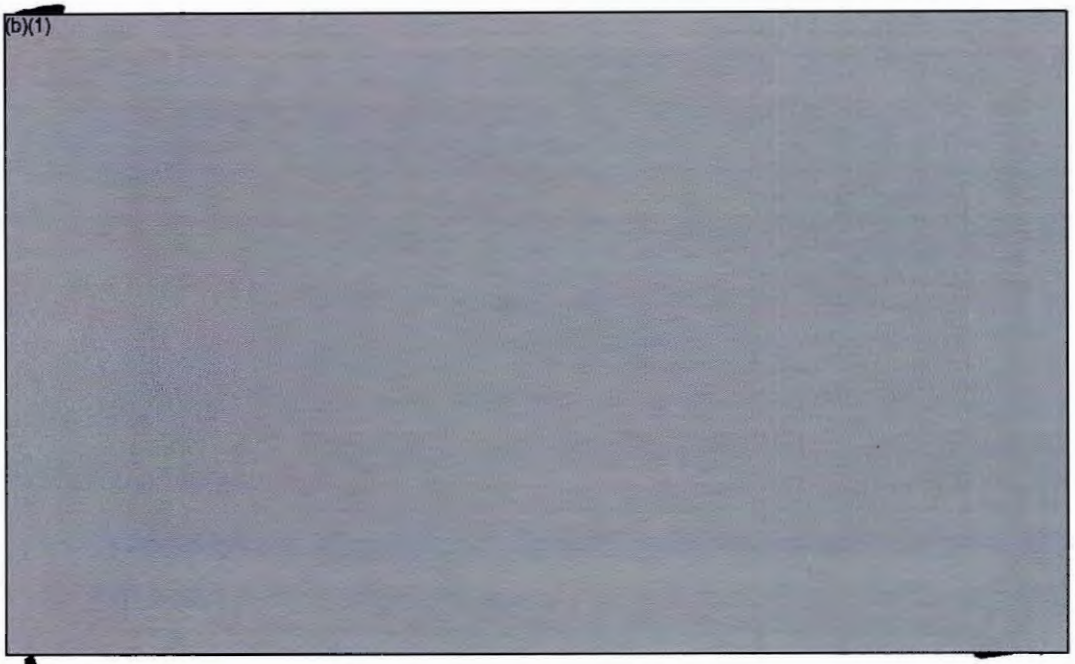
No current changes

Footnotes:

(b)(1)

5/ (S) Availability (90-day patrol) = (loadouts - backhauls)/loadouts.

(b)(1)



e. ( ) References --

Production Estimate: NDCP Rev. 2, dated 6 Sep 88, subject "Navy Decision Coordinating Paper (NDCP) for Torpedo MK 48 ADCAP Program." DAE Program Baseline dated 14 July 1989.

Approved Program: DAE Program Baseline, dated 14 July 1989.

11. ( ) Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. ( ) Cost --	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	1312.1	1312.1	1310.6
Procurement	5019.6	5019.6	5109.6
Total Swimaway	(4309.8)	(4309.8)	(4418.4)
Other Wpn Sys Cost	(599.1)	(599.1)	(582.5)
Peculiar Support	(0.0)	(0.0)	(0.0)
Initial Spares	(110.7)	(110.7)	(108.7)
Construction	16.0	16.0	22.3
Total FY 89 Base-Year $	6347.7	6347.7	6442.5

a.([redacted])Cost -- (Cont'd)	Production Estimate	Approved Program	Current Estimate
Escalation	452.6	452.6	972.9
Development (RDT&E)	(-163.9)	(-163.9)	(-159.3)
Procurement	(615.9)	(615.9)	(1130.5)
Construction (MILCON)	(0.6)	(0.6)	(1.7)
Total Then-Year $	6800.3	6800.3	7415.4

b.([redacted])Quantities --

	(b)(1)
Development (RDT&E)	[redacted]
Procurement	
Construction (MILCON)	
Total	

c.([redacted])Foreign Military Sales -- None.

d.([redacted])Nuclear Costs -- None.

e.([redacted])References --

Production Estimate: DAE Program Baseline dated 14 July 1989.

Approved Program: DAE Program Baseline dated 14 July 89.

12. [redacted] Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a.[redacted]Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1) Cost	7408.0	6800.3	7408.0
(2) Quantity 1/	(b)(1) [redacted]		
(3) Unit Cost			
b.[redacted]Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	442.5	442.5	355.7
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	442.5	442.5	355.7
(2) Quantity	240.0	240.0	240.0
(3) Unit Cost	1.844	1.844	1.482

Paragraph 12 Comments:
Note: 1/
This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are

12. [redacted] Program Acquisition/Current Procurement Unit Cost Summary (Cont'd):

not considered fully - configured end items for the purposes of this calculation.

13. [redacted] Cost Variance Analysis:

a. [redacted] Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	1148.2	5635.5	16.6	6800.3
Previous Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes:				
Economic	+3.4	+325.5	+0.1	+329.0
Quantity	-	-	-	-
Schedule	+4.0	+393.6	+0.1	+397.7
Engineering	-	-	-	-
Estimating	-4.3	-115.7	+7.2	-112.8
Other	-	-	-	-
Support	-	+1.2	-	+1.2
Subtotal	+3.1	+604.6	+7.4	+615.1
Total Changes	+3.1	+604.6	+7.4	+615.1
Current Estimate	1151.3	6240.1	24.0	7415.4

3. (U) Cost Variance Analysis (Cont'd):

(FY 1989 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	1312.1	5019.6	16.0	6347.7
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes:				
Quantity	-	-	-	-
Schedule	+2.6	+184.5	-	+187.1
Engineering	-	-	-	-
Estimating	-4.1	-95.6	+6.3	-93.4
Other	-	-	-	-
Support	-	+1.1	-	+1.1
Subtotal	-1.5	+90.0	+6.3	+94.8
Total Changes	-1.5	+90.0	+6.3	+94.8
Current Estimate	1310.6	5109.6	22.3	6442.5

b. (U) Previous Change Explanations --

RDT&E

PROCUREMENT

MILCON

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Jan 90 economic escalation rates. (Economic)	0.0	+3.4
Extension in CCAPS FSD schedule. (Schedule)	+2.6	+4.0
Budget Adjustments for SBIR reductions, Special Projects, Federal Technical Transfer Act, Gramm-Rudman, travel reductions, and escalation offset.	-4.1	-4.3

c. ( )Current Change Explanations -- (Cont'd)

	(Dollars in Millions) Base-Year	Then-Year
(Estimating)		
(2) PROCUREMENT		
Revised Jan 90 economic escalation rates. (Economic)	0.0	+325.5
Program rephased to procure at an annual quantity of (b)(1) per year extending program completion from FY98 to FY00. (Schedule)	+184.5	+393.6
Decision to procure sole source after FY90 with a competitive winner-take-all contract in FY91. (Estimating)	-124.9	-151.8
Adjustments to reflect efficiencies from changes in Navy Industrial Fund rates, Technology Base decrease, Contracted Advisory and Assistance Services (CAAS), contractor travel reductions, Defense Management Review recommendations, and Computer Aided Logistics Support (CALS) offset by program repricing adjustments. (Estimating)	+78.3	+93.9
Offset of escalation. (Estimating)	-49.0	-57.8
Revised spares requirements (Support)	+1.1	+1.2
(3) MILCON		
Revised Jan 90 economic escalation rates. (Economic)	0.0	+0.1
Magazine construction at NWS Yorktown slipped schedule one year. (Schedule)	0.0	+0.1
Automated Material Handling Facility at NUWES, Keyport, WA funded. (Estimating)	+6.3	+7.3
Offset of escalation (Estimating)	0.0	-0.1

14. [redacted] Program Acquisition Unit Cost (PAUC) History: (Then-Year Dollars in Millions)

a. [redacted] Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Prod Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
(b)(1) [redacted]									

b. [redacted] Current Baseline Estimate to Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
(b)(1) [redacted]									

15. [redacted] Contract Information: (Then-Year Dollars in Millions)

a. [redacted] Procurement

Torpedo:
Hughes Aircraft Company
Fullerton, CA
NQ0024-88-C-6148, FFP
Award: December 24, 1987
Definitized: December 24, 1987

Initial Contract Price		
Target	Ceiling	Qty
$188.1	$0.0	123.0

Current Contract Price		
Target	Ceiling	Qty
$268.2	$0.0	123.0

Estimated Price At Completion	
Contractor	Program Manager
$268.2	$268.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances		
Cumulative Variances To Date	Not Required by the Contract	
Net Change		

Explanation of Change: The increase in target price over initial target was caused by addition of scope including spares transferred when LI contract was capped ($46M), afterbody/tailcone spares ($7M), and ECPs ($15M), proofing incentive ($7M), and warhead ECPS/spares ($5M).

15. [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

Torpedo:	Initial Contract Price Target	Ceiling	Qty
Hughes Aircraft Company Fullerton, CA N00024-87-C-6056, FPI Award: September 21, 1987 Definitized: September 21, 1987	$98.1	$108.8	0.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$124.2	$135.2	0.0	$124.2	$124.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-0.8	$-7.6
Cumulative Variances To Date (12/24/89)	$0.1	$-3.9
Net Change	$0.9	$3.7

Explanation of Change: The cost variance was created by the early start of work. The schedule variance is created by late material deliveries. Variances will have no impact on contract price at completion. The increase in target price over initial target was caused by additional scope including WAS/WES test set ($3.5M), ATE microvax upgrade ($1M), spares ($15M), drawing upgrades ($4.9M), and ECP's ($1.4M).

Torpedo:	Initial Contract Price Target	Ceiling	Qty
[redacted] Westinghouse Electric Co. Cleveland, OH N00024-86-C-6162, FPI Award: April 15, 1986 Definitized: October 7, 1987	$51.0	$58.1	50.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$54.9	$62.5	50.0	$62.3	$62.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-2.2	$-6.1
Cumulative Variances To Date (10/20/89)	$-7.6	$-11.0
Net Change	$-5.4	$-4.9

Explanation of Change: Cost variance is driven by parts being procured over budget, unplanned tasks, underestimation of work hours required, rework costs, and overtime costs in the torpedo section. Schedule variance is caused by late material deliveries in torpedo section components. The Program Manager's Estimate at Completion exceeds ceiling because projections based on current definitized price at 40% completion indicate actual cost will exceed ceiling by $4M. The government's liability on this contract is limited to the ceiling price. NOTE:

15. [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

Definitized date reflects the date option P0003 was exercised.

Torpedo:	Initial Contract Price Target	Ceiling	Qty
Hughes Aircraft Company Fullerton, CA N00024-88-C-6215, FFP Award: September 30, 1988 Definitized: September 30, 1988	$219.1	$0.0	255.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$221.3	$0.0	255.0	$221.3	$221.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances		
Cumulative Variances To Date (12/31/89)	Not Required by the Contract	
Net Change		

Explanation of Change: Increase in target price is attributed to the addition of $2.2M for ECP's

Torpedo:	Initial Contract Price Target	Ceiling	Qty
Westinghouse Electric Co. Cleveland, OH N00024-88-C-6325, FFP Award: September 30, 1988 Definitized: September 30, 1988	$166.1	$0.0	167.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$158.7	$0.0	167.0	$158.7	$158.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances		
Cumulative Variances To Date (12/31/89)	Not Required by the Contract	
Net Change		

Explanation of Change: Decrease in target price is attributed to the elimination of $10.6M of spares and the addition of $3.2M for ECP's.

15. (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

TORPEDO:	Initial Contract Price Target	Ceiling	Qty
HUGHES AIRCRAFT COMPANY FULLERTON, CA N00024-89-C-6034, FFP Award: December 16, 1988 Definitized: December 16, 1988	$167.4	$0.0	0.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$188.4	$0.0	0.0	$188.4	$188.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances		
Cumulative Variances To Date (12/31/89)	Not Required by the Contract	
Net Change		

Explanation of Change: Increase in target price caused by the addition of $18M SPCC spares and $3M NAVSEA spares.

16. (U) Program Funding Summary:

a. (U) Program Status --

(1) Percent Program Completed: 54.5% (12 yrs/22 yrs)

(2) Percent Program Cost Appropriated: 40.3% ($2989.6 / $7415.4)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY79-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-00)	Total
RDT&E	957.5	30.6	60.3	102.9	1151.3
Procurement	1544.9	442.5	355.7	3897.0	6240.1
MILCON	12.7	1.4	7.3	2.6	24.0
O&M					
Total	2515.5	474.5	423.3	4002.5	7415.4

c. [redacted] Annual Summary --

Fiscal Year	Qty	Flyaway FY89 Dollars		Total Base Years	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: 1319 Research, Development, Test & Eval, Navy								
1979				28.3	17.9	17.9	17.9	8.4
1980				75.2	52.6	52.6	52.6	10.6
1981				118.7	90.6	90.6	90.6	10.6
1982				192.2	154.4	154.4	154.4	7.6
1983				214.9	180.4	180.4	180.4	4.9
1984				198.8	172.9	172.9	172.1	3.8
1985				140.0	125.5	125.5	125.5	3.4
1986				65.4	60.3	60.3	60.2	2.8
1987				59.5	56.5	56.5	55.5	2.7
1988				20.6	20.2	20.2	17.6	3.0
1989				25.6	26.2	26.1	18.8	4.2
1990				28.8	30.6	8.6	2.2	4.0
1991				54.5	60.3			4.2
1992				58.7	67.5			4.0
1993				21.3	25.4			3.7
1994				8.1	10.0			3.4
Subtot	48			1310.6	1151.3	966.0	947.8	

[redacted]

c. (U) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY89 Dollars Nonrec	Flyaway FY89 Dollars Rec	Total Base Years	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: 1507 Weapons Procurement, Navy								
1984		27.3	36.5	84.8	76.1	76.1	76.1	8.0
1985	(b)(1)	15.8	78.7	123.1	113.6	113.6	104.6	3.4
1986		86.6	234.4	380.4	363.3	363.3	177.1	2.8
1987		49.8	110.9	248.0	245.4	245.4	136.8	2.7
1988		18.9	190.6	248.4	255.7	252.0	73.4	3.0
1989		24.7	346.7	458.2	490.8	460.7	58.0	4.2
1990		35.6	290.3	397.3	442.5	9.1	2.4	4.0
1991		4.2	277.4	307.7	355.7			4.2
1992		4.1	277.6	320.6	383.6			4.0
1993		13.6	265.9	323.1	399.2			3.7
1994		1.4	275.0	320.7	408.6			3.4
1995			288.8	311.7	409.5			3.1
1996			283.3	304.1	411.9			3.1
1997			272.7	287.9	402.0			3.1
1998			266.1	281.4	405.2			3.1
1999			265.2	280.6	416.5			3.1
2000			376.3	431.6	660.5			3.1
Subtot		282.0	4136.4	5109.8	6240.1	1520.2	628.2	

c. (U) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY89 Dollars Nonrec	Flyaway FY89 Dollars Rec	Total Base Years	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: 1205 Military Construction, Navy								
1986				0.7	0.7			2.8
1987								2.7
1988				11.8	12.0			3.0
1989								4.2
1990				1.3	1.4			4.0
1991				6.4	7.3			4.2
1992								4.0
1993				2.1	2.6			3.7
Subtot	0			22.3	24.0			
Total	(b)(1)	282.0	4136.4	6442.5	7415.4	2486.2	1576.0	

17. (U) Production Rate Data:

a. (U) Annualized Production Rates --

Fiscal Year Buy	Production Rates (Quantity/Year) Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1984	0	0	0	0
1985	(b)(1)	18	(b)(1)	0
1986		164		0

17. (U) Production Rate Data (Cont'd):

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1987	(b)(1)	55	(b)(1)	
1988		306		
1989		320		
1990		320		
1991		320		
1992		320		
1993		320		
1994		320		
1995		320		
1996		320		
1997		320		
1998		291		
1999		0		
2000		0		

b. (U) Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Acq. Cost (BY $)	6347.7	+88.5	6436.2	+668.3	5767.9
(TY $)	6800.3	+607.7	7408.0	+1446.3	5961.7
PAUC Cost (BY $)	(b)(1)	0.026	(b)(1)	(b)(1)	
(TY $)		0.179			

c. (U) Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	MAR 85	0	MAR 85	0	MAR 85
Duration (in mon)	+185	+24	+209	+67	+142
End Date (Mo/Yr)	AUG 00	+24	AUG 02	+67	JAN 97

d. (U) Deliveries (Plan/Actual) --

	To Date
RDT&E	48/48
Procurement	30/30
MILCON	0/0
O & M	0/0

Paragraph 17 Comments:

(U) Annualized Production Rates -- The annualized production rates shown differ from the annual funded quantities because the funded

17. (U) Production Rate Data (Cont'd):

delivery period is 19 months for FY85, 9 months for FY86, 11 months for FY87, 4 months for FY88, and 17 months for FY00. FY88 and out reflects two contractors (leader/follower) and FY87 supports one contractor.

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules --

The costs are for the operation and support of the ADCAP torpedo. The data was prepared by PMS402 based on current budget projections in January 1989. Cost categories are Direct Depot Support, Sustaining Investment, Other Direct Costs, and Consumables/Personnel. Direct Depot Costs is a summary cost which includes costs associated with fleet firings, turnarounds, torpedo storage, and other direct maintenance costs. Sustaining Investment costs includes engineering technical support and maintenance support. The Other Direct Costs category includes production related administration, facilities, and technical support. Consumables/Personnel consists of MILPERS estimates of ADCAP related costs and costs associated with consumable items for torpedo support.

b. (U) Costs -- (FY 1989 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per ADCAP	Avg Annual Cost Per ADCAP (Antecedent)
Direct Depot Maintenance	1726.1	55.7
Sustaining Investment	780.6	25.2
Other Direct Costs	304.8	9.8
Consumables/Personnel	1020.8	32.9
Total	3832.3	123.6

c. (U) Contractor Support Costs -- (Current (Then-Year) Dollars in Millions)

Funding	FY1989 & Prior	FY1990	FY1991	Balance To Complete	Total
O&M	3.6	4.1	4.6	333.5	345.8
Industrial Fund	---	---	---	---	---
Total	3.6	4.1	4.6	333.5	345.8

N-35 SPARROW SAR-89-041

1

[redacted]

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: SPARROW (AIM/RIM-7M) (USN/USAF)

AS OF DATE: DECEMBER 31, 1989

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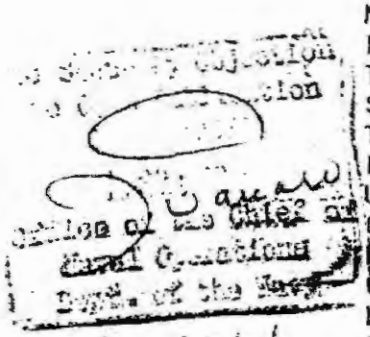

90 C064

1. [redacted] Destination and Nomenclature: AIM/RIM-7M Air-to-Air Guided Missile ((Sparrow)

2. ([redacted]) DOD Component: Departments of the Navy and Air Force

3. ([redacted]) Responsible Office and Telephone Numbers:

Air-to-Air Missile Systems Program Office (PMA-259) Washington, DC 20381	PM: CAPT J. J. Stewart, USN Assigned: February 14, 1986 AV 222-8222; COMM (202) 692-8226
PMA-259B	PM: MAJ E. A. Sandberg, USAF Assigned: September 4, 1989 AV 222-8222; COMM (202) 692-8224

4. [redacted] Program Elements/Procurement Line Items:

RDT&E: PE 0604354N Projects W0457 & W1927 (Shared funding)
PE 0207161F (Shared funding)

PROCUREMENT: APPN 1507 ICN 2202 (AIM) ICN 5120 (RIM)
APPN 3020 ICN M07FA1

5. [redacted] Related Programs: Low altitude fuze improvement (NAVSEA); AMRAAM (USAF)

AS AMENDED

[redacted] OPNAVINST 5513.2A [redacted]
[redacted]

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6. (U) Mission and Description: The AIM/RIM-7M missile is a semi-active radar-guided intercept missile which is used with a number of Air-to-Air and Ship-to-Air weapon systems and provides all-aspect attack capability in all weather conditions against a broad spectrum of targets and in a variety of countermeasures environments. The AIM/RIM-7M utilizes an inverse monopulse seeker to guide semi-actively to a target illuminated by radar signals emanating from the launching aircraft or ship. The missile incorporates on board digital processing to provide improved counter-countermeasures capabilities and better capabilities to track targets against a clutter background, a new autopilot band with low altitude capability for surface-to-surface firing, and a new active fuze for improved burst control and low altitude capability. The RIM-7M is the ship-to-air version of the AIM-7M which can be launched from NATO SEASPARROW Surface Missile Systems. The AIM/RIM-7M motor, warhead, wings, fins and autopilot design are the AIM-7F design. A blast fragmentation warhead was developed and was introduced in the FY81 buy. The AIM/RIM-7M missiles will replace the AIM-7E, AIM-7F and RIM-7H series missiles in the present inventory. The AIM-7M is specified as a primary weapon for use on F-4, F-14, F-15 and F-18 series aircraft. The RIM-7M will be the primary weapon for use with the NATO SEASPARROW Missile System aboard ships of the U.S. Navy and NATO SEASPARROW consortium nations.

(U) Program Highlights:
Significant Historical Developments -- DSARC II held in April 1978 approved engineering development of the AIM/RIM-7M. The FY 1980 AIM/RIM-7M Sparrow guidance and control section production was approved by the Office of the Secretary of Defense in September 1980 (UNDERSECDEF memo of 9/22/80). The second OSD Program Review of 9 March 1981 authorized go-ahead of the FY1981 procurement program. DNSARC III held in November 1982 authorized full rate production of the AIM/RIM-7M (ASN memo of 11/2/82). Approval for service use for the AIM-7M was granted in November 1982 (CNO ltr ser 401E/394759 of 11/8/82). A decision was made during the FY88/89 budget cycle to cancel the procurement of AIM/RIM-7M after FY1987 for the Navy. Congress added funding for 600 USN missiles. During the FY90/91 cycle the decision was made to cancel USAF procurements after FY1989. This decision was based on the procurement of AMRAAM, the Sparrow follow on. In accordance with ASD (C) memorandum of 3 August 1987 the Navy as lead service is submitting a combined USN/USAF Selected Acquisition Report (SAR).

B. Significant Developments Since Last Report --
Due to 90% delivery completed and 92% expended.
THIS IS THE FINAL SAR.

[redacted]

AS OF DATE: DECEMBER 31, 1989

8. ([redacted]) Threshold Breaches: There are currently no DAE Baseline 31 Dec 88 breaches.

9. ([redacted]) Schedule:

	Development Estimate	Approved Program	Current Estimate
A. Milestones --			
Prototype Seeker Firings	N/A	Jan 77	Jan 77
AIM/RIM-7M FSD (DSARC II)	Apr 78	Apr 78	Apr 78
Commence Joint TECHEVAL	Feb 80	N/A	Jun 80
OSD Program Review	Apr 80	N/A	Aug 80
Commence IOT&E	Apr 80	N/A	Jun 81
Approval for Service Use	May 81	N/A	Nov 82
DSARC III	Jun 81	N/A	--
DNSARC III	--	Nov 82	Nov 82
IOC (1st delivery to Fleet)	Jul 81	Jan 83	Jan 83

B. Previous Change Explanations -- Joint TECHEVAL, OSD Program Review, and IOT&E were delayed due to difficulties in repacking the government supplied fuze, and the need to incorporate a new firmware package into the Joint TECHEVAL firing missiles.

-- New milestones resulted from re-[redacted]tarting of IOT&E, delay in receipt of first production units from [redacted]he contractor, and the change of program status from a major program [redacted]o a Navy managed program. Approval for service use for AIM-7M granted November 1982; Approval for Service use for RIM-7M granted July 1983.

C. Current Change Explanations -- None.

D. References -- Development Estimate: DCP #89, Revision B, dated 19 April 1979 and full approval for service use dated 8 November 1982.
-- Approved Program: DAE baseline of 31 Dec 1988.

10. [redacted] Technical/Operational Characteristics:

	Development Estimate	Approved Prgm Goal/Threshold	Dem Perf	Current Estimate
A. [redacted] Technical --				
([redacted]) Weight/Launch,lbs	510/510	- /510	510	510
Warhead, lbs	90/90	- / 90	90	90
([redacted]) Guidance	Semi-Active Continuous Wave or Pulse Doppler Radar			
([redacted]) Prop Impulse, lb/sec	31,000	- /31,000	31,000	31,000
([redacted]) Size	Length 144", Diameter 8", Wing Span 40"			

[redacted]

[redacted]

10. (U) Technical/Operational Characteristics (Cont'd):

6. (U) Operational--	Dev Est	Approved Program Goal/Thres.	Dem Perf	Current Estimate
[redacted] Seeker				
Front lock sensitivity/dbm				
Rear lock sensitivity/dbm				
Subclutter visibility/db				
Antenna gimbal limits/deg				
Head slewing rate, deg/sec				
[redacted] Performance/Range (b)(1) (b)(1)				
Max, NM nose aspect				
Min, Ft tail aspect				
[redacted] Altitude (Min/Ft)				
[redacted] Launch probability (Pl) %, degraded by 0.2% per captive flight				
[redacted] Guidance probability (Pg) %, guidance within lethal warhead radius (b)(1) or warhead kill following successful launch				
[redacted] Fuze probability (Pf) %, proper fuzing within (b)(1) of target or warhead kill (b)(1) when properly armed				
[redacted] Multiple target (projected spacing) capability demonstrated at separation, Ft				
[redacted] Chaff (Pc) %				
[redacted] Reliability				
Air captive carry, MFHBF				
Shipboard reliability %, probability of "up" missile after 6 months deployment in launcher				

(b)(1)

[redacted]

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10. (U) Technical/Operational Characteristics (Cont'd):

C. (U) Previous Explanations --

(U) Contractor seeker design characteristics performance exceeded specification requirement as demonstrated in Navy Development Laboratory tests.

(U) Maximum range firing against a large, high altitude, high mach target during technical evaluation demonstrated smooth guidance and successful intercept at range in excess of the development estimate.

D. (U) Current Change Explanations -- None.

E. (U) References -- Development Estimate: DCP #89, Revision B, dated 19 April 1979 and full approval for service use dated 8 November 1982.

-- Approved Program: DAE baseline of 31 Dec 1988.

11. (U) Program Acquisition Cost (USN/USAF): (Current Estimate in Millions of Dollars)

A. (U) Cost --	Development Estimate (FY75-85)	Approved Program	Current Estimate (FY75-89)
elopment (RDT&E)	54.5	53.3	53.3
urement	859.2	1,434.5	1,446.3
G,C&A	(681.7)	(1,166.3)	(1,171.7)
Propulsion	(46.7)	(61.5)	(62.6)
Other Hardware	(35.8)	(22.8)	(22.2)
Procurement Sup	(66.4)	(86.9)	(90.7)
Total Flyaway	(830.6)	(1,337.5)	(1,347.1)
Fleet Support	(19.9)	(68.0)	(70.4)
Initial Spares	(8.7)	(29.0)	(28.8)
Construction	(0.0)	(0.0)	(0.0)
Total FY78 Base Year $	913.7	1,487.8	1,499.6
Escalation	344.4	1,264.0	1,281.1
Development	(2.8)	(7.9)	(7.9)
Procurement	(341.6)	(1,256.1)	(1,273.2)
Construction	(0.0)	(0.0)	(0.0)
Total Then-Year $	1258.1	2,751.8	2,780.8
B. Quantities --			
Development(RDT&E)	44	44	44
Procurement	11095	15544	15592
Total	11139	15588	15636

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11. (U) Program Acquisition Cost (USN/USAF) (Cont'd):

C. Foreign Military Sales (Includes RIK) -- Signed letters of offer to date total up to 4480 for $949.8 including support to the following:

Australia	206	$52.3	Israel	150	32.7
Bahrain	5	$4.9	NATO	1313	$274.4
Canada	847	$183.5	Portugal	24	$7.5
Egypt	690	$174.4	Turkey	125	$30.2
Greece	270	67.9	SDAF	850	122.0

D. Nuclear Costs ne.

E. References --

Development Estimate: DCP#89, Rev B. dated 19 April 1979 and full approval for service use dated 8 November 1982.

Approved Program: DAE Baseline 31 Dec 88.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then Year) Dollars in Millions)

	Current Est Dec 89 SAR	Current Year UCR Baseline Dec 88 SAR	Budget Year UCR Baseline Dec 89 SAR
A. Program Acquisition --			
(1) Cost	2780.8	2751.8	2780.8
(2) Quantity	15636	15588	15636
(3) Unit Cost	0.178	0.177	0.178
B. Current Procurement --			
	(FY1990)	(FY1990) APPN	(FY1991)
(1) Cost	0.0	0.0	0.0
Less CY AP	0.0	0.0	0.0
Plus PY AP	0.0	0.0	0.0
Net Total	0.0	0.0	0.0
(2) Quantity	0	0	0
(3) Unit Cost	0.000	0.000	0.000

13. (U) Cost Variance Analysis: (Total USN/USAF)
a. Summaay -- [Current (Then-Year) Dollars in Millions]

	RDT&E	PROC	MILCON	TOTAL
Development Estimate (DE)	57.3	1200.8	0.0	1258.1
Previous Changes:				
Economic	3.4	122.1	0.0	125.5
Quantity	0.0	553.4	0.0	553.4
Schedule	5.7	205.5	0.0	211.2
Engineering	0.0	0.0	0.0	0.0
Estimating	-5.2	440.1	0.0	434.9
Other	0.0	0.0	0.0	0.0
Support	0.0	168.7	0.0	168.7
Subtotal	3.9	1489.8	0.0	1493.7
Current Changes:				
Economic	0.0	1.3	0.0	1.3
Quantity	0.0	7.8	0.0	7.8
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	0.0	14.3	0.0	14.3
Other	0.0	0.0	0.0	0.0
Support	0.0	5.6	0.0	5.6
Subtotal	0.0	29.0	0.0	29.0
Total Changes	3.9	1518.8	0.0	1522.7
Current Estimate	61.2	2719.6	0.0	2780.8

[FY 1978 Constant Dollars (Base-Year) in Millions]

	RDT&E	PROC	MILCON	TOTAL
Development Estimate (DE)	54.5	859.2	0.0	913.7
Previous Changes:				
Quantity	0.0	213.0	0.0	213.0
Schedule	3.0	68.4	0.0	71.4
Engineering	0.0	0.0	0.0	0.0
Estimating	-4.2	216.5	0.0	212.3
Other	0.0	0.0	0.0	0.0
Support	0.0	77.4	0.0	77.4
Subtotal	-1.2	575.3	0.0	574.1
Current Changes:				
Quantity	0.0	3.4	0.0	3.4
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	0.0	6.2	0.0	6.2
Other	0.0	0.0	0.0	0.0
Support	0.0	2.2	0.0	2.2
Subtotal	0.0	11.8	0.0	11.8
Total Changes	-1.2	587.1	0.0	585.9
Current Estimate	53.3	1446.3	0.0	1499.6

13. (U) Cost Variance Analysis (Cont'd):

B. Previous Change Explanations --

(1) RDT&E

Economic: Revised escalation rates

Schedule: Change in milestones for improving AIM/RIM-7

Estimating: Reprogramming to higher priority program and re-estimate of prior year rates

(2) PROCUREMENT

Economic: Revised escalation rates

Quantity: Production quantities increased by 4179

Schedule: Total program restructured to reflect revise Air Force and Navy procurement strategies

Estimating: Revised quantities estimates based on actual contractor proposals, contract growth from target to ceiling, repogramming, and re-estimate of prior year rates.

Support: Restructured support to reflect revised Air Force and Navy strategies.

(3) MILCON None.

C. Current Change Explanations --

			(Dollars in Millions) Base Year $	Then Year $
(1)	RDT&E		0.0	0.0
(2)	PROCUREMENT			
	Economic:	Revised escalation indices	N/A	1.3
	Quantity:	Net production increase of 48 missiles	3.4	7.8
	Estimating:	USAF reprogrammed funds to procure Congressional authorized quantity.	4.1	9.6
		Navy Reprogramming	2.1	4.7
	Support:	Restructured support to reflect increased and revised USAF strategy	2.2	5.6
(3)	MILCON		0.0	0.0
TOTAL CURRENT CHANGES			11.8	29.0

14. (U) Program Acquisition Unit Cost (PAUC) History:

A. Initial SAR Estimate (DE) to Current Estimate (CE) --

CHANGES (Then-Year Dollars in Millions)

PAUC Initial SAR EST (DE)	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	Current Estimate
.113	+.008	+.007	+.014	+.000	+.025	+.011	+.000	.065	0.178

15. (U) Contract Information: (Then Year Dollars in Millions)

Procurement -

GC&A
Raytheon Company, Lowell, MA.
N00019-87-C-0140, FFP
Award: 3/87(FY87) 3/88(FY88)
Definitized: March 1987

	Initial Contract Price Target	Ceiling	Qty
$	215.3	N/A	1927
(USN)	115.4	N/A	1039
(USAF)	30.6	N/A	274
(FMS/Other)	69.3	N/A	614

	Current Contract Price Target	Ceiling	Qty
$	280.1	N/A	2527
(USN)	131.6	N/A	1156
(USAF)	47.5	N/A	418
(FMS/Other)	101.0	N/A	953

	Estimated Price at Completion Contractor	Program Manager
$	280.1	280.1
	131.6	131.6
	47.5	47.5
	101.0	101.0

15. (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

GC&A
General Dynamics, Camden, AR
N00019-87-C-0139, FFP
Award: 3/87(FY87) 3/88(FY88)
Definitized: March 1987

	Initial Contract Price		
	Target	Ceiling	Qty
$	182.5	N/A	1391
(USN)	97.1	N/A	753
(USAF)	26.4	N/A	189
(FMS/Other)	59.0	N/A	449

	Current Contract Price			Estimated Price at Completion	
	Target	Ceiling	Qty	Contractor	Program Manager
$	315.6	N/A	2835	315.6	315.6
(USN)	131.9	N/A	1160	131.9	131.9
(AF)	67.6	N/A	544	67.6	67.6
(FMS/Other)	116.1	N/A	1131	116.1	116.1

GC&A
Raytheon Company, Lowell, MA.
N00019-89-C-0218, FFP
Award: 5/89 (FY89)
Definitized: May 1989

	Initial Contract Price		
	Target	Ceiling	Qty
$	99.2	N/A	947
(USN)	25.0	N/A	243
(USAF)	24.3	N/A	239
(FMS/Other)	49.9	N/A	465

	Current Contract Price			Estimated Price at Completio	
	Target	Ceiling	Qty	Contractor	Program Manage
$	99.2	N/A	947	99.2	99.2
(USN)	25.0	N/A	243	25.0	25.0
(USAF)	24.3	N/A	239	24.3	24.3
(FMS/Other)	49.9	N/A	465	49.9	49.9

15. (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

GC&A		Initial Contract Price Target	Ceiling	Qty
General Dynamics, Camden, AR	$	39.4	N/A	300
N00019-89-C-0217, FFP	(USN)	9.6	N/A	75
Award: 6/89 (FY89)	(USAF)	9.6	N/A	76
Definitized: June 1989	(FMS/Other)	20.2	N/A	149

	Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$	39.4	N/A	300	39.4	39.4
(USN)	9.6	N/A	75	9.6	9.6
(AF)	9.6	N/A	76	9.6	9.6
(FMS/Other)	20.2	N/A	149	20.2	20.2

NOTE: CP are not required on FFP Contract

16. (U)Program Funding Summary:(Current Estimate in Millions of Dollars)

A. Program Status --

(1) Percent Program Completed: 100% (15 yrs/15 yrs)

(2) Percent Program Cost Appropriated: 100% ($2780.8/$2780.8)

B. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY75-89)	Budget Year (FY90)	Balance FYDP (FY91)	To complete	Total
RDT&E	61.2	0.0	0.0	0.0	61.2
Procurement	2719.6	0.0	0.0	0.0	2719.6
Total	2780.8	0.0	0.0	0.0	2780.8

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

C. Annual Summary -- (Total USN/USAF)

FISCAL YEAR	QTY	FLYAWAY FY78 DOLLARS NONREC	FLYAWAY FY78 DOLLARS REC	TOTAL BASE YEAR $	TOTAL THEN-YEAR $ PROGRAM	OBLIGATED	EXPENDED	ESCAL. RATE (%)
APPROPRIATED: RDT&E								
1975				2.4	2.4	2.4	2.4	10.9
1976				7.8	7.8	7.8	7.8	6.6
197T				0.8	0.8	0.8	0.8	2.9
1977	38			12.8	12.8	12.8	12.8	2.6
1978				0.0	0.0	0.0	0.0	0.0
1979	6			11.1	12.8	12.8	12.8	8.4
1980				12.0	15.2	15.2	15.2	10.5
1981				2.2	3.1	3.1	3.1	11.9
1982				3.7	5.4	5.4	5.4	7.6
1983				0.0	0.0	0.0	0.0	0.0
1984				0.0	0.0	0.0	0.0	0.0
1985				0.0	0.0	0.0	0.0	0.0
1986				0.5	0.9	0.9	0.9	2.8
SUB TOT	44	0.0	0.0	53.3	61.2	61.2	61.2	
APPROPRIATED: WPN/MPAF								
1980	390	7.8	72.4	82.1	118.0	118.1	118.1	11.8
1981	1490	10.2	177.4	201.4	323.3	323.2	323.2	11.6
1982	1516	12.8	171.7	200.3	348.9	349.0	349.0	14.3
1983	1970	0.0	170.7	185.1	341.1	341.5	341.5	9.0
1984	1700	0.0	145.9	162.2	311.0	312.9	300.9	8.0
1985	2131	0.0	163.7	172.0	339.6	339.6	321.0	3.4
1986	2445	0.0	177.1	194.6	397.4	399.1	370.2	2.8
1987	2120	0.0	132.6	137.3	290.6	288.7	275.4	2.7
1988	1158	0.0	73.1	62.9	138.5	136.6	88.4	3.1
1989	672	0.0	24.2	48.5	111.0	67.8	20.9	4.2
SUB TOT	15592	30.8	1308.8	1,446.3	2,719.6	2676.5	2508.6	
TOTAL	15636	30.8	1308.8	1,499.6	2,780.8	2737.7	2569.8	

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

C. Annual Summary -- (Total USN)

FISCAL YEAR	QTY	FLYAWAY FY78 DOLLARS NONREC	FLYAWAY FY78 DOLLARS REC	TOTAL BASE YEAR $	TOTAL THEN-YEAR $ PROGRAM	OBLIGATED	EXPENDED	ESCL. RATE (%)
				APPROPRIATION: RDT&E				
1975				2.4	2.4	2.4	2.4	10.9
1976				7.8	7.8	7.8	7.8	6.6
197T				0.8	0.8	0.8	0.8	2.9
1977	38			12.8	12.8	12.8	12.8	2.6
1978				0.0	0.0	0.0	0.0	0.0
1979	6			11.1	12.8	12.8	12.8	8.4
1980				10.9	13.8	13.8	13.8	10.5
1981				0.0	0.0	0.0	0.0	11.9
1982				3.7	5.4	5.4	5.4	7.6
[illegible]3				0.0	0.0	0.0	0.0	0.0
[illegible]4				0.0	0.0	0.0	0.0	0.0
1985				0.0	0.0	0.0	0.0	0.0
1986				0.5	0.9	0.9	0.9	2.8
SUB TOT	44	0.0	0.0	50.0	56.7	56.7	56.7	
				APPROPRIATION: WPN				
1980	60	2.8	19.4	23.8	34.2	34.3	34.3	11.8
1981	625	1.2	81.6	87.8	141.0	141.0	141.0	11.6
1982	559	7.7	62.2	73.2	127.5	127.5	127.5	14.3
1983	670	0.0	61.5	69.0	127.1	127.0	127.0	9.0
1984	695	0.0	60.8	75.0	143.9	144.0	132.0	8.0
1985	1671	0.0	131.4	139.7	275.7	275.7	258.5	3.4
1986	1948	0.0	141.8	159.5	325.7	326.4	303.6	2.8
1987	1716	0.0	106.9	111.1	235.1	232.8	221.9	2.7
1988	600	0.0	36.0	32.0	72.5	70.8	42.1	3.1
1989	318	0.0	0.0	24.9	57.0	49.7	14.7	4.2
SUB TOT	8862	11.7	701.6	796.0	1,539.9	1529.2	1402.6	
TOTAL	8906	11.7	701.6	846.0	1,596.6	1585.9	1459.3	

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

C. Annual Summary -- (Total USAF)

FISCAL YEAR	QTY	FLYAWAY FY78 DOLLARS NONREC	FLYAWAY FY78 DOLLARS REC	TOTAL BASE YEAR $	TOTAL THEN-YEAR $ PROGRAM	OBLIGATED	EXPENDED	ESCAL. RATE (%)
			APPROPRIATION: RDT&E					
1975								
1976								
197T								
1977								
1978								
1979								
1980				1.1	1.4	1.4	1.4	10.5
1981				2.2	3.1	3.1	3.1	11.9
1982								
1983								
4								
5								
6								
SUB TOT	0	0.0	0.0	3.3	4.5	4.5	4.5	
			APPROPRIATED: MPF					
1980	330	5.0	53.0	58.2	83.8	83.8	83.8	11.8
1981	865	9.0	95.8	113.6	182.3	182.2	182.2	11.6
1982	957	5.1	109.5	127.0	221.4	221.5	221.5	14.3
1983	1300	0.0	109.2	116.1	214.0	214.5	214.5	9.0
1984	1005	0.0	85.1	87.1	167.1	168.9	168.9	8.0
1985	460	0.0	32.3	32.4	63.9	63.9	62.5	3.4
1986	497	0.0	35.3	35.1	71.7	72.7	66.6	2.8
1987	404	0.0	25.7	26.2	55.5	55.9	53.5	2.7
1988	558	0.0	37.1	30.0	66.0	65.8	46.3	3.1
1989	354	0.0	24.2	23.6	54.0	18.1	6.2	4.2
SUB TOT	6730	19.1	607.2	649.3	1,179.7	1147.3	1106.0	
TOTAL	6730	19.1	607.2	652.6	1,184.2	1151.8	1110.5	

17 (U) Production Rate Data:

A. Annual Production Rates -- (NOTE: The maximum annual production rate includes the participation of FMS).

PRODUCTION RATES (QUANTITY/YEAR)

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1980	1000	390	390	390
1981	2525	1490	1490	1490
1982	2125	1516	1516	1516
1983	1265	1760	1970	2937
1984	2090	1700	1700	3000
1985	2090	1085	2131	4560
1986		1022	2445	4560
1987		1496	2120	
1988		875	1158	
1989			672	

B. Cost Variance -- Dollars in Millions (NOTE: Subject to limitations on production rates above.)

[redacted]	Production Estimate	Variance (CE Less DE)	Current Estimate	Variance (CE Less MAX)	Maximum Economic
Prog Acq Cost					
(BY $)	1389.3	+ 110.3	1499.6	+ 798.1	701.5
(TY $)	2511.4	+ 269.4	2780.8	+ 1331.3	1449.5
PAUC					
(BY $)	0.071	+ 0.025	0.096	+ 0.050	0.046
(TY $)	0.128	+ 0.050	0.178	+ 0.083	0.095

C. Schedule Variance -- (NOTE: Subject to the limitations on production rates above.)

Item	Production Estimate	Variance (CE Less DE)	Current Estimate	Variance (CE Less MAX)	Maximum
Start Date (Mo/Yr)	12/81	0	12/81	N/A	12/81
Duration (in Months)	99	+12	111	+24	87
End Date	3/90	+12	3/91	N/A	3/89

17. (U) Production Rate Data (Cont'd):

D. Deliveries (Plan/Actual) --

	To Date	
RDT&E	44	44
Procurement	15592	14067

E. Approved Design to Cost Goal --

	Dev Estimate	Current Estimate	Latest Appr. Threshold
@ Qty: 1000			
@ Peak Rate: 100/mo			
FY78 Base-Year $	0.092	0.092	0.108
Then-Year $			

18. (U) Operating Support Costs:

A. Assumptions and Ground Rules -- N/A

B. Costs -- N/A

C. Contractor Support Costs --

	(Then-Year Dollars in Millions)				
	FY1989 & Prior	FY1990 Year	FY1991 Year	Balance To Complete	Total
O&MN	1.3	0.2	0.2	0.0	1.7
Industrial Fund	0.1	0.2	0.2	0.0	0.5
Total	1.4	0.4	0.4	0.0	2.2

SAR-89-044

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~~(Unclassified)~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: SSN 688 NUCLEAR ATTACK SUBMARINE

-37 SSN 688

AS OF DATE: December 31,1989

INDEX

AS AMENDED
MAR 22 1990

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1. Designation and Nomenclature: SSN 688 Class Nuclear Attack Submarine (Los Angeles Class)

2. DOD Component: Department of the Navy

3. Responsible Office and Telephone Number:
   NAVSEASYSCOM CAPT J. F. Shipway PMS 393 Program Office
   Assigned: Oct 1988; AV 332-3407; COMM (703) 602-3405

4. Program Elements/Procurement Line Items:
   RDT&E: PE 0603564N, Project 0408 (Shared)
   PE 0604567N, Project 1803 (Shared)
   SCN: PE 0204281N
   MILCON: PE 0804731N

5. Related Program: HARPOON, TOMAHAWK, SSBN (TRIDENT), BSY-1 Advanced Combat System, SSN-21

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6. Mission and Description: The SSN 688 Class submarine is designed to destroy enemy ships, primarily submarines, in order to prohibit the employment of such forces in attack and destruction of U.S. and allied targets. These single-screw submarines are powered by (b)(1) (b)(1) shaft horsepower nuclear propulsion plant, are capable of (b)(1) have accommodations for 110 men, can endure (b)(1) days (b)(1) sea, and are armed with four torpedo tubes. The USS Providence (SSN 719), delivered 26 June 1985, and all subsequent ships will be armed with 12 vertical missile tubes located external to the pressure hull. The USS SAN JUAN (SSN 751) delivered 30 June 88 and all subsequent ships will have under-ice capability and AN/BSY-1 combat system. One FY 1987 ship and the FY 1989 and 1990 ships will be equipped with the Improved Performance Machinery Plant (IPMP) also. The ships can employ MK-48 torpedoes, HARPOON anti-ship missiles, and anti-ship and land attack versions of the TOMAHAWK missile. This system does not replace any other defense system.

7. Program Highlights:

a. Significant Historical Developments--The SSN 688 Class submarine construction program consists of 62 awarded ships from FY 70 to present: 33 awarded to General Dynamics Corporation, Electric Boat Division, and 29 to Newport News Shipbuilding. Prior to the period covered by this SAR, 39 ships had been delivered to the Navy--23 by Electric Boat and 16 by Newport News.

b. Significant Developments Since Last Report--General Dynamics Corporation, Electric Boat Division, delivered two SSN 688 Class submarines to the Navy in 1989: the USS PASADENA (SSN 752) on 31 January 1989 and the USS TOPEKA (SSN 754) on 28 September 1989; and Newport News Shipbuilding delivered one SSN 688 Class submarine to the Navy in 1989: the USS NEWPORT NEWS (SSN 750) on 16 May 1989. The total number of ships delivered since program inception is 42. In addition, one SSN 688 was launched in 1989: the SCRANTON (SSN 756) on 3 July 1989 at Newport News Shipbuilding. One more ship was authorized for new construction for fiscal year 1990; this ship was awarded on 28 November 1989 to Newport News Shipbuilding.

c. Changes Since "As of Date"-- None

8. Threshold Breaches: DAE baseline approved 28 March 1989. There are no threshold breaches.

9. Schedule:

a. Milestones--	Dev Estimate	Approved Program Goal/Threshold	Current Estimate
Characteristics Approved	NOV 68	NOV 68	NOV 68
DSARC I	FEB 70	FEB 70	FEB 70
DCP #27 Approved	MAR 70	MAR 70	MAR 70
Production Contract	JAN 71	JAN 71	JAN 71
Production Started	JAN 71	JAN 71	JAN 71
Lead Ship Launch	4TH QTR FY73	4th QTR FY 73	APR 74
Acceptance Trials Lead Ship	1ST QTR FY 75	1ST QTR FY 75	OCT 76
Delivery-Lead Ship	1ST QTR FY 75	1ST QTR FY 75	NOV 76
Initial Operating Capability	1ST QTR FY 75	1ST QTR FY 75	NOV 76
Last Follow Ship Del	MAY 96	MAY 96	OCT 95 (CH-1)

b. Previous Change Explanations: Early ships experienced schedule delays primarily due to late contractor-furnished equipment, shipbuilder's limitations in application of his work force, production/productivity problems, and late and defective design agent furnished information. Follow ships were delayed to maintain intervals between ships. Additional delays resulted from strikes at Electric Boat during Jun-Nov 1975 and Jun-Oct 1988. Three ships in FY 1991 and FY 1992 were deleted from the program.

c. CH-1. Last delivery from October 94 to October 95: Since the last report the profile of ships to be constructed under the program has changed from 63 to 62 with the deletion of one FY 90 ship. The last ship of the class was awarded to Newport News Shipbuilding on 28 November 1989 and is projected to deliver October 1995.

d. References--
Development Estimate: Ship Construction Awards dated 8 January 1971. Approved Program: DAE Baseline approved Mar 28, 1989.

10. Technical/Operational Characteristics:

A. Technical-	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
Submarine				
(a) Length	360 ft.	360 ft.	360 ft.	360 ft.
(b) Beam Max.	33 ft.	33 ft.	33 ft.	33 ft.
(c) Draft Dev.	32 ft.	32 ft.	32 ft.	32 ft.
(d) Displacement	6900 tons	6900 tons	6900 tons	6900 tons
(e) Operating Depth	(b)(1)			

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B. [redacted] Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
(f) Propulsion				
Type	S6G	S6G	S6G	S6G
SHP	(b)(1)			
(g) Crew	133	133	133	133
AN/BQQ-5B				
(a) Maintainability (MTTR)	40	177	177	177
(b) Hardware Reliability				
Passive	1,400	599	599	599
Active	480	N/A	N/A	N/A
B. Operational				
(a) Speed (Max)	(b)(1)			
(b) Endurance				
Fuel	Nuclear	Nuclear	Nuclear	Nuclear
Stores (Days)	(b)(1)			
(c) Armament	4 torpedo tubes 12 external VLS tubes	4 torpedo tubes 12 external VLS tubes	4 torpedo tubes 12 external VLS tubes	4 torpedo tubes 12 external VLS tubes

C. Previous Change Explanations:
AN/BQQ-5B are based on demonstrated performance during OPEVAL and FOT&E.
Deleted from DCP #104 on 9 September 1975.

D. Current Change Explanations: None

E. References: --
Development Estimate Ship Construction Awards dated 8 January 1971. Approved Program: DAE Baseline approved March 28, 1989.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Development Estimate (FY70-76)	DAE Baseline	Current Estimate (FY70-96)
a. Cost			
Development (RDT&E)	0.0	24.5	24.5
Procurement (SCN)	5,126.8	11,960.2	11,413.3
Basic Ship Cost	2,484.6	(7,268.7)	(7022.1)
GFE	2,248.0	(4,303.1)	(4026.9)
Other	234.2	(58.2)	(44.4)
OF/PD	160.0	(330.2)	(319.9)
Construction (MILCON)	0.0	20.4	20.4
Total: FY71 Base Year	$5,126.8	12,005.1	11,458.2

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Development Estimate	Approved program	Current Estimate
Escalation	620.7	16,074.5	16,043.9
Development (RDT&E)	0	(23.3)	(23.3)
Procurement(SCN)	620.7	(16,033.3)	(16,002.5)
Construction (MILCON)	0	(17.9)	(18.0)
Total Then-Year $	$5,747.5	$28,079.6	$27,502.0
b. Quantities			
Development (RDT&E)	-	-	-
Procurement (SCN)	32	63	62
Total	32	63	62

c. Foreign Military Sales -- None

d. Nuclear Costs -- Not available.

e. References --
Development Estimate: DCP #104 dated September 1970, revised and reapproved 13 April 1978. USDR&E letter 13 March 1970 cancelled DCP #104 and returned surveillance to the Navy. DCP #27, dated 19 March 1970.
Approved Program: DAE baseline dated 28 March 1989.

12. Program Acquisition/Current Procurement Unit Cost Summary:

(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	SAR Current Estimate (DEC 89 SAR)	UCR Baseline Estimate (DEC 88 SAR)	UCR Baseline Estimate (DEC 89 SAR)
a. Program Acquisition -			
(1) Cost	27,502.0	28,079.6	27,502.0
(2) Quantity	62	63	62
(3) Unit Cost	443.6	445.7	443.6
b. Current Procurement --	(FY 1990)	(FY90 Approp)	(FY 1991)
(1) Cost	782.0	782.0	51.2
Less CY Adv Proc	0.0	0.0	
Plus PY Adv Proc	231.2	231.2	
Less OF/PD	(49.1)	(49.1)	(51.2)
Net Total	964.1	964.1	0.0
(2) Quantity	1	1	0
(3) Unit Cost	964.100	964.100	0.000

[redacted]

13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate		5747.5		5747.5
Previous Changes:				
Economic	6.2	-4552.9	-5.0	-4551.7
Quantity		23051.5		23051.5
Schedule		87.3		87.3
Engineering	40.0	1911.1		1951.1
Estimating	1.6	283.9	0.1	285.6
Other		412.8		412.8
Support		1052.3	43.2	1095.5
Subtotal	47.8	22246.0	38.3	22332.1
Current Changes				
Economic		55.1		55.1
Quantity		-744.9		-744.9
Engineering		-31.5		-31.5
Estimating		551.2	0.1	551.3
Other		-412.8		-412.8
Support		5.2		5.2
Subtotal	0.0	-577.7	0.1	-577.6
Total Changes	47.8	21668.3	38.4	21754.5
Current Estimate	47.8	27415.8	38.4	27502.0

13. Cost Variance Analysis (Cont'd):

(FY 71 Constant (Base-Year Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate		5126.8		5126.8
Previous Changes:				
Quantity		5824.0		5824
Schedule		14.6		14.6
Engineering	23.2	509.4		532.6
Estimating	1.3	13.7		15
Other		298.5		298.5
Support		173.2	20.4	193.6
Subtotal	24.5	6833.4	20.4	6878.3

13. Cost Variance Analysis (Cont'd):

(FY 71 Constant (base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Current Changes				
Quantity		-196.0		-196.0
Engineering		-9.0		-9.0
Estimating		-33.2		-33.2
Other		-298.5		-298.5
Support		-10.2		-10.2
Subtotal	0.0	-546.9	0.0	-546.9
Total Changes	24.5	6286.5	20.4	6331.4
Current Estimate	24.5	11413.3	20.4	11458.2

b. Previous Change Explanation --

RDT&E

Economic: revised escalation indices
Engineering: increase to fund costs directly related to the SSN 688 Class Program
Estimating: refinement of R&D estimate and addition of the SSN 688 Class Development Line

PROCUREMENT

Economic: revised escalation indices
Quantity: addition of 2 SSNs since the authorization of the DE and 28 SSNs at the established baseline value
Schedule: revision of schedule baseline
Engineering: changes to the propulsion plant associated with the Long life core, cost reduction improvements and the addition of VLS, BSY-1, and IPMP.
Estimating: refinement of estimate, changes in procurement plan, increased estimates for deferred work, shipbuilding contract over-target increases, and the Government's liability under P.L. 85-804 to fund REA settlements
Support: increased outfitting and post delivery requirements

CONSTRUCTION

Economic: revised escalation indices
Support: fund Military Construction projects at New London, Norfolk, San Diego, Portsmouth, and Pearl Harbor.

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanation --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E N/A		
(2) Procurement		
Revised Dec 89 economic escalation (Economic)		+55.1
Deletion of 1 submarine (Quantity)	-196.0	-744.9
VLS associated with quantity deletion (Engineering)	-9.0	-31.5
Refinement of estimates to reflect later contract/pricing data (Estimating)	+34.3	+138.4
Change in prior year SAR calculation (Estimating)	-366.0	
Recategorization of PL-85-804 settlement (Other)	-298.5	-412.8
(Est)	+298.5	+412.8
Refinement of Outfitting/Post Delivery estimates (Support)	-10.2	+5.2
(3) MILCON N/A		

14. Program Acquisition Unit Cost (PAUC History:(Millions of then-year $)

a. Initial SAR Estimate to Current Baseline DE Estimate

PAUC (Init Est)	Changes								PAUC (Baseline DE est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
165.8	+18.4	-5.2					+.6	+13.8	179.6

b. Current Baseline Estimate to Current Estimate --

PAUC (DEV Est)	Changes								PAUC Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
179.6	-72.5	+272.9	+1.4	+31.0	+13.5	0	+17.7	264.0	443.6

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E N/A

b. Procurement -- SCN

	Initial Contract Price		
	Target	Ceiling	Qty
Construction of SSN 753,756,758,759	278.0	317.4	1

Newport News Shipbuilding and
Drydock Company
Newport News, VA 23607
N00024-84-C-2064, FPIF
Award: 29 Nov 1983
Definitized: 29 Nov 1983

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
1103.5	1240.8	4	1240.8	1240.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-170.7	-56.6
Cumulative Variance to Date(8/20/89)	-259.5	-38.6
Net Change	-88.8	+18.0

[redacted]planation of Change: The cost variance reflects increased submarine [redacted]nstruction complexity, an optimistic budget due to the effects of [redacted]gressive competition, and learning associated with the modular construction process. The ships being built for this contract are the first submarines to use modular construction at this shipyard. The improved schedule variance is a result of a revised delivery baseline. Both the Program Manager and the contractor continue to estimate final price at ceiling price.

	Initial Contract Price		
	Target	Ceiling	Qty
Construction of SSN 764-767	1018.1	1209.3	4

Newport News Shipbuilding and
Drydock Company
Newport News, VA 23607
N00024-87-C-2007, FPIF
Award: 6 Feb 1987
Definitized: 6 Feb 1987

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
1030.6	1223.3	4	1223.3	1223.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-31.4	-99.0
Cumulative Variance to Date(9/24/89)	-82.4	-65.0
Net Change	-51.0	+34.0

Explanation of Change: The cost variance reflects increased submarine construction complexity, an optimistic budget due to the effects of aggressive competition, and learning associated with the modular construction process. The contractor has taken strong efforts to improve efficiencies. The improved schedule variance is a result of a revised delivery baseline. Both the Program Manager and the contractor continue to estimate final price at ceiling.

	Initial Contract Price		
	Target	Ceiling	Qty
Construction of SSN 769-770,772	606.7	698.7	2

Newport News Shipbuilding and
Drydock Company
Newport News, VA 23607
N00024-88-C-2195, FPIF
Award: 30 June 1988
Definitized: 30 June 1988

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
949.2	1091.7	3	988.8	1086.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-0.4	-5.3
Cumulative Variance to Date(10/22/89)	-7.6	-15.5
Net Change	-7.2	-10.2

Explanation of Change: The cost variance reflects increased submarine construction complexity, an optimistic budget due to the effects of completion, and learning associated with the modular construction process. The contractor has taken strong efforts to improve efficiencies. This contract is less than 10% complete leaving the contractor time to improve performance.

	Initial Contract Price		
	Target	Ceiling	Qty
Construction of SSN 754-755, 757	520.0	589.4	2

Electric Boat Division
Groton, CT 06340
N00024-84-C-2063, FPIF
Award: 28 November 1983
Definitized: 28 November 1983

Current Contract Price			Estimated Price At Completion	
arget	Ceiling	Qty	Contractor	Program Manager
859.5	972.5	3	956.7	956.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-60.0	-75.7
Cumulative Variance to Date (9/30/89)	-113.5	-8.0
Net Change	-53.5	+67.7

Explanation of Change: The change in estimates at completion resulted from a review of the impacts of the 1988 labor strike and difficulties in hiring key trade skills by the contractor. The cost variance is a combination of an overly optimistic budget baseline by the contractor which resulted from aggressive competition and their hiring difficulties. The schedule variance improved as a result of a revised delivery baseline.

	Initial Contract Price		
	Target	Ceiling	Qty
Construction of SSN 760-763	1032.6	1171.0	4

Electric Boat Division
Groton, CT 06340
N00024-86-C-2076, FPIF
=ward: 21 March 1986
=efinitized: 21 March 1986

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
1051.7	1192.6	4	1192.6	1192.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-72.9	-46.5
Cumulative Variance to Date(9/30/89)	-96.0	-22.2
Net Change	-23.1	+24.3

Explanation of Change: The change in estimates at completion resulted from a review of the impacts of the 1988 labor strike and difficulties in hiring key trade skills by the contractor. The cost variance is a combination of an overly optimistic budget baseline by the contractor which resulted from aggressive competition and their hiring difficulties. The schedule improved as a result of a revised delivery baseline.

	Initial Contract Price		
	Target	Ceiling	Qty
Construction of SSN 768 and 771	399.9	475.0	1

Electric Boat Division
Groton, CT 06340
N00024-88-C-2196, FPIF
Award: 30 June 1988
Definitized: 30 June 1988

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
758.2	893.4	2	769.8	785.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variance to Date(9/30/89)	-4.5	-2.8
Net Change	-4.5	-2.8

Explanation of Change: The cost and schedule variances are reported for the first time on this contract. The Program Manager's and contractor's estimates at completion differ in labor and overhead costs stemming from different manhour estimates.

c. MILCON--N/A

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 75.9% (22 YRS/29 YRS)

(2) Percent Program Cost Appropriated: 98.5% (27,076.9/27,502.0)

b. Appropriation Summary --

Appropriation	Current & Prior Yrs (FY69-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-97)	Total
RDT&E	47.8	-	-	-	47.8
Procurement (SCN)	26,208.7	782.0	51.2	373.9	27,415.8
MILCON	38.4	-	-	-	38.4
TOTAL	26294.9	782.0	51.2	373.9	27502.0

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of $)

c. Annual Summary --

Fiscal Year	Qty	FY 71 Base-Year Dollars: Sailaway Nonrec	Sailaway Rec	Total Base Year $	Total Then-Year Dollars: Program	Obligated	Expended	Esca Rat %
Appropriation: RDT&E								
1970	0			0.5	0.5	0.5	0.5	5.5
1971	0			1.8	1.8	1.8	1.8	5.1
1972	0			1.1	1.2	1.2	1.2	4.6
1973	0			1.1	1.2	1.2	1.2	4.3
1974	0			0.4	0.5	0.5	0.5	7.9
1977	0			1.2	1.8	1.8	1.8	2.5
1978	0			1.1	1.7	1.7	1.7	6.
1979	0			3.6	6.6	6.6	6.6	8.
1980	0			1.3	2.7	2.7	2.7	10.5
1981	0			2.2	4.7	4.7	4.7	10.6
1982	0			2.2	5.0	5.0	4.9	7.
1983	0			3.1	7.5	7.5	7.4	4.
1984	0			1.7	4.3	4.3	4.2	3.
1985	0			1.2	3.0	3.0	2.9	3.
1986	0			2.0	5.3	5.3	5.2	2.
1987	0			0	0.0	0.0	0.0	2.
Subtotal	0			24.5	47.8	47.8	47.3	
Appropriation: SCN								
1969	0		23.9	23.9	26.5	26.5	26.5	
1970	3		542.3	542.3	601.2	601.3	601.0	5.
1971	4		517.7	517.7	617.1	617	616.0	5.
1972	5		696.2	696.2	911.4	909	906.4	4.
1973	6		706.9	706.9	1041.8	1042.8	1022.8	5.
1974	5		573.2	573.2	931.9	931.4	920.2	9.
1975	3		296.3	296.3	532.1	534.2	527.5	14.
1976	2		298.1	298.1	577.3	573.3	567.6	11.
197T	0		88.5	88.5	188.9	188.9	188.6	2.

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dc

c. Annual Summary --

Fiscal Year	Qty	FY 71 Base-Year Dollars			Then-Year Dollars			Esca Rat %
		Sailaway		Total				
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: SCN (Cont'd)								
1977	3		657.5	657.5	1411.9	1410.6	1387.8	6.
1978	1		192.7	192.7	451.8	450.5	447.2	8.
1979	1		316.8	316.8	757.8	756.2	750.3	9.
1980	2		386.2	386.2	1003.6	925.4	909.4	9.
1981	2		428.4	428.4	1149.2	1126.9	1102.7	9.
1982	2		556.6	556.6	1536.9	1495.2	1452.1	7.
1983	2		619.9	619.9	1738.1	1692.8	1656.5	3.
1984	3		719.9	719.9	2058.6	1861.8	1694.6	3.
1985	4		927.1	927.1	2710.8	2551.1	2026.6	2.
1986	4		818.1	818.1	2458.0	2212.6	1317.9	1.
1987	4		764.8	764.8	2374.3	2127.1	1042.0	1.
1988	3		556.0	556.0	1806.2	1521.3	245.9	2.
1989	2		392.5	392.5	1323.3	999.6	61.5	2.
1990	1		223.6	223.6	782.0	0.0	0.0	
1991	0		14.1	14.1	51.2	0.0	0.0	4.
1992	0		37.5	37.5	140.1	0.0	0.0	
1993	0		20.3	20.3	78.2	0.0	0.0	3.
1994	0		23.0	23.0	91.7	0.0	0.0	3.
1995	0		5.2	5.2	21.3	0.0	0.0	3.
1996	0		5.0	5.0	21.3	0.0	0.0	3.
1997	0		5.0	5.0	21.3	0.0	0.0	3.
Subtotal	62	0	11413.3	11413.3	27415.8	24555.5	19471.1	
Appropriation: MILCON								
1973	0			2.9	3.9	3.9	3.9	5.5
1974	0			1.6	2.3	2.3	2.3	11.7
1975	0			2.7	4.3	4.3	4.3	16.1

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of $)

c. Annual Summary --

Fiscal Year	Qty	FY 71 Base-Year Dollars			Then-Year Dollars			Esca Rat %
		Sailaway		Total				
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: MILCON								
1976	0			4.2	7.0	7.0	7.0	3.0
1978	0			2.5	4.8	4.8	4.8	7.6
1979	0			3.8	7.6	7.6	7.6	9.3
1982	0			0.2	0.6	0.6	0.6	7.
1987	0			2.0	6.1	1/	1/	2.
1988	0			0.0	0.0	1/	1/	
1989	0			0.5	1.7	1/	1/	4.
Subtotal	0	0.0	0.0	20.4	38.3	30.5	30.5	
Total	62	0.0	11413.3	11458.2	27501.9	24633.8	19548.9	

1/ Obligations and expenditures are not reported to NAVSEA

17. Production Rate Data:

a. Annual Production Rates: N/A

b. Cost Variance: N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	N/A
Procurement	42/42

18. Operating and Support Costs:

a. N/A

b. N/A

c. CSC

(2) THIS PAGE IS UNCLASSIFIED

N-3 AN/SQQ-89 [redacted]

SAR-89-016

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)
PROGRAM: AN/SQQ-89 Surface Ship ASW Combat System (U)

AS OF DATE: December 31, 1989

INDEX [redacted]

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AS AMENDED
MAR 21 1990

1. (U) **Designation and Nomenclature (Popular Name).**
AN/SQQ-89(V) Surface Ship ASW Combat System Program

2. (U) **DoD Component.** Department of the Navy

3. (U) **Responsible Office and Telephone Number**

Surface Ship ASW Combat System
Naval Sea Systems Command
PMS411
National Center 2, Suite 12E16
Arlington, Virginia 22202

Capt WM. A. Estell, Jr
Assigned: 20 Jul [redacted]
COMM (703) 602-[redacted]
AUTOVON: 332-[redacted]

90 F 0656
No Security Objection to Open Publication
(AS AMENDED)
MAR 21 1990
Office of the Assistant for Naval Operations Dept. of the Navy

4. (U) **Program Elements/Procurement Line Items**

Basic AN/SQQ-89
RDT&E,N: 0205620N/ S0896 (MK 116)
0604713N/ S0234 (AN/SQR-19)
0604212N/ W1707 (AN/SRQ-4): (Shared funding.)
0604575N/ S1451 (AN/SQS-53C)

PROCUREMENT: SCN 0204221N/ 8219 (Shared funding.)
SCN 0204222N/ 8224 (Shared funding.)
OPN 0204223N/ 33545200, 84VA
OPN 0204225N/ 33213300, 33213400, 33213600
82WF, 82JE, 82DB
OPN 0204228N/ 33223600, 82WP
OPN 0204243N/ 43S1: (Shared funding.)

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DECLASSIFY ON: OADR

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4. (U) Program Elements/Procurement Line Items (continued)

Basic AN/SQQ-89 (continued)

O&M,N: 78017Q/ 21105020, 21104510 P4K3, RU7C: (Shared funding.)
78012Q/ 21114034, 21116010 Q7UM, RFXN: (Shared funding.)
78017P/ 21105009, P4XR: (Shared funding.)

MILCON: 0204262N

Improved AN/SQQ-89

RDT&E,N: 0604713N/ S1916 (AN/SQQ-89I)
0603553N/ S1704 (AN/SQQ-89I): (FY87-90)
(Shared funding.)

PROCUREMENT: SCN 0204292N/ 8219, 8224: (Shared funding.)
OPN 0204225N/ 33213600, 82DB

5. (U) Related Programs. LAMPS MK III

6. (U) Mission and Description. The AN/SQQ-89 is required to provide long range detection, classification, and tracking capabilities to surface ship combatants to allow them to prosecute enemy submarines. The Basic AN/SQQ-89 provides [(b)(1)] passive capability against [(b)(1)] in all of its configurations. It provides a [(b)(1)] detection capability for CG 47, DDG 51, DD 963, and DDG 993 class ships. The AN/SQQ-89 has various configurations achieved by installing components of the Basic AN/SQQ-89 according to the current configuration of each ship; the set of equipments procured for a specific ship therefore varies with each installation.

AN/SQQ-89 Improved is required to maintain equivalent ranges against the emerging Soviet submarine threat given [(b)(1)] AN/SQQ-89 Improved will provide [(b)(1)] detection capability for FFG 7 class ships and [(b)(1)] for DDG 51, Flight III class ships. For CG 47/DD 963/DDG 993 class ships which do not have AN/SQS-53C, a variant of the Block 2 FFG 7 ship system will be installed to provide a [(b)(1)] detection capability for these ships. For DDG 51, Flights I and II, and CG 47/DD 963/DDG 993 class ships which have AN/SQS-53C, all planned Block 2 passive and receiver improvements, [(b)(1)] will be provided including receive arrays and an increased processing capability [(b)(1)] The AN/SQQ-89 Improved is now in its Design Definition Phase.

AN/SRQ-4 is a data link between AN/SQQ-89 and the LAMPS MK III helicopter and is included as part of the AN/SQQ-89 for SAR reporting. Responsibilities and funding for the AN/SRQ-4 and the AN/SQQ-28 were transferred from the LAMPS MK III SAR to this SAR.

7. [redacted] Program Highlights

a. [redacted] Significant Historical Developments

The various subsystems in the Basic AN/SQQ-89 were originally developed under independent programs. The subsystems were designed so that they could be integrated into a single system. Subsequent to FY87, only Basic AN/SQQ-89 and Improved AN/SQQ-89 systems were procured and the AN/SQQ-89 subsystems lost their separate identities. Subsystem testing has been completed as follows:

SUBSYSTEM	OPERATIONAL TESTING COMPLETED
AN/SQR-19	1983
AN/SQQ-28	1981
AN/SQS-53B	1983
MK 116	1982
AN/SRQ-4	1981
AN/SQS-53C	1989

Contracts for design definition of Improved AN/SQQ-89 were awarded in February 1987 (Westinghouse) and May 1987 (General Electric). However, design definition did not begin until February 1988 when funds were made available.

The AN/SQS-53C subsystem entered full rate production in June 1989.

The FY89 production option on contract N00024-88-C-6219 was awarded to General Electric in July 1989.

b. [redacted] Significant Developments Since Last Report

For CG 47/DD 963/DDG 993 class ships which do not have AN/SQS-53C, a variant of the Block 2 FFG ship system will be installed to provide a (b)(1) (b)(1) detection capability. For DDG 51 Flights I and II, and CG 47/DD 963/DDG 993 class ships which have AN/SQS-53C, all planned Block 2 passive and receiver improvements, (b)(1) (b)(1) , will be provided including receive arrays and an increased processing capability (b)(1) .

The AN/SQQ-89 Basic will not incorporate Advanced Video Processor (AVP) in FY90 as previously planned due to risks associated with the maturity of AVP and the redesign of AN/SQQ-89 Basic. The Navy is proceeding to mitigate the risks to allow procurement of an AVP based system in FY91.

Congress provided $30.0M as part of the FY90 AN/SQQ-89 Surface ASW System Improvement RDT&E appropriation to be used only for integration of AN/UYS-2 into AN/SQQ-89 Basic.

c. [redacted] Changes Since "As Of" Date: None

8. (U) Threshold Breaches. DAE baseline dated 30 September 1989.

9. (C) Schedule

a. (C) Milestones

(U) Basic AN/SQQ-89:	Production/Estimate Approved Program	Current Estimate
(U) AN/SRQ-4 Subsystem		
FSD Contract Award	Sep 77/Sep 77	Sep 77
DNSARC III	Jun 82/Jun 82	Jun 82
Approval for Production	Dec 82/Dec 82	Dec 82
(U) AN/SQR-19 Subsystem		
FSD Contract Award	Oct 76/Oct 76	Oct 79
DNSARC III	Nov 80/Nov 80	Mar 83
Approval for Production	Mar 83/Mar 83	Dec 84
(U) AN/SQQ-28 Subsystem		
FSD Contract Award	Feb 78/Feb 78	Feb 78
DNSARC IIIA (PASU)	Dec 81/Dec 81	Dec 81
DNSARC IIIB (ASU)	Aug 82/Aug 82	Aug 82
(U) AN/SQS-53B Subsystem		
FSD Contract Award	Jun 79/Jun 79	Jun 79
DNSARC III	Dec 82/Dec 82	Dec 82
Approval for Production	Jun 83/Jun 83	Jun 83
(U) AN/SQS-53C Subsystem		
FSD Contract Award	May 82/May 82	May 82
DNSARC IIIA (ALP)	Jan 86/Jan 86	Jan 86
DNSARC (NPDM) IIIB (ALP)	Sep 86/Sep 86	Sep 86
DNSARC (NPDM) IIIC (ALP)	Dec 87/Dec 87	Mar 88
Approval for Production (AFP)	Dec 87/Dec 87	Jun 89
(U) MK 116 Subsystem		
Approval for Production	Dec 82/Dec 82	Dec 82

(U) Improved AN/SQQ-89:	Planning Estimate/ Approved Program	Current Estimate
MS II (FFG) Block 1 or 2	Sept 89/Sept 89	Apr 90
MS II (BFC) Blocks 1 & 3	Sept 89/Sept 89	Apr 90
MS III (FFG) Block 1 or 2	Sept 93/Sept 93	Apr 95
MS III (BFC) Block 1	Sept 94/Jun 94	N/A
MS III Block 2 (BFC)	N/A / N/A	Apr 97
MS III (BFC) Block 3 (ALP)	Sept 93/Sept 93	Apr 95
MS III (BFC) Block 3 (AFP)	Sept 94/Jun 94	Jun 96
IOC Block 2 (FFG)	(b)(1)	
IOC Block 2 (BFC)		
IOC Block 3 (BFC)		

b. (U) Previous Change Explanations

The Improved AN/SQQ-89 program milestones were restructured to address the current status of program development. The nomenclature for the Battle Group Escort (BGE) was reidentified. They are now identified as Battle Force Capable (BFC) for the Improved program.

Block 1 enhancements for both the FFG and BFC ship classes were subsumed by both Blocks 2 and 3. Reports no longer address Block 1 independently. Block 2 for BFC ships was added to the Improved program.

With the exception of Milestone II, the Improved AN/SQQ-89 program milestone changes were the direct result of Congressional reduction/ deferment of all FY87 funds, funding reductions in FY88/89 due to Presidential Budget and the Department of Navy adjustments thereto, and FY90/91 Presidential Budget as amended by Congress. The total amount of the program funding reductions, from FY87 through FY91 was in excess of $144.0M. Milestone II delays were contributed in part to funding reductions and in part to slips in the USS Glover (AN/SQQ-89I Test Ship) overhaul schedule.

c. (U) Current Change Explanations None

d. (U) References

Production Estimate

(1) DCP-92 dated August 16, 1976 (AN/SQR-19)
(2) DCP-85 dated March 5, 1979 (AN/SRQ-4 and AN/SQQ-28)
(3) OR 062-03-86 dated 24 December 1985 (AN/SQQ-89)
(4) ASN (RE&S) Milestone IIIC (NPDM held 19 November 1987; Decision Memorandum was issued March 1988); Decision Memorandum of 17 December 1986 (AN/SQS-53C)

Approved Program: DAE baseline dated 30 September 1989.

10. AN/SQQ-89A(V)1 Technical/Operational Characteristics

a. Basic AN/SQQ-89(1)

	Production Estimate	Approved Program Goals/Thresholds	Demon. Perf.	Current Estimate
AN/SQR-19				
Technical: N/A				
Operational:				
Detection at own ship speed (20 knots)(dB)				
FOM Narrowband(2)				
FOM Broadband(2)				
Bearing Accuracy (degrees)				
Frequency Coverage (b)(1) (Hz)				
Frequency Coverage (b)(1) (Hz)				
Mechanical Characteristics				
Survival Speed (knots)				
Streaming & Recovery Time(3) (minutes)				
Reliability/Maintainability (hrs)				
Shipbased Electronics MTBF				
Shipbased Electronics MTTR				
Array MTBF				
Array MTTR				
Software MTBF				
Software MTTR				
Operational Availability (A_o)(4)				

(b)(1)

(1) The "Demonstrated Performance" data are currently being updated to reflect recent average fleet performance. Subsequently, the "Current Estimate" data will be updated as appropriate.

(2) (b)(1)

(3) (b)(1)

(4) The Operational Availability values do not reflect Mean Logistic Delay Time (MLDT)

10. (U) AN/SQQ-89A(V)1 Technical/Operational Characteristics (continued)

(U) AN/SRQ-4	Production Estimate	Approved Program Goals/Thresholds	Demon. Perf.	Current Estimate
(U) Technical	N/A	N/A	N/A	N/A
(U) Operational				
(C) Data Transfer Reliability (%) ASW at 100nm ASST at 40nm	(b)(1)			
(U) AN/SQQ-28				
(U) Technical/Operational				

Processing Capability/Sonobuoy
LOFAR (AN/SSQ-41)
DIFAR DIRECTIONAL (AN/SSQ-53)
DIFAR OMNI (AN/SSQ-53)
DIFAR NULL STEER (AN/SSQ-53)
VLAD DIRECTIONAL (AN/SSQ-77)
VLAD OMNI (AN/SSQ-77)
DEMON (AN/SSQ-41, AN/SSQ-53, or AN/SSQ-77)
BT (AN/SSQ-36)
ANM (AN/SSQ-57)
RO (AN/SSQ-47)
CASS (AN/SSQ-50)
DICASS DIRECTIONAL (AN/SSQ-62)
DICASS OMNI (AN/SSQ-62)

The AN/SQQ-28 is required to process the sonobuoys identified, and has demonstrated this capability.

10. (U) AN/SQQ-89A(V)1 Technical/Operational Characteristics (continued)

(U) AN/SQS-53C

(U) Technical	Production Estimate	Approved Program Goals/Thresholds	Demon. Perf.	Current Estimate
Space and Weight	178 sq.ft.	178 sq.ft./178 sq.ft.	178 sq.ft.	178 sq.ft.
(electronics)	16.5 tons	16.5 tons/16.5 tons	16.5 tons	16.5 tons
Reliability				
Passive Subsystem (MTBF)(HW)	600 hrs.	600 hrs./600 hrs.		
Active Subsystem (MTBF)(HW)	1,100 hrs.	1,100 hrs./1,100 hrs.		
Total Subsystem (MTBF)(HW)	460 hrs.	460 hrs./460 hrs.	1,290 hrs.	1,290 hrs.

(U) Operational

(U) Operational Availability (A_o) (b)(1)

(U) Active Detection
BB, CZ, PDT Search Coverage
Noise Limited FOM
OSS
15 kt

(U) Passive Detection
PNB Search Coverage
PNB Search FOM

PBB Search Coverage
PBB Search FOM

(U) Basic AN/SQQ-89(5)

Technical

Mean Time Between Mission Critical Failure (MTBMCF) (b)(1)

Mean Time To Repair Hardware (MTTR) (HW) (b)(1)

Mean Time To Restore a Software Failure (MTTR) (SW) (b)(1)

Operational

Operational Availability (A_o)(6) (b)(1)

(5) These thresholds were developed to address the composite capability of the individual subsystems within the overall AN/SQQ-89 ASW combat system architecture.

(6) The A_o values account for Mean Logistics Delay Time (MLDT) in the calculation for the Basic System.

10. (U) AN/SQQ-89A(V)1 Technical/Operational Characteristics (continued)

b. (U) Improved AN/SQQ-89

	Planning Estimate	DAE Baseline Goals/Thresholds	Demonstrated Performance	Current Estimate
(C) Technical Active Detection: Battle Force Capable FFG-7 Class		(b)(1)		
(U) Operational Operational Availability	.8	.8/.8	TBD	.8

c. (U) Previous Change Explanations.

Demonstrated performances of the AN/SQR-19 subsystem Figure of Merit (FOM) and Array MTBF have been revised to accurately show performance demonstrated subsequent to TECHEVAL/OPEVAL. The current estimates in Streaming and Recovery Time and Array MTTR have been revised to accurately show performance being achieved.

d. (U) Current Change Explanations. N/A.

Operational performance thresholds for the Basic AN/SQQ-89 system have been identified in TEMP 802-2.

e. (U) References

Production Estimate

(1) DCP-92 dated August 16, 1976 (AN/SQR-19)
(2) DCP-85 dated March 5, 1979 (AN/SRQ-4 and AN/SQQ-89)
(3) OR 062-03-86 dated 24 December 1985 (AN/SQQ-89)
(4) ASN (RE&S) Milestone IIIC (NPDM held 19 November 1987; Decision Memorandum of 17 December 1986 (AN/SQS-53C)

Approved Program: DAE baseline dated 30 September 1989.

11. (U) Program Acquisition Cost. (Current Estimate in Millions of Then-Year Dollars)

I. Basic AN/SQQ-89	Production Estimate	Approved Program Estimate	Current Estimate
a. Costs			
Development (RDT&E,N)	754.2	901.6	945.0
Procurement	2961.0	2810.1	2660.5
Major System Equipment	(1986.5)	(1664.5)	(1562.8)
System Support	(207.9)	(323.1)	(413.1)
Sailaway Total	2194.4	1987.6	1975.9
Other Wpn Sys Cost	548.3	574.2	435.7
Initial Spares	218.3	248.3	248.9
OPN (Fleet Mod. Prog.)	N/A	N/A	87.0
O&M,N (Fleet Mod. Prog.)(7)	183.8	160.6	79.7
MILCON	N/A	N/A	4.6
TOTAL FY85 BASE-YEAR $	3899.0	3872.3	3776.8
Escalation			
Total Escalation	248.6	412.0	493.5
Development (RDT&E,N)	(-66.4)	(-99.6)	(-74.8)
Procurement	(291.9)	(487.0)	(532.4)
OPN (FMP)	(N/A)	(N/A)	(31.0)
O&M,N (FMP)	(23.1)	(24.6)	(5.1)
MILCON	(N/A)	(N/A)	(-.2)
Total Then-Year $	4147.6	4284.3	4270.3
b. Quantities (8)			
Development (RDT&E,N)	0	0	0
Procurement	120	114	110
TOTAL	120	114	110

(7) (U) Only AN/SRQ-4 and AN/SQQ-28 O&MN (FMP) cost estimates are currently addressed.

(8) (U) To avoid distortion of the number of Basic AN/SQQ-89 sonars in the Fleet, the quantity acquired with OPN funding is considered to be equal to the number of ships receiving a Basic AN/SQQ-89 plus shore systems and trainers. Ships, shore systems, and trainers will receive several incremental upgrades over the program years to achieve Basic AN/SQQ-89 capability. To prevent duplicate counting, each ship, shore system, or trainer is counted to have received a Basic AN/SQQ-89 when it is finally upgraded to the final Basic AN/SQQ-89 configuration it is scheduled to receive. The number of AN/SRQ-4s, AN/SQQ-28s, AN/SQR-19s, AN/SQS-53Cs, and the individual subsystems contained in Other Component Programs, procured in the program years prior to FY88 in RDT&E,N and OPN are not included in the quantities total as they are subsumed by the Basic AN/SQQ-89 program. Similarly, the number of Improved AN/SQQ-89 to be acquired will be equal to the number of ships, shore systems, and trainers

11. (U) Program Acquisition Cost. (continued)

c. Foreign Military Sales:

(1) AN/SQR-19

Spain: 3 AN/SQR-19 subsystems in FY83 for $50.9M.
1 AN/SQR-19 subsystem in FY87 for $8.0M

Canada: 7 Handling and Stowage Groups (H&SGs) and 8 Towed Array Groups (TAGs) in FY85 for $47.1M.

(2) AN/SQQ-28

Spain: 4 AN/SQQ-28 subsystems in FY81 for $14.2M.

Canada: 1 AN/SQQ-28 subsystem in FY85 for $2.3M.

d. Nuclear Costs: None.

e. References:

Production Estimate: 31 December 1986 SAR.

Approved Program: DAB baseline dated 30 September 1989.

(8) (U) continued
scheduled to receive Improved AN/SQQ-89. The total number of AN/SQQ-89 systems to be acquired is considered to be the sum of Basic AN/SQQ-89 and Improved AN/SQQ-89 systems.

11. (U) Program Acquisition Cost. (continued)

II. Improved AN/SQQ-89

a. Costs	Planning Estimate	Approved Program Estimate	Current Estimate
Development (RDT&E,N)	764.8	766.6	1049.0
Procurement	TBD	TBD	TBD
Major System Equipment	TBD	TBD	TBD
System Support	TBD	TBD	TBD
Sailaway Total	TBD	TBD	TBD
Other Wpn Sys Cost	TBD	TBD	TBD
Initial Spares	TBD	TBD	TBD
O&M,N (Fleet Mod. Prog.)	TBD	TBD	TBD
TOTAL FY85 BASE-YEAR $	764.8	766.6	1049.0
Escalation			
Total Escalation	187.9	210.5	390.4
Development (RDT&E,N)	(187.9)	(210.5)	(390.4)
Procurement	0	0	0
O&M,N (FMP)	0	0	0
Total Then-Year $	952.7	977.1	1439.4

b. Quantities (8)			
Development (RDT&E,N)	0	0	0
Procurement	TBD	0	TBD
TOTAL	TBD	0	TBD

c. Foreign Military Sales: None.

d. Nuclear Costs: None.

e. References:

Planning Estimate: 31 December 1986 SAR.

Approved Program: DAB baseline dated 30 September 1989.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary.
(Current (Then-Year) Dollars in Millions)

I. Basic AN/SQQ-89

	Current Estimate (Dec 1989 SAR)	Current Year UCR Baseline (Dec 1988 SAR)	Budget Year UCR Baseline (Dec 1989 SAR)
a. Program Acquisition:			
(1) Cost	4270.3	4284.3	4270.3
(2) Quantity	110	114	110
(3) Unit Cost	38.8	37.6	38.8

b. Current Procurement: Not applicable due to year to year changes in the mix of hardware components being purchased under this program.

II. Improved AN/SQQ-89

a. Program Acquisition:			
(1) Cost	TBD	TBD	TBD
(2) Quantity	TBD	TBD	TBD
(3) Unit Cost	TBD	TBD	TBD

b. Current Procurement: Not available.

13. [redacted] Cost Variance Analysis.

a. Summary. Total AN/SQQ-89 Program (9)

Current (Then-Year) Dollars in Millions

Production/Planning Estimate	RDT&E,N	PROCUREMENT	O&MN	MILCON	TOTAL
	1640.5	3252.9	206.9	.0	5100.3
Previous Changes:					
Economic	24.3	55.7	3.2		83.2
Quantity	.0	-574.8			-574.8
Schedule	4.5	329.9			334.4
Engineering	6.7	251.0			257.7
Estimating	103.1	-9.0	-24.9		69.2
Other Support	.0	-8.6			-8.6
Subtotal	138.6	44.2	-21.7	0	161.1
Current Changes:					
Economic	48.3	120.4	2.1		170.8
Quantity		-24.2			-24.2
Schedule		57.0			57.0
Engineering					.0
Estimating	482.2	-257.4			224.8
Other Support		118.0	-102.5	4.4	.0 19.9
Subtotal	530.5	13.8	-100.4	4.4	448.3
Total Changes	669.1	58.0	-122.1	4.4	609.4
Current Estimate	2309.6	3310.9	84.8	4.4	5709.7

FY 1985 Constant (Base-Year) Dollars in Millions

Production/Planning Estimate	RDT&E,N	PROCUREMENT	O&MN	MILCON	TOTAL
	1519.0	2961.0	183.8	.0	4663.8
Previous Changes:					
Quantity	.0	-503.5			-503.5
Schedule	4.7	122.2			126.9
Engineering	9.0	211.4			220.4
Estimating	135.5	33.3	-23.2		145.6
Other Support	.0	-14.3			.0 -14.3
Subtotal	149.2	-150.9	-23.2	0	-24.9
Current Changes:					
Quantity		-12.4			-12.4
Schedule		43.3			43.3
Engineering					.0
Estimating	325.8	-180.5			145.3
Other Support		87.0	-80.9	4.6	.0 10.7
Subtotal	325.8	-62.6	-80.9	4.6	186.9
Total Changes	475.0	-213.5	-104.1	4.6	162.0
Current Estimate	1994.0	2747.5	79.7	4.6	4825.8

(9) [redacted] The baseline is based on addition of former SAR programs (AN/SQR-19 and AN/SQS-53C), a portion of a SAR program (AN/SQQ-28), plus non-SAR programs (AN/UYQ-25, AN/SQS-53B, and MK 116).

13. [redacted] Cost Variance Analysis (continued)

a. Summary. Basic AN/SQQ-89

Current (Then-Year) Dollars in Millions

	RDT&E,N	PROCUREMENT	O&MN	MILCON	TOTAL
Production Estimate	687.8	3252.9	206.9	0	4147.6
Previous Changes:					
Economic	9.0	55.7	3.2		67.9
Quantity		-574.8			-574.8
Schedule	4.5	329.9			334.4
Engineering	6.7	251.0			257.7
Estimating	94.0	-9.0	-24.9		60.1
Other					.0
Support		-8.6			-8.6
Subtotal	114.2	44.2	-21.7	0	136.7
Current Changes:					
Economic	3.5	120.4	2.1		126.0
Quantity		-24.2			-24.2
Schedule		57.0			57.0
Engineering					.0
Estimating	64.7	-257.4			-192.7
Other					.0
Support		118.0	-102.5	4.4	19.9
Subtotal	68.2	13.8	-100.4	4.4	-14.0
Total Changes	182.4	58.0	-122.1	4.4	122.7
Current Estimate	870.2	3310.9	84.8	4.4	4270.3

FY 1985 Constant (Base-Year) Dollars in Millions

	RDT&E,N	PROCUREMENT	O&MN	MILCON	TOTAL
Production Estimate	754.2	2961.0	183.8	0	3899.0
Previous Changes:					
Quantity		-503.5			-503.5
Schedule	4.7	122.2			126.9
Engineering	9.0	211.4			220.4
Estimating	133.7	33.3	-23.2		143.8
Other					.0
Support		-14.3			-14.3
Subtotal	147.4	-150.9	-23.2	0	-26.7
Current Changes:					
Quantity		-12.4			-12.4
Schedule		43.3			43.3
Engineering					.0
Estimating	43.4	-180.5			-137.1
Other					.0
Support		87.0	-80.9	4.6	10.7
Subtotal	43.4	-62.6	-80.9	4.6	-95.5
Total Changes	190.8	-213.5	-104.1	4.6	-122.2
Current Estimate	945.0	2747.5	79.7	4.6	3776.8

13. [redacted] Cost Variance Analysis (continued)

(10)

b. Previous Change Explanations

AN/SQQ-89 (V) Basic

RDT&E

Economic: Revised escalation indices.

Schedule: Program restructured due to funding constraints.

Engineering: System redesigned to use new Navy standard hardware.

Estimating: Increased contractor support costs, hardware development, and integration costs.

Procurement

Economic: Revised escalation indices.

Quantity: Decreased ship market.

Schedule: Program restructured due to funding restraints and the addition of one more year of funding.

Engineering: System redesigned to use new Navy standard hardware and accommodate the improvement program.

Estimating: Change due to administrative error in applying Then-Year dollar factors only instead of outlay factors. Increased contractor support costs, hardware development, and integration costs. Revisions in the ship schedule, different hulls require different equipment upgrades.

Support: Changed procurement requirements.

O&M,N

Economic: Revised escalation indices.

Estimating: Refinement of estimates to include two additional program years for shipboard portion of LAMPS MKIII (AN/SRQ-4 and AN/SQQ-28) programs.

(9) [redacted] continued

	RDT&E,N	OPN	O&M,N	Total
AN/SQR-19	62.4	538.7	0	601.1
AN/SQS-53C	312.5	1934.7	0	2247.2
Other	1265.6	779.5	206.9	2252.0
TOTAL	1640.5	3252.9	206.9	5100.3

13. [redacted] Cost Variance Analysis (continued)

b. Previous Change Explanations (continued)

AN/SQQ-89 Improved Program

RDT&E

Economic: Revised escalation indices for the AN/SQQ-89I.

Estimating: Reduction in funding for the AN/SQQ-89I was due to the program being restructured to available funding in FY87-89.

c. Current Change Explanations:

	(Dollars in Millions) FY85 (Base Year)$	Then-Year $
AN/SQQ-89(V) Basic		
RDT&E Revised escalation indices for the AN/SQQ-89(V) Basic. (Economic)		$ 3.5
Increased program cost due to funding deferments, and an addition of 3 years of funding for the ASWCSI. (Estimating)	$ 43.4	$ 64.7

(10) [redacted] Addresses all AN/SQQ-89 subsystems (AN/SQR-19 and AN/SQS-53C) previously reported separately in SARs. Only the AN/SQR-19 Subsystem SAR reported previous changes.

13. (U) Cost Variance Analysis (continued)

c. Current Change Explanations:	(Dollars in Millions) FY85 (Base Year)$	Then-Year$
AN/SQQ-89(V) Basic (continued)		
PROCUREMENT Revised escalation indices for the AN/SQQ-89(V) Basic. (Economic)		$120.4
A decrease from 114 to 110 OPN systems being procured. (Quantity)	-$ 12.4	-$ 24.2
Revised ship installation schedule with reductions in procurement rate for the AN/SQQ-89 Basic. (Schedule)	$ 43.3	$ 57.0
Refinement of estimate and requirements for incremental upgrades, to existing Basic systems. (Estimating)	-$180.5	-$257.4
Previously the FMP was reported as O&M,N FMP, from FY84 - 89. FMP funding has been transferred to the OPN account by PBD631. (Support)	$ 87.0	$118.0
O&MN Revised escalation indices for the Basic AN/SQQ-89(V). (Economic)		$ 2.1
O&M,N funding has been transferred to OPN FMP. (Support)	-$ 80.9	-$102.5
MILCON PMA266 transfer of AN/SQQ-28 and AN/SRQ-4 MILCON funding. This funding was for the construction of operations & maintenance training facilities in May Port Fla. and N.I. San Diego CA. (Support)	$ 4.6	$ 4.4
AN/SQQ-89 Improved Program		
RDT&E Revised escalation indices for the Improved AN/SQQ-89(V). (Economic)		$ 44.8
Refinement of estimate due to the restructuring of the Improved program and the deferment of funding to the out years. (Estimating)	$282.4	$417.5

13. [redacted] Cost Variance Analysis (continued)

d. Summary: Improved AN/SQQ-89

Current (Then-Year) Dollars in Millions

	RDT&E,N	PROCUREMENT	O&M,N	MILCON	TOTAL
Planning Estimate	952.7	TBD	TBD	TBD	952.7
Previous Changes:					
Economic	15.3				15.3
Quantity					.0
Schedule					.0
Engineering					.0
Estimating	9.1				9.1
Other					.0
Support					.0
Subtotal	24.4	0	0	0	24.4
Current Changes:					
Economic	44.8				44.8
Quantity					.0
Schedule					.0
Engineering					.0
Estimating	417.5				417.5
Other					.0
Support					.0
Subtotal	462.3	0	0	0	462.3
Total Changes	486.7	0	0	0	486.7
Current Estimate	1439.4	TBD	TBD	TBD	1439.4

FY 1985 Constant (Base-Year) Dollars in Millions

	RDT&E,N	PROCUREMENT	O&MN	MILCON	TOTAL
Planning Estimate	764.8	TBD	TBD	TBD	764.8
Previous Changes:					
Quantity					.0
Schedule					.0
Engineering					.0
Estimating	1.8				1.8
Other					.0
Support					.0
Subtotal	1.8	0	0	0	1.8
Current Changes:					
Quantity					.0
Schedule					.0
Engineering					.0
Estimating	282.4				282.4
Other					.0
Support					.0
Subtotal	282.4	0	0	0	282.4
Total Changes	284.2	0	0	0	284.2
Current Estimate	1049.0	TBD	TBD	TBD	1049.0

14. [redacted] Program Acquisition Unit Cost (PAUC) History. AN/SQQ-89
(Millions of Then-Year Dollars)

a. Basic AN/SQQ-89

(1) Initial SAR Estimate (Production Estimate) to Current Estimate

PAUC (Initial SAR Est)	Changes								PAUC (Current Est)
	Econ	Qty	Schd	Engr	Est	Other	Spt	Total	
34.6	1.763	-2.277	3.558	2.343	-1.206	.000	.040	4.2	38.8

b. Improved AN/SQQ-89

(1) Initial SAR Estimate (Planning Estimate) to Current Estimate

PAUC (Initial SAR Est)	Changes								PAUC (Current Est)
	Econ	Qty	Schd	Engr	Est	Other	Spt	Total	
TBD									TBD

15. [redacted] Contract Information (Then-Year Dollars in Millions)

a. ASWCS MK 116 MOD 7 Subsystem Development
General Electric Company, Syracuse, NY

N00024-84-C-6362/CPIF
Awarded: July 1984
Definitized: July 1984

Initial Contract Price		
Target	Ceiling	Qty
$20.6	$N/A	2

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 78.2	$ 85.3	2	$70.8	$70.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-0.3	$-0.8
Cum Variances To Date (12/89)	$ 0.0	$-1.4
Net Change	$+0.3	$-0.6
Cum Variance Change Percent	100.0%	-75.0%

Explanation of Change: The contract has been modified to incorporate a ceiling price of $85.3M. Testing of the MK 116 Mod 7 ASWCS integrated into the AEGIS combat system was conducted in November 1989 with satisfactory results.

15. [redacted] Contract Information (Then-Year Dollars in Millions) (continued)

b. AN/SQS-53C Subsystem Procurement
General Electric Company, Syracuse, NY

	Initial Contract Price		
N00024-85-C-6116/FPI	Target	Ceiling	Qty
Awarded: April 1985	$44.5	$47.4	1
Definitized: June 1986			

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$127.4	$152.3	6	$148.8	$160.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-17.8	$- 9.5
Cum Variances To Date (12/89)	$-19.9	$-10.8
Net Change	$- 2.1	$- 1.3
Cum Variance Change Percent	-11.8%	-13.7%

Explanation of Change: GE has delivered the system for DDG51 but is behind their schedule for delivering the five remaining systems due to manufacturing problems. Their latest delivery plans will meet ship requirements.

c. AN/SQR-19 Subsystem Procurement
General Electric Company, Syracuse, NY

	Initial Contract Price		
N00024-85-C-6012/FPI/FFP	Target	Ceiling	Qty
Awarded: August 1985	$53.3	$62.5	33
Definitized: August 1985			

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$163.1	$173.3	48	$154.2	$150.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-2.3	$-4.3
Cum Variances To Date (12/89)	$-1.2	$-4.9
Net Change	$+1.1	$-0.6
Cum Variance Change Percent	47.8%	-14.0%

Explanation of Change: All 33 systems procured in FY85 and FY86 have been delivered. GE is behind in delivering the 15 systems procured in FY87 due to problems associated with redesign of the system to incorporate AN/UYK-44 in place of AN/UYK-20 and manufacturing problems. Their latest delivery plans will meet ship requirements.

15. Contract Information (Then-Year Dollars in Millions) (continued)

d. AN/SQQ-89 On-Board Trainer Subsystem Procurement
Raytheon, SSD, RI

		Initial Contract Price		
N00024-84-C-6132 FPI		Target	Ceiling	Qty
Awarded:	September 1985	$82.0	$87.6	52
Definitized:	September 1985			

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$64.8	$69.5	52	$64.4	$64.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-5.3	$-3.6
Cum Variances To Date (12/89)	$-0.4	$-1.0
Net Change	$+4.9	$+2.6
Cum Variance Change Percent	92.6%	72.2%

Explanation of Change: Raytheon has delivered 28 of the 52 OBTs to the Navy. The next system is scheduled for delivery in April 1990. The contractor has increased his Estimated Price at Completion to reflect additional integration and test cost incurred during development of the system. The Navy has sufficient funds held in "commitments" to cover the expected cost growth of the contract.

e. AN/SQQ-89 Subsystem Procurement
General Electric, Syracuse, NY

		Initial Contract Price		
N00024-88-C-6219/FFP		Target	Ceiling	Qty
Awarded:	July 1988	$276.9	$ N/A	12 TAGs
Definitized:	July 1988			12 OBTs
				5 Forward fits 9 Backfits

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$518.0	$N/A	10 Forward fits 25 Backfits	$ N/A	$ N/A

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cum Variances To Date (12/89)	N/A	N/A
Net Change	N/A	N/A

Explanation of Change: The FY88 contract was awarded in July 1988, and the FY89 option in June 1989. The total contract is valued at $518.0M with a number of options exercised. The first system delivery is scheduled for March 1990; however, GE is behind schedule due to problems associated with the redesign of the system to incorporate the AN/UYK-44 in place of the AN/UYK-20, and manufacturing problems. Their latest delivery plan will meet ship requirements.

[redacted]

16. (U) Program Funding Summary.
(Current Estimate in Millions of Dollars)

a. Basic AN/SQQ-89

1. Program Status

(1) Percent Program Completed: 66.7%
(16 yrs./24 yrs.)

(2) Percent Program Cost Appropriated: 55.5%
($2,633.8 / $4,270.3)

2. Appropriation Summary (Then-Year Dollars)

Appropriation	Prior Years (FY75-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-COMPLETE)	Total
RDT&E,N	705.8	14.9	19.3	130.2	870.2
OPN	1573.4	220.8	288.8	1109.9	3192.9
OPN FMP	0	29.7	22.1	66.2	118.0
O&M,N (FMP)	84.8	0	0	0	84.8
MILCON	4.4	0	0	0	4.4
TOTAL	2368.4	265.4	330.2	1306.3	4270.3

b. Improved AN/SQQ-89

1. Program Status

(1) Percent Program Completed: N/A
(3 yrs./TBD)

(2) Percent Program Cost Appropriated: N/A
($164.2 / TBD)

2. Appropriation Summary (Then-Year Dollars)

Appropriation	Prior Years (FY88-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-COMPLETE)	Total
RDT&E,N	57.6	106.6	122.7	1152.5	1439.4
OPN	0	0	TBD	TBD	TBD
O&M,N (FMP)	0	0	0	0	0
TOTAL	57.6	106.6	122.7	1152.5	1439.4

16. [redacted] Program Funding Summary (continued)
(Current Estimate in Millions of Dollars)

c. Annual Summary. Total AN/SQQ-89 Program

Fiscal Year	Qty	FY85 Base-Year Dollars			Then-Year Dollars			Esc Rate %
		Sailaway		Total	Program	Obli-gated	Ex-pended	
		Nonrec	Rec					
Appropriation: RDT&E,N								
1975				16.6	8.7	8.7	8.7	10.9%
1976				19.1	10.6	10.6	10.6	6.6%
197T				7.1	4.1	4.1	4.1	2.9%
1977				42.3	25.1	25.1	25.1	2.6%
1978				58.9	37.6	37.6	37.6	6.8%
1979				66.1	46.6	46.6	46.6	8.4%
1980				95.3	74.3	74.3	74.3	10.6%
1981				82.5	70.2	70.2	69.7	10.6%
1982				87.0	77.8	77.8	77.8	7.6%
1983				96.1	89.9	89.6	84.3	4.9%
1984				72.4	70.3	68.7	67.8	3.8%
1985				61.4	61.4	61.2	59.8	3.4%
1986				50.8	52.3	52.0	51.1	2.8%
1987				35.8	38.6	38.2	36.6	2.7%
1988				37.4	41.6	33.3	30.1	3.0%
1989				46.9	54.4	32.6	22.4	4.2%
1990				100.8	121.5	4.2	0	4.0%
1991				113.1	142.0	0	0	4.2%
1992				135.2	176.1	0	0	4.0%
1993				142.8	192.5	0	0	3.7%
1994				156.6	218.1	0	0	3.4%
1995				156.6	225.0	0	0	3.1%
1996				156.6	231.8	0	0	3.1%
1997				156.6	239.1	0	0	3.1%
1998				0	0	0	0	3.1%
1999				0	0	0	0	3.1%
2000				0	0	0	0	3.1%
Subtotal				1994.0	2309.6	734.8	706.6	
Appropriation: OPN (FMP)								
1990				23.4	29.7			4.2%
1991				16.7	22.1			4.0%
1992				16.1	22.1			3.7%
1993				15.6	22.1			3.4%
1994				15.2	22.0			3.1%
1995				0	0			3.1%
1996				0	0			3.1%
Subtotal				87.0	118.0			

16. (U) Program Funding Summary (continued)
(Current Estimate in Millions of Dollars)

c. Annual Summary. Total AN/SQQ-89 Program (continued)

Fiscal Year	Qty	FY85 Base-Year Dollars			Then-Year Dollars			Esc Rate %
		Sailaway		Total	Program	Obligated	Expended	
		Nonrec	Rec					
Appropriation: OPN								
1979		0	.7	1.0	.7	.7	.7	8.7%
1980		0	2.7	3.0	2.3	2.3	2.3	10.6%
1981		0	4.1	4.3	3.6	3.6	3.6	10.6%
1982		0	36.0	42.0	37.6	37.5	36.8	7.6%
1983		4.5	80.9	132.1	123.4	123.4	120.4	4.9%
1984		10.1	171.4	280.1	269.7	262.9	252.8	3.8%
1985		7.3	159.8	245.5	245.5	239.9	213.9	3.4%
1986		4.8	141.3	215.7	234.4	233.5	197.1	2.8%
1987		10.7	137.7	211.5	238.0	245.2	154.0	2.7%
1988		8.5	110.4	153.3	180.6	174.0	78.7	3.0%
1989		14.6	107.1	193.9	237.6	224.7	173.2	4.2%
1990		18.8	93.3	173.4	220.8	0	0	4.0%
1991		24.3	158.9	218.6	288.8	0	0	4.2%
1992		16.4	166.6	250.4	342.3	0	0	4.0%
1993		13.5	233.2	270.6	381.8	0	0	3.7%
1994		14.3	223.4	265.1	385.8	0	0	3.4%
1995		0	0	0	0	0	0	3.1%
To Complete		TBD	TBD	TBD	TBD	TBD	TBD	
Subtotal	TBD	147.8	1827.7	2660.5	3192.9	1547.7	1233.5	
Appropriation: O&M,N (FMP)								
1984				1.2	1.2	1.2	1.2	3.8%
1985				15.4	15.4	15.4	15.4	3.4%
1986				16.1	16.6	16.6	16.6	2.8%
1987				30.6	33.0	33.0	33.0	2.7%
1988				10.9	12.2	12.2	12.2	3.0%
1989				5.5	6.4	6.4	6.4	4.2%
To Complete								
Subtotal				79.7	84.8	84.8	84.8	
Appropriation: MILCON								
1982				2.6	2.5	2.5	2.5	7.6%
1983				2.0	1.9	1.9	1.9	4.9%
1984				0	0	0	0	
Subtotal				4.6	4.4	4.4	4.4	
Total	TBD	147.8	1827.7	4825.8	5709.7	2371.7	2029.3	

16. Program Funding Summary (continued)
(Current Estimate in Millions of Dollars)

d. Annual Summary. Basic AN/SQQ-89

Fiscal Year	Qty	FY85 Base-Year Dollars			Then-Year Dollars			Esc Rate %
		Sailaway		Total	Program	Obli-gated	Ex-pended	
		Nonrec	Rec					
Appropriation: RDT&E,N								
1975				16.6	8.7	8.7	8.7	10.9%
1976				19.1	10.6	10.6	10.6	6.6%
197T				7.1	4.1	4.1	4.1	2.9%
1977				42.3	25.1	25.1	25.1	2.6%
1978				58.9	37.6	37.6	37.6	6.8%
1979				66.1	46.6	46.6	46.6	8.7%
1980				95.3	74.3	74.3	74.3	10.6%
1981				82.5	70.2	70.2	69.7	10.6%
1982				87.0	77.8	77.8	77.8	7.6%
1983				96.1	89.9	89.6	84.3	4.9%
1984				72.4	70.3	68.7	67.8	3.8%
1985				61.4	61.4	61.2	59.8	3.4%
1986				50.8	52.3	52.0	51.1	2.8%
1987				35.8	38.6	38.2	36.6	2.7%
1988				19.3	21.5	21.2	19.6	3.0%
1989				14.6	16.9	15.2	10.0	4.2%
1990				12.3	14.9	1.9	0	4.0%
1991				15.4	19.3	0	0	4.2%
1992				15.2	19.8	0	0	4.0%
1993				16.0	21.5	0	0	3.7%
1994				15.2	21.2	0	0	3.4%
1995				15.2	21.9	0	0	3.1%
1996				15.2	22.5	0	0	3.1%
1997				15.2	23.2	0	0	3.1%
1998				0	0	0	0	3.1%
Subtotal				945.0	870.2	703.0	683.7	
Appropriation: OPN (FMP)								
1990				23.4	29.7	0	0	4.2%
1991				16.7	22.1	0	0	4.0%
1992				16.1	22.1	0	0	3.7%
1993				15.6	22.1	0	0	3.4%
1994				15.2	22.0	0	0	3.1%
1995				0	0	0	0	3.1%
1996				0	0	0	0	3.1%
Subtotal				87.0	118.0	0	0	

[redacted]
UNCLASSIFIED

16. (U) Program Funding Summary (continued)
(Current Estimate in Millions of Dollars)

d. Annual Summary. Basic AN/SQQ-89 (continued)

Fiscal Year	Qty	FY85 Base-Year Dollars			Then-Year Dollars			Esc Rate %
		Sailaway		Total	Program	Obli-gated	Ex-pended	
		Nonrec	Rec					
				(11)				
Appropriation: OPN								
1979		0	.7	1.0	.7	.7	.7	8.7%
1980		0	2.7	3.0	2.3	2.3	2.3	10.6%
1981		0	4.1	4.3	3.6	3.6	3.6	10.6%
1982		0	36.0	42.0	37.6	37.5	36.8	7.6%
1983		4.5	80.9	132.1	123.4	123.4	120.4	4.9%
1984		10.1	171.4	280.1	269.7	262.9	252.8	3.8%
1985		7.3	159.8	245.5	245.5	239.9	213.9	3.4%
1986		4.8	141.3	215.7	234.4	233.5	197.1	2.8%
1987		10.7	137.7	211.5	238.0	245.2	154.0	2.7%
1988		8.5	110.4	153.3	180.6	174.0	78.7	3.0%
1989		14.6	107.1	193.9	237.6	224.7	173.2	4.2%
1990		18.8	93.3	173.4	220.8	0	0	4.0%
1991		24.3	158.9	218.6	288.8	0	0	4.2%
1992		16.4	166.6	250.4	342.3	0	0	4.0%
1993		13.5	233.2	270.6	381.8	0	0	3.7%
1994		14.3	223.4	265.1	385.8	0	0	3.4%
1995		0	0	0	0	0	0	3.1%
1996		0	0	0	0	0	0	3.1%
Subtotal	110	147.8	1827.7	2660.5	3192.9	1547.7	1233.5	
Appropriation: O&M,N (FMP)								
1984				1.2	1.2	1.2	1.2	3.8%
1985				15.4	15.4	15.4	15.4	3.4%
1986				16.1	16.6	16.6	16.6	2.8%
1987				30.6	33.0	33.0	33.0	2.7%
1988				10.9	12.2	12.2	12.2	3.0%
1989				5.5	6.4	6.4	6.4	4.2%
Subtotal				79.7	84.8	84.8	84.8	
Appropriation: MILCON								
1982				2.6	2.5	2.5	2.5	7.6%
1983				1.9	1.9	1.9	1.9	4.9%
1984				0	0	0	0	
Subtotal				4.6	4.4	4.4	4.4	
Total	110	147.8	1827.7	3776.8	4270.3	2339.9	2006.4	

(11) To avoid distortion of the number of Basic AN/SQQ-89 sonars in the Fleet, the quantity acquired with OPN funding is considered to be equal to the number of ships receiving a Basic AN/SQQ-89 plus shore systems and

[redacted]

16. [redacted] Program Funding Summary (continued)
(Current Estimate in Millions of Dollars)

e. Annual Summary. Improved AN/SQQ-89

Fiscal Year	Qty	FY85 Base-Year Dollars			Then-Year Dollars			Esc Rate %
		Sailaway		Total	Program	Obli-gated	Ex-pended	
		Nonrec	Rec					
Appropriation: RDT&E,N								
1987				0	0	0	0	2.7%
1988				18.1	20.1	12.1	10.5	3.0%
1989				32.3	37.5	17.4	12.4	4.2%
1990				88.5	106.6	2.3	0	4.0%
1991				97.7	122.7	0	0	4.2%
1992				120.0	156.3	0	0	4.0%
1993				126.8	171.0	0	0	3.7%
1994				141.4	196.9	0	0	3.4%
1995				141.4	203.1	0	0	3.1%
1996				141.4	209.3	0	0	3.1%
1997				141.4	215.9	0	0	3.1%
1998				0	0	0	0	3.1%
1999				0	0	0	0	3.1%
2000				0	0	0	0	3.1%
Subtotal	0			1049.0	1439.4	31.8	22.9	
Appropriation: OPN								
Subtotal	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Appropriation: O&M,N								
Subtotal		0	0	0	0	0	0	
Total	TBD	0	0	1049.0	1439.4	31.8	22.9	

(11) [redacted] (continued)
trainers. Ships, shore systems, and trainers will receive several incremental upgrades over the program years to achieve Basic AN/SQQ-89 capability. To prevent duplicate counting, each ship, shore system, or trainer is counted to have received a Basic AN/SQQ-89 when it is finally upgraded to the final Basic AN/SQQ-89 configuration it is scheduled to receive, assuming the Improved AN/SQQ-89 is introduced starting in FY95. The number of AN/SRQ-4s, AN/SQQ-28s, AN/SQR-19s, AN/SQS-53Cs, and the individual subsystems contained in Other Component Programs procured in the program years prior to FY88 in RDT&E and OPN are not included in the quantities total as they are subsumed by the Basic AN/SQQ-89 program. Similarly, the number of Improved AN/SQQ-89s to be acquired will be equal to the number of ships, shore systems, and trainers scheduled to receive Improved AN/SQQ-89. The total number of AN/SQQ-89 systems to be acquired is considered to be the sum of the Basic AN/SQQ-89 and Improved AN/SQQ-89 systems.

17. (U) Production Rate Data

a. Annual Production Rates. The year to year changes in the mix of hardware components being purchased under this program preclude the identification of quantities by fiscal year.

b. Deliveries. Basic AN/SQQ-89 (Partial System(12) and Final Configuration(13))

	PARTIAL PLANNED/DELIVERED	FINAL PLANNED/DELIVERED
RDT&E,N	0/0	0/0
OPN	19/19	14/14

c. Approved Design to Cost

AN/SQQ-89 Basic: Not available.

AN/SQQ-89 Improved: None.

(12) System includes the functional equivalent of any two of the subsystems previously known as the AN/SQR-19, AN/SQS-53B, AN/SQQ-28, and the AN/SQS-53C.

(13) Final Basic AN/SQQ-89 configuration the ship is scheduled to receive assuming the Improved AN/SQQ-89 is procured starting in FY95.

18. (U) Operating and Support Costs

a. Assumptions and Ground Rules

(1) There is no antecedent system.

(2) O&S costs for the AN/SQQ-89 are based upon 94 Basic AN/SQQ-89 systems.

(3) OPN O&S costs are for ECPs to the system and procurement of spares.

(4) MPN O&S costs are for personnel required to operate and support the shipboard system.

(5) O&M,N O&S costs are for laboratory and program office support inservice systems, field services, and equipment and software maintenance.

b. Costs FY85 Constant (Base-Year) Dollars in Millions.

Cost Element	AN/SQQ-89 Avg Annual Cost (per System)	Antecedent
O&M,N	1.11	N/A
MPN	.69	N/A
OPN	.32	N/A
Total	2.12	N/A

c. Contractor Support Costs (Then-Year Dollars in Millions)

Appropriation	Prior Years (FYXX-89)	Year (FY90)	Year (FY91)	To Complete (FY92-COMPLETE)	Total
O&M,N (14)	9.9	7.1	7.8	TBD	24.8
NIF	N/A	N/A	N/A	N/A	N/A
TOTAL	9.9	7.1	7.8	0	24.8

(14) This O&M,N cost category identifies interim support, logistics support, systems engineering, CETS, and depot maintenance support costs. It however, does not correlate to the O&M,N (FMP) costs previously reported in this report.

[redacted]

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SAR-89-049

N-41 TOMAHAWK

AS AMENDED

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: TOMAHAWK SEA LAUNCHED CRUISE MISSILE, R/UGM-109

MAR 22 1990

AS OF DATE: December 31, 1989

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90-CD664
No Security Objection to Open Publication
(AS AMENDED)
MAR 22 1990
Office of the Chief of Naval Operations
Dept. of the Navy

1. (U) Designation/Nomenclature (Popular Name): RGM-109/Sea Launched Cruise Missile TOMAHAWK), Surface; UGM-109/Sea Launched Cruise Missile (TOMAHAWK), Submarine

2. (U) DoD Component: U.S. Navy

3. (U) Responsible Office and Telephone Number:

Cruise Missiles Project (PDA-14)
Washington, DC 20363-5140

RADM William C. Bowes
Assigned: November 1 1987
AV 222-7409; Comm (202)692-7409

4. (U) Program Elements/Procurement Line Items:

RDT&E: 0604367N, 0604707N, 0204229N - Project K1784 - 0603717N (Prior years)

PROCUREMENT: 0208009N, 0204229N, 0204660N - APPN 1507 and APPN 1810 (ICN 2071)

5. (U) Related Programs: Air-Launched and Ground-Launched Cruise Missiles (USAF); MK-41 Vertical Launching System; Harpoon Missile; OTH Targeting; SSN 21 Combat System Improvement; BB-61; CG-47; DDG-51; DD-963; SSN-688; and SSN-637 Class Ships.

6. (U) Mission and Description: The TOMAHAWK Land Attack Missile/Conventional, (TLAM/C), variant counters threats against the U.S. Navy by destroying naval targets ashore, fleet command, control and logistic systems; industrial or other high value

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targets and ground-based air defense systems aiding aircraft penetration. The TOMAHAWK Anti-Ship Missile (TASM) redresses the current Soviet anti-ship cruise missile stand-off advantage and complements aircraft strikes against combat ships with effective air defense systems. The TOMAHAWK Land Attack Missile/Nuclear (TLAM/N) variant provides a highly survival, world-wide theater nuclear capability. The TOMAHAWK program does not replace another program.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- Development of this generation of U.S. cruise missiles began in 1972. Since then, the ground-launched and sea-launched land-attack nuclear variants and the sea-launched anti-ship and land-attack conventional variants have completed full scale engineering development and OPEVAL, entered rate production, and have been deployed: approximately 1,400 missiles in operational status have been delivered to the Navy. The remaining missiles will be procured and delivered before the mid-1990's. Sea-launched cruise missiles will be deployed in more than 190 surface ships and submarines.

The TOMAHAWK is expected to satisfy the mission requirements.

b. Significant Developments Since Last Report --

(1) (U) The first TOMAHAWK Maine Range launch was successfully conducted on 10 January 1989. The objectives of the establishment of the Maine range was to demonstrate TOMAHAWK (TLAM) performance in a cold weather environment and demonstrate TOMAHAWK flight using a different terrain. The second and third Maine Range launches were succesfully conducted in February 1989. All objectives were met.

(2) (U) The TLAM Planning System (TPS) portion of the Theater Mission Planning Center Upgrade (TMPC) successfully completed its Preliminary Design Review in June 1989. The Digital Imagery Work Station (DIWS) portion remains on schedule and is completing integration of the initial hardware suite. TPS software development is running behind the contract schedule and will delay system IOC until late FY-91.

(3) (U) The Block III TOMAHAWK contracts were awarded in July 1989. The Block III is an upgrade to the TOMAHAWK Conventional Land Attack Missile to incorporate the Global Positioning System (GPS); an improved, lighter warhead; improved Digital Scene Matching Correlator (DSMAC) IIA; time of arrival (TOA) control; and the upgraded F107-402 engine. GPS allows increased mission planning flexibility, DSMAC IIA reduces launch restriction due to diurnal and seasoned effects, the lighter warhead increases range by adding more fuel capacity, TOA allows coordinated strikes, and the F107-402 engines significantly increases thrust with a modest improvement in fuel consumption.

c. (U) Changes Since "As Of" Date -- None

8. (U) Threshold Breaches: There are currently no DAE Baseline breaches. DAE Baseline approved 31 December 1988

9. (U) Schedule:

a. (U) Milestones --

	Dev Est.	Approved Program	Current Est.
(1) (U) DSARC I - Land Attack			
Nuclear	Feb 74	Feb 74	Feb 74
Anti-Ship	Feb 74	Feb 74	Feb 74
(2) (U) First Flight	May 76	Mar 76	Mar 76
(3) (U) First Guided Flight -			
Land Attack Nuclear	Oct 76	Oct 76	Dec 76
Anti-Ship	Dec 76	Dec 76	Dec 76
(4) (U) DSARC II			
Nuclear	Jan 77	Jan 77	Jan 77
Anti-Ship	Jan 77	Jan 77	Jan 77
(5) (U) First Full Scale Development (FSD) Flight -			
Land Attack Nuclear	Mar 77	Mar 77	Jan 77
Anti-Ship	Feb 77	Feb 77	Feb 77
Land Attack Conventional			
(Block I)	N/A	N/A	Jul 81
(Block IIA)	N/A	N/A	Jun 84
(Block IIB)	N/A	N/A	Nov 85

(6) (U) Combined DTOT/OPEVAL Complete	Dev. Est. Sub/Ship	Approved Program Sub/Ship	Current Est. Sub/Ship
Land Attack Conventional			
(Block I)	N/A	N/A	N/A
(Block IIA)	N/A	Apr85	Apr85
(Block IIB)	Jul87	May88	May88
Anti-Ship	May80/Jan81	Oct83/May84	Oct83/May84
Land Attack Nuclear	May80/Jan81	Oct83/Apr84	Oct83/Apr84

(7) (U) NPDM

Land Attack Conventional (Block I)	N/A	N/A	N/A
Land Attack Conventional (Block IIA)	N/A	Dec85	Dec85
Land Attack Dispenser	Dec87	Aug88	Aug88
Anti-Ship	Sep80/May81	Dec84	Dec84
Land Attack Nuclear	Sep80/May81	Dec84	Dec84
Vertical Launch TOMAHAWK	N/A	N/A/Oct86	N/A/Oct86

9. (U) Schedule (Cont'd):

(8) (U) IOC

Complete	Dev. Est. Sub/Ship	Approved Program Sub/Ship	Current Est. Sub/Ship
Land Attack Conventional			
(Block I)	N/A	N/A/Apr83	N/A/Apr86
(Block IIA)	N/A	Mar86	Mar86
(Block IIB)	Sep87	Sep88	Sep88
Anti-Ship	Jun81/Jun82	Nov83/Jun84	Nov83/Jun84
Land Attack Nuclear	Jan82/Jun82	Jun84	Jun84

b. (U) Previous Change Explanations --

Conventional Dispenser Variant OPEVAL completion was delayed from [2/88 to 5/88] due to ship availability and delay in missile deliveried due to hardware availability.

c. (U) Current Change Explanations -- None

d. (U) References --

Development Estimate: Draft DCP 125 dated December 22 1976 (Land-Attack), Program Memorandum No. 117, December 22 1976 (Anti-Ship) approved by SECNAV 5 January 1977; NDCP W0545 dated August 31 1987 (TOMAHAWK Weapons System) approved by OPNAV.

Approved Program: DAE Baseline approved 31 December 1988.

10. [redacted] Technical/Operational Characteristics:

	Dev Est	Approved Program (CH-1) Goal/Threshold	Demon-strated Perf	Current Estimate
a. Technical Characteristics --				
(1) ([redacted]) Land Attack --				
([redacted]) Range Operational: (km)				
(a) Nuclear		(b)(1)		H-1
(b) Conventional, Sub				H-1
(c) Conventional, Ship				
(d) Submunition, Sub				
(e) Submunition, Ship				
(2) ([redacted]) Cruise Speed(Mach):				
(3) ([redacted]) Cruise (Penetration) Altitude (Ft AGL)				
(4) [redacted] Terminal Accuracy (CEP ft)				
(a) Nuclear				
(b) Conventional				
(c) Submunition				
(5) [redacted] Mission Reliability (MR				
(a) RGM-109A				
(b) UGM-109A				
(c) RGM-109B				
(d) UGM-109B				
(e) RGM-109C				
(f) UGM-109C				
(g) RGM-109D				
(h) UGM-109D				
(6) [redacted] Probability of Hit (PH,R/UGM-109B Only)				
(a) RGM-109B		(b)(1)		
(b) UGM-109B				
(7) [redacted] Dispense Reliability (PD,R/UGM-109D Only)				
(a) RGM-109D		(b)(1)		
(b) UGM-109D				
(8) [redacted] Probability of Mission Success (R/UGM-109B, MR X PH)				
(a) RGM-109B		(b)(1)		
(b) UGM-109B				
(9) [redacted] Probability of Mission Success (R/UGM-109D, MR X PD)				
(a) RGM-109D		(b)(1)		
(b) UGM-109D				
(10) [redacted] Range Operational (km) (R/UGM-109B)				
		(b)(1)		
(11) ([redacted]) Cruise Speed (Mach):				
(12) ([redacted]) Cruise Penetration Alt (TASM)				
Altitude		(b)(1)		

10. (U) Technical/Operational Characteristics (cont'd):

	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
b. (C) Operational Characteristics --				
(1) (U) Launch Speed (KTS)				
(a) Sub Horizontal Torpedo tube (HTTL) Launcher	-	(b)(1)		
(b) Sub, Vertical Launch System VLS	-			
(c) Ship, Armored Box Launcher (ABL)	-			
(d) Ship, Vertical Launch System (VLS)	-			
(2) (U) Keel Depth (ft)				
(a) Horizontal Torpedo Tube	-			
(b) Vertical Launch Tube	-			
(3) (U) Wind (KTS)				
(a) Sub (All Launchers) (Relative Tail Wind)	-			
(b) Ship (ABL) (Relative Tail Wind)	-			
(c) Ship (VLS) (Relative Tail Wind)	-			
(4) (U) Wave Height (Sea State) (13 ft)	-	5	6	5
(5) (U) Maximum Salvo (Missiles)		(b)(1)		
(a) Sub, (TTL)	-			
(b) Sub, (VLS)	-			
(c) Ship, (ABL)	-			
(d) Ship, (VLS)	-			

c. (U) Previous Change Explanations --
(U) Approved program based on NDCP W0545 dated 31 Aug 1987
(U) Probability of Hit - Demonstrated Performance based on flights from 1 Jan 83 to 1 Feb 88.
(U) Approved program based on NDCP K0545 dated 31 Oct 1988.

d. (U) Current Change Explanations --
(CH-1) (U) Approved program based on NDCP K0545 dated 31 Oct 1988.

e. (U) References --

Development Estimate: Draft DCP 125 dated December 22, 1976 (Land-Attack), Program Memorandum No. 117, December 22, 1976 (Anti-Ship) approved by SECNAV January 5, 1977; NDCP K0545 dated October 31, 1988 (TOMAHAWK Weapons System) approved by OPNAV.

Approved Program: DAE Baseline approved 31 December 1988.

11. (U) Program Acquisition Costs (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. (U) Program Acquisition Cost --			
Development (RDT&E)	782.8	1315.7	1312.5
Procurement	1023.6	3850.8	3456.6
Air Vehicle (Flyaway)	(786.0)	(2974.8)	(2600.8)
Other Launch/Fire Control Costs	(90.2)	(467.8)	(474.5)
Peculiar Support	(81.1)	(268.9)	(234.3)
Initial Spares	(66.3)	(139.3)	(146.1)
Construction (MILCON)	0.0	23.6	27.4
Total FY 77 Base-Year $	1806.4	5190.1	4796.5
Escalation	616.5	5538.1	4964.7
Development (RDT&E)	(83.3)	(554.5)	(544.2)
Procurement	(533.2)	(4955.2)	(4386.0)
Construction (MILCON)	(0.0)	(28.4)	(34.5)
Total Then-Year Prog Cost 1/	2422.9	10728.2	9761.2
b. (U) Quantities --			
Development (RDT&E)	81	74	74
Procurement	1082	4030	3630
Total	1163	4104	3704

c. (U) Foreign Military Sales -- N/A

d. (S) Nuclear Costs -- DOE Warhead Costs (non-add) are (b)(1)

1/ (U) Excludes SCN for new construction ships and shipboard Vertical Launching System costs.

e. References --

Development Estimate: Draft DCP 125 dated 22 December 1976 (Land-Attack), Program Memorandum No. 117, 22 December 1976 (Anti-Ship) approved by SECNAV 5 January 1977; NDCP K0545 dated October 31, 1988 (TOMAHAWK Weapons System) approved by OPNAV.

Approved Program: DAE Baseline approved 31 December 1988.

12. [redacted] Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Est (Dec 89 SAR)	UCR Baseline (Current Year) (Dec 88 SAR)	UCR Baseline (Budget Year) (Dec 89 SAR)
a. [redacted] Program Acquisition --			
(1) Cost	9761.2	10728.2	9761.2
(2) Quantity	3704	4104	3704
(3) Unit Cost	2.635	2.614	2.635
b. [redacted] Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	648.5	648.5	873.2
Less CY Adv Proc	-75.6	-75.6	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	572.9	572.9	873.2
(2) Quantity	400	400	600
(3) Unit Cost	1.432	1.432	1.455

13. (U) Cost Variance Analysis:

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	866.1	1556.8	0.0	2422.9
Previous Changes				
Economic	-16.4	-1877.5	0.1	-1893.8
Quantity	-22.6	7701.6	0.0	7679.0
Schedule	213.4	446.8	0.0	660.2
Engineering	820.0	999.6	0.0	1819.6
Estimating	6.8	-1778.8	51.4	-1720.6
Other	0.0	0.0	0.0	0.0
Support	2.9	1757.5	0.5	1760.9
Subtotal	1004.1	7249.2	52.0	8305.3
Current Changes				
Economic	6.2	197.4	2.2	205.8
Quantity	0.0	-471.8	0.0	-471.8
Schedule	-1.8	-541.2	0.0	-543.0
Engineering	0.5	27.2	0.0	27.7
Estimating	-18.4	-117.2	7.7	-127.9
Other	0.0	0.0	0.0	0.0
Support	0.0	-57.8	0.0	-57.8
Subtotal	-13.5	-963.4	9.9	-967.0
Total Changes	990.6	6285.8	61.9	7338.3
Current Estimate	1856.7	7842.6	61.9	9761.2

13. ~~(U)~~ Cost Variance Analysis (cont'd):

(FY 1977 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	782.8	1023.6	0.0	1806.4
Previous Changes				
Quantity	-17.5	2660.9	0.0	2643.4
Schedule	148.5	-165.5	0.0	-17.0
Engineering	409.1	422.1	0.0	831.2
Estimating	-9.3	-799.3	23.2	-785.4
Other	-	-	-	-
Support	2.1	709.0	0.4	711.5
Subtotal	532.9	2827.2	23.6	3383.7
Current Changes				
Quantity	0.0	-153.6	0.0	-153.6
Schedule	0.0	-151.5	0.0	-151.5
Engineering	0.3	15.8	0.0	16.1
Estimating	-3.5	-88.2	+3.8	-87.9
Other	0.0	0.0	0.0	0.0
Support	0.0	-16.7	0.0	-16.7
Subtotal	-3.2	-394.2	+3.8	-393.6
otal Changes	529.7	2433.0	27.4	2990.1
urrent Estimate	1312.5	3456.6	27.4	4796.5

b. ~~(U)~~ Previous Change Explanations --

RDT&E

Economic: Revised escalation rates.

Schedule: Program delay to make design improvements, increase commonality, accelerate development of conventional land attack missile variant, and realign development of nuclear land attack.

Quantity: Reduction of 7 missiles.

Engineering: Design changes for commonality with the Ground Launch Cruise Missile. Complete TOMAHAWK baseline program including BGM-109 IOC. Establishment of TOMAHAWK Improvement Program. Implementation of program restructuring including additions such as Submunition Dispenser, Terminal Maneuver, Improved Booster, Nuclear Safety, specific Weapon System block upgrades, Theater Mission Planning Center Upgrades. Block IIB Overrun. Program years add-on.

13. ~~(U)~~ Cost Variance Analysis (cont'd):

Estimating: Revised estimate to offset economic indices. Addition of Theater Mission Planning System development caused by program restructuring.

Support: To fund the first surface ship fire control system trainer from RDT&E.

PROCUREMENT

Economic: Revised escalation rates.

Quantity: Reduction of fire control systems for 33 ships and 52 submarines. Establish Procurement Objective of 3994 missiles. Quantity change of 36 missiles.

Schedule: Delay first procurement from FY80 and FY81. Rephasing of 689 missiles from FY85-87 to FY88-92 and the Congressionally mandated rephasing of FY84 TASM's. Missile procurement schedule slip for affordability issues.

Engineering: Requirement to use Armored Box Launcher vice cannister launchers and production of 1,157 R/UGM-109D variants, vice R/UGM-109C versions.

Estimating: Congressionally mandated amortization of tooling and test equipment. Re-estimate of Quality Assurance requirements. Inclusion of both Systems Engineering/Integrating Agent and Principal Support Laboratory in FY85 and later years. Lower costs due to competition. Estimating reductions related to competitive contract awards and repricing. Expected multi-year contract savings. Revised estimates of surface and submarine support equipment.

Support: Support equipment and initial spares associated with missile quantity changes. Schedule rephasing of associated missile support equipment, spares and Common Weapon Control System (CWCS) spares. Transfer of Theater Mission Planning Center (TMPC) support requirements from missile flyaway. Deletion of one AN/SWG-3.

MILCON

Military construction requirement not estimated in DE. (Estimating)

Economic: Revised escalation rates.

Estimating: New program requirements.

13. [redacted] Cost Variance Analysis (cont'd):
c. [redacted] Current Change Explanations --

	(DOLLARS INMILLIONS) Base-Year	Then-Year
(1) RDT&E		
Revised Jan 90 economic escalation rates. (Economic)	N/A	6.2
Theater Mission Planning Center IOC slip from FY90 to late FY91 (Schedule)	N/A	-1.8
Revised program estimate (Estimating)	-3.5	-18.4
Revised Integrated Strike Planning System Requirement. (Engineering)	0.3	0.5
(2) Procurement		
Revised Jan 90 economic escalation rates. (Economic)	N/A	197.4
Defer one OPN Funded TWCS Suite (Schedule)	-4.0	-10.4
Functional Transfer of Installation Funding to OPN. (Engineering)	15.8	27.2
Program Repricing. (Estimating)	-78.0	-83.0
Tomahawk Weapon Control System Spares Reestimate. (Support)	-0.2	-1.1
Deletion of 400 Missiles in FY94 from Total Program. (Quantity)	-153.6	-471.8
Accelerate Procurement of 400 Missiles from FY93 and FY94 into FY91/92. (Schedule)	-147.5	-530.8
FY89 Competition Savings (Estimate)	-10.2	-31.2
Reclassification of Costs as Inflation (Estimate)	0.0	-3.0
Reduction for Initial Spares. (Support)	-16.5	-56.7

(3) MILCON		
Revised Jan 90 economic escalation rates. (Economic)	N/A	2.2
Economic Adjustment. (Estimate)	0.0	-0.1
Additional Missile Magazines. (Estimate)	4.1	8.5
Revised Project Estimates. (Estimate)	-0.3	-0.7

14. Program Acquisition Unit Cost (PAUC) History: (Millions of then-year dollars)

a. (U) Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
2.083	-0.456	0.514	0.016	0.499	-0.496	0.000	0.475	0.552	2.635

b. (U) Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
2.635	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.635

15. [redacted] Contract Information: (Then-Year Dollars in Millions)

a. [redacted] RDT&E -- Dollar Value of ongoing effort has dropped below reporting threshold.

b. [redacted] Procurement -- Information includes SLCM and GLCM cost and quantities.

1. AUR Missile:

General Dynamics (FY88 AUR)
San Diego, CA
N00032-87-C-3102, FFP
Award: November 1987
Definitized: November 1987

Initial Contract Price		
Target	Ceiling	Qty
$280.8M	N/A	332

Current Contract Price		
Target	Ceiling	Qty
$300.2M	N/A	332

Estimated Price At Completion	
Contractor	Program Manager
$300.2M	$300.2M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date		
Net Change		

Explanation of Change: Not reported for FFP contracts

2. AUR Missile:

McDonnell Douglas (FY88 AUR)
St. Louis, MO
N00032-86-C-3103, FFP
Award: December 1987
Definitized: December 1987

Initial Contract Price		
Target	Ceiling	Qty
$173.0M	N/A	143

Current Contract Price		
Target	Ceiling	Qty
$173.0M	N/A	143

Estimated Price At Completion	
Contractor	Program Manager
$173.0M	$173.0M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date		
Net Change		

Explanation of Change: Not reported for FFP contracts

NOTE: Contracts N00032-C-6124 and N00032-C-6126 are 90% complete and will no longer be reported.

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15. [redacted] Contract Information (cont'd):

3. AUR Missile:

General Dynamics (FY88 AUR)
San Diego, CA
N00032-87-C-3102, FFP
Award: March 1988
Definitized: November 1988

Initial Contract Price		
Target	Ceiling	Qty
$141.8M	N/A	86

Current Contract Price		
Target	Ceiling	Qty
$141.8M	N/A	86

Estimated Price At Completion	
Contractor	Program Manager
$141.8M	$141.8M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date		
Net Change		

Explanation of Change: Not reported for FFP contracts.

4. AUR Missile:

McDonnell Douglas (FY88 AUR)
St. Louis, MO
N00032-87-C-3103, FFP
Award: March 1988
Definitized: November 1988

Initial Contract Price		
Target	Ceiling	Qty
$239.0M	N/A	206

Current Contract Price		
Target	Ceiling	Qty
$239.0M	N/A	206

Estimated Price At Completion	
Contractor	Program Manager
$239.0M	$239.0M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date		
Net Change		

Explanation of Change: Not reported for FFP contracts.

5. AUR Missile:

General Dynamics (FY90 AUR)
San Diego, CA
N00019-89-C-0092, FFP
Award: December 1989
Definitized: December 1989

Initial Contract Price		
Target	Ceiling	Qty
$238.2M	N/A	280

Current Contract Price		
Target	Ceiling	Qty
$238.2M	N/A	280

Estimated Price At Completion	
Contractor	Program Manager
$238.2M	$238.2M

Cost Variance	Schedule Variance

[redacted]

15. (U) Contract Information (Cont'd):

Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date		
Net Change		

Explanation of Change: Not reported for FFP contracts.

6. AUR Missile:

McDonnell Douglas (FY90 AUR)
St. Louis, MO
N00019-89-C-0093, FFP
Award: December 1989
Definitized: December 1989

Initial Contract Price		
Target	Ceiling	Qty
$156.4M	N/A	120

Current Contract Price		
Target	Ceiling	Qty
$156.4M	N/A	120

Estimated Price At Completion	
Contractor	Program Manager
$156.4M	$156.4M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date		
Net Change		

Explanation of Change: Not reported for FFP contracts.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

(1) Percent Program Completed: 81.0% (17 yrs/21 yrs)

(2) Percent Program Cost Appropriated: 71.0%
($6,934.5/$9,761.2)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY74-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-94)	Total
RDT&E	1651.7	49.5	49.1	106.4	1856.7
Procurement	5228.7	648.5	873.2	1092.2	7842.6
Weapon	4547.4	605.7	836.8	904.5	6894.4
Other	681.3	42.8	36.4	187.7	948.2
MILCON	12.8	4.6	11.2	33.3	61.9
TOTAL	6893.2	702.6	933.5	1231.9	9761.2

16. [redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. [redacted] Annual Summary --

FY	Qty	Flyaway FY77 Dollars		Total Base Year$	Total Then-Year Dollars			ESCL Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1974	0			7.9	6.6	6.6	6.6	8.0
1975	0			40.9	37.3	37.3	37.3	10.9
1976	0			135.1	130.6	130.6	130.6	6.6
1977	0			115.3	119.2	119.2	119.2	2.6
1978	0			188.1	209.5	209.5	209.5	6.8
1979	74			125.3	154.1	154.1	154.1	8.4
1980	0			77.6	105.4	105.5	105.5	10.6
1981	0			90.3	133.8	133.9	133.9	10.6
1982	0			92.4	144.2	144.3	144.3	7.6
1983	0			72.6	118.3	118.4	118.4	4.9
1984	0			79.9	135.0	134.6	134.6	3.8
1985	0			46.2	80.5	80.5	78.8	3.4
1986	0			41.2	73.9	73.8	73.6	2.8
1987	0			41.8	77.1	76.8	76.4	2.7
1988	0			36.4	69.5	69.3	50.9	3.0
1989	0			28.5	56.7	56.5	25.4	4.2
1990	0			23.9	49.5	22.1	13.8	4.0
1991	0			22.8	49.1	NA	NA	4.2
1992	0			19.6	43.8	NA	NA	4.0
1993	0			15.5	35.8	NA	NA	3.7
1994	0			11.2	26.8	NA	NA	3.4
Sub TTL	74			1312.5	1856.7	1673.0	1612.9	

[redacted]

16. [redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

FY	Qty	Flyaway FY77 Dollars		Total Base Years	Total Then-Year Dollars			ESCL Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: WPN								
1980	6	1.6	10.4	19.3	30.8	30.8	30.8	1.5
1981	50	13.8	82.7	113.2	195.3	195.3	195.3	1.7
1982	61	15.5	94.3	125.4	234.3	234.3	234.3	1.9
1983	51	14.1	82.6	109.7	216.0	216.0	216.0	2.0
1984	124	20.2	121.3	167.2	343.1	343.1	343.1	2.0
1985	180	32.2	192.8	265.9	561.3	561.3	561.3	2.1
1986	249	34.0	219.3	315.2	689.4	689.3	689.3	2.2
1987	324	42.2	236.3	323.2	732.9	732.5	706.2	2.3
1988	475	37.3	283.8	359.7	848.2	837.6	650.3	2.4
1989	510	44.0	207.5	283.3	696.1	673.0	206.4	2.4
1990	400	25.8	211.2	238.1	605.7	NA	NA	2.5
1991	600	23.0	270.5	316.9	836.8	NA	NA	2.6
1992	600	19.6	231.4	329.2	904.5	NA	NA	2.7
1993	0	0.0	0.0	0.0	0.0	NA	NA	2.8
1994	0	0.0	0.0	0.0	0.0	NA	NA	2.9
1995	0	0.0	0.0	0.0	0.0	NA	NA	3.0
Sub TTL	3630	359.8	2241.0	2966.3	6894.4	4513.2	3833.0	

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

FY	Qty	Flyaway FY77 Dollars Nonrec	Flyaway FY77 Dollars Rec	Total Base Year$	Total Then-Year Dollars Program	Total Then-Year Dollars Obligated	Total Then-Year Dollars Expended	ESCL Rate (%)
		Appropriation:			OPN			
1981				23.1	36.3	36.3	36.3	1.6
1982				43.2	70.9	70.9	70.9	1.6
1983				74.6	127.1	127.1	123.3	1.7
1984				35.2	61.7	61.7	55.0	1.8
1985				44.4	80.1	80.1	75.3	1.8
1986				56.3	105.2	105.2	94.5	1.9
1987				55.2	106.8	106.8	94.6	1.9
1988				27.7	56.1	56.1	35.0	2.0
1989				17.5	37.1	37.1	24.1	2.1
1990				19.5	42.8	42.8	0.0	2.2
1991				16.0	36.4	NA	NA	2.3
1992				32.4	76.3	NA	NA	2.4
1993				23.7	57.6	NA	NA	2.4
1994				21.5	53.8	NA	NA	2.5
1995				0.0	0.0	NA	NA	0.0
Sub TTL				490.3	948.2	724.1	609.0	

FY	Qty	Flyaway FY77 Dollars Nonrec	Flyaway FY77 Dollars Rec	Total Base Year$	Total Then-Year Dollars Program	Total Then-Year Dollars Obligated	Total Then-Year Dollars Expended	ESCL Rate (%)
		Appropriation:			MILCON			
1982				0.3	0.5	0.5	0.5	1.7
1983				0.0	0.0	NA	NA	1.7
1984				0.0	0.0	NA	NA	1.8
1985				0.0	0.0	NA	NA	1.8
1986				0.0	0.0	NA	NA	1.9
1987				1.9	3.7	NA	NA	1.9
1988				0.0	0.0	NA	NA	2.0
1989				4.1	8.5	NA	NA	2.1
1990				2.1	4.6	NA	NA	2.2
1991				5.0	11.2	NA	NA	2.3
1992				6.6	15.4	NA	NA	2.3
1993				6.3	15.4	NA	NA	2.4
1994				1.1	2.6	NA	NA	2.5
1995				0.0	0.0	NA	NA	0.0
Sub TTL				27.4	61.9	0.5	0.5	
TOTAL	3704			4,796.5	9,761.2			

17. [redacted] Production Rate Data:

a. [redacted] Annualized Production Rates -- (NOTE: The annualized production rates shown differ from the annual funded quantities because the funded delivery period for prior Fiscal Year procurements was greater than 12 months. Starting with the FY 1984 funding delivery period we project a twelve month period to program completion.

	PRODUCTION RATES (Quantity/Year)			
Fiscal Year Buy	Development Estimate	Production Estimate	Current Estimate	Maximum Econ Rate
1980		6	6	6
1981	30	50	50	50
1982	104	61	61	120
1983	149	51	51	135
1984	156	124	124	244
1985	161	180	180	300
1986	190	249	249	249
1987	198	330	324	350
1988	94	450	475	600
1989	-	617	510	600
1990	-	614	400	600
1991	-	631	600	600
1992	-	631	600	600
1993	-	-	-	-
1994	-	-	-	-
1995	-	-	-	-

* March 1994 would be the earliest theoretical date for total program (3630) completion at maximum production rates.

[redacted]

17. [redacted] Production Rate Data cont'd:

b. [redacted] Cost Variance -- Dollars in Millions (NOTE: Subject to limitations on production rates above.)

Item	Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max)	Maximum Economic Rate
Prog Acq Cost (BY $)	6240.0	-1049.9	5190.1	1283.7	3906.4
(TY $)	13791.4	-3063.2	10728.2	1656.1	9072.1
PAUC (BY $)	1.534	-0.269	1.265	0.305	0.960
(TY $)	3.390	-0.776	2.614	0.384	2.230

c. [redacted] Schedule Variance -- (NOTE: Subject to the limitations on production rates above.)

	Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max)	Maximum Economic Rate
Start Date (Mo/Yr)	July 82	N/A	July 82	N/A	July 82
Duration (in Months)	152	0	152	35	117
End Date (Mo/Yr)	March 95	N/A	March 95	N/A	March 94

d. [redacted] Deliveries (Plan/Actual) --

	To Date
RDT&E	
Land Attack	47/37
Anti-Ship	27/37
Total	74/74
PROCUREMENT	
Land Attack	521/497
Anti-Ship	420/420
Land Attack/Nuclear	351/350
Total	1292/1267

[redacted]

18. [redacted] Operating and Support Costs:

a. Assumptions and Ground Rules -- N/A

b. Costs -- N/A

c. Contractor Support Costs --

(Then-Year Dollars in Millions)

	FY1989 Prior	FY1990 Year	FY1991 Year	Balance To Complete	Total
O&M,N	102.4	53.4	64.5	------	220.3

A-27 UH-60A/L

SAR-89-123

UH-60L BLACK HAWK, December 31, 1989

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)

PROGRAM: UH-60A/UH-60L BLACK HAWK

AS OF DATE: December 31, 1989

No SECURITY Objection to PUBLIC RELEASE
21 MAR 1990
SECURITY REVIEW, ODCSINT, HQDA

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CLEARED
FOR OPEN PUBLICATION
MAR 22 1990 21
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

1. Designation and Nomenclature (Popular Name): UH-60L BLACK HAWK

2. DOD Component: Department of the Army

3. Responsible Office and Telephone Number:

BLACK HAWK Project Manager's Office
4300 Goodfellow Boulevard
St. Louis, Missouri 63120-1798

PM: COL William E. Turner
Assigned: July 7, 1986
AUTOVON: 693-1700

4. Program Elements/Procurement Line Items:

RDT&E: PE 64206A, Projects D378 (SUNK) D189 (SUNK), PE62206, D069, PE23744, D193, PE64217, DE70

Procurement: APPN 2031, SSN A05002; SSN AA0952; SSN A09400

MILCON: Project 388, 379, 314, 981, 148, 409, 194, T040400, 9212810, 92122460, 92855290

5. Related Programs: Army's EH-60A QUICK FIX, MH-60K BLACK HAWK, UH-60A/L Flight Simulator and AH-64 APACHE programs; Navy's SH-60B SEAHAWK and SH-60F programs; and Air Force's MH-60G PAVE HAWK program.

OASD(PA) DFOISR 90-T-0703

6. Mission and Description: The BLACK HAWK is a twin engine helicopter that is used in the performance of the air assault, air cavalry and aeromedical evacuation mission. This aircraft is sized as an infantry squad assault helicopter capable of carrying up to 14 troops, but normally configured for a crew of 3 and 11 troops. It performs the missions of transporting troops and equipment into combat, resupplying the troops while in combat and performing the associated functions of aeromedical evacuation, repositioning of reserves, and command and control. The UH-60L BLACK HAWK is continuing to replace the UH-1H Iroquois in air assault, air cavalry, and aeromedical evacuation units.

7. Program Highlights:

a. Significant Historical Developments: June 22, 1971 the BLACK HAWK program was approved by the DEPSECDEF for full-scale development. March 6, 1972 a contract to develop a 1500 shaft horsepower advanced technology engine was awarded to General Electric Company (GE). August 30, 1972 contracts were awarded to Boeing Vertol and Sikorsky Aircraft to develop the BLACK HAWK airframe. Prototype qualification testing commenced October 17, 1974 and was completed December 8, 1976. These tests accumulated 2990 flight test hours and 2676 ground vehicle test hours. The BLACK HAWK was approved for production as a result of DSARC III, held November 30, 1976. December 23, 1976 Sikorsky Aircraft and GE were awarded initial production contracts for airframes and engines, respectively. October 22, 1979 ASARC IIIA was held at which time permission was granted for follow-on BLACK HAWK production.

May 15, 1979 FY80 HASC report 96-166 directed the Army to perform a UH-60A HELLFIRE feasibility demonstration. The demonstration was integrated with Army requirements for the UH-60A BLACK HAWK to carry external stores such as fuel tanks to meet self deployment and extended range needs--the External Stores Support Systems (ESSS) program. May 20, 1982, the HELLFIRE feasibility demonstration was satisfactorily concluded. July 1, 1983 Development Testing II (DT II) of the ESSS was successfully completed. September 23, 1983 Operational Test II (OT II) was successfully completed at Ft. Campbell, KY. The DOD FY 84 Authorizations and Appropriation Acts directed the Army to qualify the HELLFIRE missile system on the UH- 60A and appropriated $15 million to fund the program. Congress appropriated an additional $15.8 million in the DOD FY86 Appropriation Act to complete qualification of the HELLFIRE missile system on the UH-60A. DT II for the UH-60A HELLFIRE Missile System was completed in November 1987. The HELLFIRE system is qualified on the UH-60A and a TDP has been procured for the future requirements for the procurement of the HELLFIRE system for the UH-60A.

7. Program Highlights (Cont'd):

The Multiyear III Airframe contract for FY 88-91 to procure the remaining 252 UH-60's to complete the approved procurement objective of 1107 was approved by Congress. The FY88, 89 and 90 increments of Multiyear III have been executed for 72 UH-60's in each year.

Congressional interest and subsequent funding in FY88 initiated the Army effort to develop an upgrade to the UH-60A to include a composite rotor system which was designated the Multi-Stage Improvement Program (MSIP). The MSIP was planned to conclude in 1992 with the incorporation of the selected configuration changes in the aircraft production line. The plan did not include retrofit of those changes to the fielded fleet of UH-60A's.

b. Significant Developments Since Last Report -- The continued procurement of the UH-60 was approved in Feb 89 as stated in the Army Aviation Modernization Plan for a total quantity of 2253 aircraft. The propulsion system for the UH-60 was changed from the GE T700 engine to the GE T701C engine in October 1989 as the result of a competitive procurement. With the incorporation of the 701C engine into the UH-60 the aircraft model designation was changed to the UH-60L. The significant improvement in performance of the UH-60L over the UH-60A has eliminated the Material Need (MN) deficiencies previously reported except for the mission endurance which falls slightly below the MN requirement.

The Multi-Stage Improvement Program (MSIP) for the upgrade of the UH-60 that was initiated due to congressional interest in 1988 had been completed to the point of contract award in Jan 1989 but all efforts were discontinued in Feb 1989 at DA direction. The primary reason for termination of the MSIP was insufficient resources in the outyear procurement program.

The BLACK HAWK system currently meets most essential mission requirements (see paragraph 8).

c. Changes since "As of" Date -- None.

8. Threshold Breaches:

a. There are currently no breaches to the DAE approved baseline, dated 02 Mar 1989, for the UH-60A and no breaches to the AAE approved baseline, dated 26 Feb 1990, for the UH-60L.

b. The UH-60L meets all of the critical mission performance thresholds but falls slightly short of the mission endurance time specified in the MN as 2.3 hours. The decrease in mission endurance time is primarily due to the weight increase of the Improved Durability Main Gearbox and the 701C engines coupled with a slight increase in specific fuel consumption.

9. Schedule

a. Milestones --

	Development Estimate	Approved Program	Current Estimate	
UH-60A				
First Year of Funding	Jul 67	N/A	Jul 67	
Engine Develop Contract Award	Dec 71	N/A	Mar 72	
Prototype Dev Contracts Awarded	Sep 72	N/A	Aug 72	
First Flight	Sep 74	N/A	Nov 74	
Engine Military Qual Test (150 Hrs)	Dec 75	N/A	Mar 76	
Development Test II				
Started	Feb 76	N/A	Mar 76	
Completed	Dec 77	N/A	Dec 76	
Operational Test II				
Started	Not Shown	N/A	Jun 76	
Completed	Not Shown	N/A	Sep 76	
Milestone III (DSARC)	Sep 76	N/A	Nov 76	
Type Classification (Standard)	Not Shown	N/A	Nov 76	
Prototype Evaluation Completed	Not Shown	N/A	Dec 76	
Initial Production Contract Award	N/A	Dec 76	Dec 76	
Single Year Contract Award (FY78)	N/A	Oct 77	Oct 77	
1st Production Aircraft Delivery	N/A	Oct 78	Oct 78	
Single Year Contract Award (FY79)	N/A	Oct 78	Oct 78	
Deliveries-FY77 Contract DAAJ01-77-C-0001	N/A	Oct 78	Oct 78	
Deliveries-FY78 Contract DAAJ01-77-C-0001	N/A	May 79	May 79	
Milestone III A (ASARC)	Not Shown	Oct 79	Oct 79	
Initial Oper Capability (IOC)	Jun 79	Nov 79	Nov 79	
Single Year Contract Award (FY80)	N/A	Nov 79	Nov 79	
Deliveries-FY79 Contract DAAJ01-77-C-0001	N/A	Aug 80	Aug 80	
Single Year Contract Award (FY81)	N/A	Dec 80	Dec 80	
Deliveries-FY80 Contract DAAJ01-77-C-0001	N/A	Jul 81	Jul 81	
Deliveries-FY81 Contract DAAJ01-81-C-0011	N/A	Mar 82	Mar 82	
Multi-Year Contract Award (FY 82-84)	N/A	Apr 82	Apr 82	
Deliveries-FY82-84 MYC DAAJ09-85-C-A326	N/A	Dec 82	Dec 82	
Multi-Year Contract Award (FY 85-87)	N/A	Oct 84	Oct 84	
Deliveries-FY85-87 MYC DAAJ09-85-C-A006	N/A	Mar 85	Mar 85	
MY Airframe Contract Award (FY88-91)	N/A	Jan 88	Jan 88	
Plnd Del-FY88-91 MYC Contract Start	N/A	Jan 88	Jan 88	
H-60 Series Engine Contract Award	N/A	May 88	May 88	
MY Airframe Contract Award (FY89)	N/A	Nov 88	Nov 88	
Initial Proc Obj (1107) Completed	N/A	Jun 91	Jun 91	
Appr MSIP IPR by Department of Army	N/A	Mar 89	N/A	(CH-1)
Award MSIP Development Contract	N/A	Apr 89	N/A	(CH-2)
Award CRS Dev Contract	N/A	Apr 89	N/A	(CH-2)
MSIP/CRS Preliminary Design Review	N/A	Oct 89	N/A	(CH-3)
MSIP/CRS Critical Design Review	N/A	Oct 90	N/A	(CH-4)
FDTE				
Started	Not Shown	Jul 79	Jul 79	
Completed	Not Shown	Oct 79	Oct 79	

9. Schedule (Cont'd):

	Development Estimate	Approved Program	Current Estimate
UH-60A			
Deployment Plan:			
3/227th AHB - Hanau GE	N/A	Feb 89	Apr 89 (CH-5)
E/1st ASLT - Ft. Riley	N/A	Apr 89	Feb 89 (CH-6)
1/245 ASLT - OKNG	N/A	Apr 89	Jul 89 (CH-7)
140th ASLT - CANG	N/A	May 89	May 89
1/24th AHB - Hunter	N/A	Jul 89	Jul 89 (CH-8)
2/1st AHB - Ansbach GE	N/A	Oct 89	Jul 89 (CH-8)
UH-60L			
MY Airframe Contract Award (FY88-91)	Jan 88	Jan 88	Jan 88
MY Engine Contract Award (FY89-93)	Nov 88	Nov 88	Nov 88
H-60 Series Eng (GE T701C) Del Start	Jan 89	Jan 89	Jan 89
Appr UH-60 Proc Obj (2253)	Feb 89	Feb 89	Feb 89 (CH-9)
DA IPR for Type Class of UH-60L	Sep 89	Sep 89	Sep 89
Planned Incorporation of GE T701C (UH-60L)	Oct 89	Oct 89	Oct 89
MY Airframe Contract Award (FY90)	Nov 89	Nov 89	Nov 89
MY Engine Contract Award (FY90)	Nov 89	Nov 89	Nov 89
MY Airframe Contract Award (FY91)	Nov 90	Nov 90	Nov 90
MY Engine Contract Award (FY91)	Nov 90	Nov 90	Nov 90
Deployment Plan:			
TXNG - Austin TX	Nov 89	Nov 89	Nov 89
2-229 ASLT - Ft. Rucker AL	Jan 90	Jan 90	Jan 90
1/6 AHB - Ft. Hood TX	Mar 90	Mar 90	Mar 90
4/6 AHB - Ft. Hood TX	Mar 90	Mar 90	Mar 90
3rd ACR - Ft. Bliss TX	Apr 90	Apr 90	Apr 90
3/6 AHB - Ft. Hood TX	May 90	May 90	May 90
1/3 AHB - Ft. Hood TX	May 90	May 90	May 90
C/25th ASLT - Ft. Drum NJ	Jun 90	Jun 90	Jun 90
E/3 ASLT - Ft. Hood TX	Jun 90	Jun 90	Jun 90
1/4 AHB - Ft. Carson CO	Jul 90	Jul 90	Jul 90
1/5 AHB - Ft. Polk LA	Sep 90	Sep 90	Sep 90

b. Previous Change Explanations --

Changes in the current estimate of milestone accomplishments have been caused by (a) conformance with the new Army Acquisition Guidelines; (b) reduction in prototype aircraft from 6 to 3; (c) time required to repair the prototype which was damaged in November 1975; (d) scheduling problems and additional time required by other Government agencies for testing; (e) decision by DSARC III on initial production go ahead in December 1976; (f) the January 22, 1979 temporary grounding of the BLACK HAWK fleet because of the observance of a failure mode in a primary servo; (g) the June 11, 1979 official beginning of FDTE at Ft. Campbell, KY; and (h) the October 15, 1979 completion of FDTE at Ft. Campbell, KY.

9. Schedule (Cont'd):

c. Current Change Explanation -

(CH-1) Current Estimate changed from Mar 89 to N/A - MSIP terminated.
(CH-2) Current Estimate changed from Apr 89 to N/A - MSIP terminated.
(CH-3) Current Estimate changed from Oct 89 to N/A - MSIP terminated.
(CH-4) Current Estimate changed from Oct 90 to N/A - MSIP terminated.
(CH-5) Current Estimate changed from Feb 89 to actual date Apr 89.
(CH-6) Current Estimate changed from Apr 89 to actual date Feb 89.
(CH-7) Current Estimate changed from Apr 89 to actual date Jul 89.
(CH-8) Current Estimate changed from Oct 89 to actual date Jul 89.
(CH-9) Current Estimate changed from Mar 89 to actual date Feb 89

d. References --

Development Estimate: UH-60A DCP #13, June 13, 1971 and DCP #13 Update, November 1, 1977, UH-60L AAE approved baseline, dated 26 Feb 90.

Approved Program: DAE approved baseline, dated 02 Mar 89, for the UH-60A and AAE approved baseline, dated 26 Feb 90, for UH-60L.

10. Technical/Operational Characteristics:

a. Technical --

UH-60A	Develop Est	Approved Program Goal/ Threshold	Demon-strated Perf	Current Est
Payload (Pounds)	2640	2640/2640	2640	2640
Flight Performance with Payload 1/				
(1) Vertical Climb in Feet Per Minute (FPM) 2/	500	450/425	450	425 3/
(2) Cruise Speed in Knots 4/	150	145/139	145	139
(3) Endurance in Hours 5/	2.3	2.3/2.3	2.3	2.3
System Meantime Between Failure (MTBF) in Hours	4.0	4.0/4.0	6.6	4.7
Maintenance Man-hours Per Flight Hour (MMH/FH) 6/	3.8	3.0/3.0	3.0	3.0

10. Technical/Operational Characteristics (Cont'd):

	Develop Est	Approved Program Goal/ Threshold	Demon-strated Perf	Current Est
UH-60L				
Payload (Pounds)	N/A	2640/2640	2640	2640
Flight Performance with Payload 1/				
(1) Vertical Climb in Feet Per Minute (FPM) 2/	N/A	900/785	785	785
(2) Cruise Speed in Knots 4/	N/A	152/150	150	150
(3) Endurance in Hours 5/	N/A	2.3/2.1	2.1	2.1
System Meantime Between Failure (MTBF) in Hours	N/A	4.7/4.0	4.0	4.0
Maintenance Man-hours Per Flight Hour (MMH/FH) 6/	N/A	3.0/3.8	3.8	3.8
b. Operational --				
UH-60A				
Payload (Troop) 1/	11	11/11	11	11
Air Transportability				
(1) C-130 (Quantity) 7/	1	N/A	N/A	N/A
(2) C-141 (Quantity)	2	2/2	2	2
(3) C-5 (Quantity)	6	6/6	6	6
Mission Reliability 8/				
(Probability of Success)	.986	.991/.987	.991	.991
(MTBF in Hours)	70.9	106/75.9	106	106
b. Operational --				
UH-60L				
Payload (Troop) 1/	N/A	11/11	11	11
Air Transportability				
(1) C-130 (Quantity) 7/	N/A	N/A	N/A	N/A
(2) C-141 (Quantity)	N/A	2/2	2	2
(3) C-5 (Quantity)	N/A	6/6	6	6
Mission Reliability 8/				
(Probability of Success)	N/A	.991/.987	.987	.987
(MTBF in Hours)	N/A	106/75.9	75.9	75.9

10. Technical/Operational Characteristics (Cont'd):

c. Previous Change Explanations --

Variances in the demonstrated performance and current estimates of the operational/technical characteristics for the UH-60A are due to: (1) bands of acceptable performance which were identified to allow for cost effective trade-offs in the BLACK HAWK MN, ED, October 1976; (2) weight growth due to design revisions and added mission capabilities have reduced the vertical rate of climb demonstrated from 664 to 425 feet per minute and have reduced the cruise speed from 145 knots to 139 knots; (3) system meantime between failure has improved from 4.3 to 4.7 based on sample data collected on Lot 9 (FY85) and newer UH-60A aircraft; (4) mission reliability has improved from .980 to .991 with the associated meantime between mission abort in hours improving from an estimated 49.5 to the demonstrated 106 hours. These values are based on a mission reliability evaluation performed on Lot 12 (FY88) UH-60A aircraft during the period Mar-Aug 1988.

d. Current Change Explanations -- None.

e. References --

Development Estimate: UH-60A DCP #13, June 13, 1971 and DCP #13 Update, November 1, 1977, UH-60L AAE approved baseline, dated 26 Feb 90.

Approved Program: DAE approved baseline, dated 02 Mar 89, for the UH-60A and AAE approved baseline, dated 26 Feb 90, for UH-60L.

Footnotes:

1/ At 4,000 ft, altitude at 95 degrees F, with a crew of 3 and mission fuel.
2/ Using 95% Intermediate Rated Power (IRP).
3/ Current estimate is based on the actual weighing of a latest configuration UH-60A BLACK HAWK production aircraft.
4/ Using Maximum Continuous Power (MCP).
5/ Using a mission profile.
6/ Inspection and servicing, total corrective MMH/FH mission reconsideration, preparation of aircraft for air transport and refilling through Aviation Intermediate Maintenance (AVIM) level.
7/ TWX, DAMO-RQD, June 8, 1978, approved deletion of this requirement from the UH-60A BLACK HAWK program.
8/ Mission reliability is currently being measured in terms of MTBF in hours. The value shown (106) is equivalent to the value for probability of success (.991).

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	$ 357.6	$ 384.0	$ 384.0
Procurement	1,584.4	3,899.6	3,899.6
Airframe		(2,445.8)	(2,445.8)
Engine		(609.0)	(609.0)
Avionics		(128.5)	(128.5)
Other Flyaway		(377.6)	(377.6)
Total Flyaway		(3,560.9)	(3,560.9)
Other Weapon System Cost		(162.9)	(162.9)
Initial Spares		(175.8)	(175.8)
Construction (MILCON)	0.0	7.1	7.1
Total FY 71 Base-Year	1,942.0	4,290.7	4,290.7
Escalation	365.3	11,881.4	11,881.4
Development (RDT&E)	(52.3)	(155.6)	(155.6)
Procurement	(313.0)	(11,709.8)	(11,709.8)
Construction (MILCON)	(0.0)	(16.0)	(16.0)
Total Then-Year $	2,307.3	16,172.1	16,172.1
b. Quantities --			
Development (RDT&E)	16	10	10
Procurement	1,107	2,257	2,257
Total	1,123	2,267	2,267

c. Foreign Military Sales --

SAUDI ARABIA

Case Identifier - SR-B-VJB
LOA Dates - 20 Oct 87
Model - UH-60A (DESERT HAWK)
Quantity - 13
Case Total Cost - $152.1M
Delivery Schedule - Jan 90 - (6)
Apr 90 - (7)

COLOMBIA

Case Identifier - CO-B-UKZ
LOA Date - 30 Jul 87
Model - UH-60A (BLACK HAWK)
Quantity - 5
Case Total Cost - $34.3M
Delivery Schedule - Jul 88 (5)

11. Program Acquisition Cost (Cont'd): (Current Estimate in Millions of Dollars)

c. Foreign Military Sales --(Cont'd)

COLOMBIA

Case Identifier - CO-B-ULY
LOA Date - Dec 89 (Est)
Model - UH-60L (BLACK HAWK)
Quantity - 5
Case Total Cost - $35.3M
Delivery Schedule - Jan 90-(5)

COLOMBIA

Case Identifier - CO-B-ULX
LOA Date - 29 Mar 89
Model - UH-60A (BLACK HAWK)
Quantity - FSRs
Case Total Cost -$.4M
Delivery Schedule - N/A

EGYPT

Case Identifier - EG-B-UJC
LOA Date - 8 Aug 89
Model - UH-60A (BLACK HAWK)
Quantity - 2
Case Total Cost - $38.2M
Delivery Schedule - Dec 90-(2)

d. Nuclear Costs -- None

e. References --

Development Estimate: UH-60A DCP #13, June 13, 1971 and DCP #13 update, November 1, 1977, UH-60L approved baseline, dated 26 Feb 90.

Approved Program:
AAE approved baseline, dated 26 Feb 90, for UH-60L.

12. Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
a. Program Acquisition --	Current Est (Dec 89 SAR)	UCR Baseline (Dec 88 SAR)	UCR Baseline (Dec 89 SAR)
(1) Cost	16,172.1	8,451.3	16,172.1
(2) Quantity	2,257	1,327	2,257
(3) Unit Cost	7.165	6.369*	7.165

* This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purpose of this calculation.

12. Program Acquisition/Current Procurement Unit Cost Summary (Cont'd):
(Current (Then-Year) Dollars in Millions)

b. Current Procurement --		(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1)	Cost	430.7	430.7	469.3
	Less CY Adv Proc	178.2	178.2	197.2
	Plus PY Adv Proc	189.9	189.9	199.7
	Net Total	442.4	442.4	471.8
(2)	Quantity	72	72	72
(3)	Unit Cost	6.144	6.144	6.553

13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	409.9	1,897.4	0.0	2,307.3
Previous Changes:				
Economic	+52.0	+1,206.5	0.0	+1,258.5
Quantity	-22.0	+ 641.4	0.0	+ 619.4
Schedule	+ 3.0	-46.0	0.0	-43.0
Engineering	+96.7	+ 296.0	+44.8	+ 437.5
Estimating	+64.7	+3,413.1	0.0	+3,477.8
Other	+18.5	+ 1.4	0.0	+ 19.9
Support	+12.4	+ 361.5	0.0	+ 373.9
Subtotal	+225.3	+5,873.9	+44.8	+6,144.0
Current Changes:				
Economic	+1.1	+133.9	+1.8	+136.8
Quantity	---	+3,604.0	0.0	+3,604.0
Schedule	---	---	---	---
Engineering	-55.2	-148.4	---	-203.6
Estimating	-42.0	+4,000.6	-23.5	+3,935.1
Other	---	---	---	---
Support	+.5	+248.0	---	+248.5
Subtotal	-95.6	+7,838.1	-21.7	+7,720.8
Total Changes	+129.7	+13,712.0	+23.1	+13,864.8
Current Estimate	539.6	+15,609.4	23.1	16,172.1

13. Cost Variance Analysis (Cont'd):

(FY 1971 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	357.6	1,584.4	0.0	1,942.0
Previous Changes:				
Quantity	-20.2	+171.6	0.0	+151.4
Schedule	+1.4	-100.5	0.0	-99.1
Engineering	+35.7	+62.3	+13.5	+111.5
Estimating	+20.3	+782.8	0.0	+803.1
Other	+12.6	+0.8	0.0	+13.4
Support	+7.7	+1.1	0.0	+8.8
Subtotal	+57.5	+918.1	+13.5	+989.1
Current Changes:				
Quantity	---	+670.7	---	+670.7
Schedule	---	---	---	0.0
Engineering	-19.0	-37.3	---	-56.3
Estimating	-12.3	+720.1	-6.4	+701.4
Other	---	---	---	---
Support	+.2	+43.6	---	+43.8
Subtotal	-31.1	+1,397.1	-6.4	+1,359.6
Total Changes	+26.4	+2,315.2	+7.1	+2,348.7
Current Estimate	384.0	3,899.6	7.1	4,290.7

b. Previous Change Explanations --

RDT&E

Economic: Due to the application of January 1989 and prior DA/OSD inflation guidance.

Quantity: Due to a reduction in the number of engines and number of flying prototypes from 12 to 6 to support the development program.

Schedule: Due to the net of decreases resulting from a Congressional reduction in FY 75 and on OSD reduction in FY 78 and increase resulting from rescheduling the program because of the 1975 Boeing-Vertol and 1978 Sikorsky Aircraft prototype accidents.

13. Cost Variance Analysis (Cont'd):

Engineering: Due to the net of a decrease resulting from deleting the vertical instrument requirement and increases resulting from developing a prototype auxiliary fuel cell system, addition of the ESSS program and provision of funds for a Multi Stage Improvement Program, and Solid State Flight Data Recorder.

Estimating: Due to the net of decreases resulting from revised cost estimates based on information from contract negotiations, providing funds to the DIVADS program, and application of OSD generic historical RDTE inflation factors; and increases for transferring APA funds to RDTE for CIP, extension of the airframe and engine maturity contracts, and addition of Congressional directed HELLFIRE qualification program, as well as continued funding of MSIP program.

Other: Due to increases to overhaul/repair the Boeing-Vertol prototype damaged in the Oct 75 accident and to sustain the development program as a consequence of the Sikorsky Aircraft prototype damaged in the 1978 accident.

Support: Due to the net of decreases resulting from favorable cost performance on the Maturity Test, reduction in the number of overhauls during the GCT, and reduction in support because of 6 vice 12 prototypes, increases for providing engine and avionics representatives for support at the airframe contractor's site and development of a Cockpit Emergency Procedures Trainer Command Instrument Systems Trainer.

Procurement

Economic: Due to application of January 1989 and prior DA/OSD inflation guidance.

Quantity: Due to procurement of 4 additional aircraft for the U.S. Customs Service in FY 87, and addition of 216 aircraft over the period of FY 91-94, due to an increase in the procurement.

Schedule: Due to net of decreases resulting from increasing the procurement quantity in FY 77-79 from 85 to 200, in FY 82-90 following cancellation of the SOTAS program, and in FY 85 from 78 to 86; and increases from stretching the program from FY 77-85 to FY 77-86, FY 77-86 to FY 77-90, and FY 77-90 to FY 77-91.

13. Cost Variance Analysis (Cont'd):

Engineering:	Due to the net deletion of funding for Special Operations Forces aircraft and addition of Multi Stage Improvement Program.
Estimating:	Due to the net of decreases resulting from revising the parametric cost estimating methodology, transfer of PEP funding from procurement to RDTE, reductions in the FY 78 avionics initial spares requirement, revision of production estimates due to multiyear contracts for the airframe and engine in FY 82-88, savings due to acceleration of aircraft in FY 82-84, revising the cost estimating methodology and estimates based on the March 1974 design-to-unit-cost review and independent parametric cost estimate, Source Selection Evaluation Board's review, addition of mission flexibility kits and aircraft survivability equipment, airframe production start-up problems, application of OSD approved BLACK HAWK system peculiar historical indices and January 1986 DA/OSD Inflation Guidance to prior year costs.
Other:	Due to the cost growth on the FY 77 airframe production contract.
Support:	Due to the net of decreases resulting from transferring stock fund spares requirements from the project manager's budget to the respective major subordinate command's budget, revised initial spares requirements because of completion of initial spares in FY 82; peculiar ground support equipment; and production delivery acceleration; and increases resulting from increased quantity and unit price of engines for initial spares, increased funding requirements for initial spares in the subsequent years to accommodate an increased number of deployment sites and the carry over of funding shortfalls from earlier years, resumption of funding liability for peculiar ground support equipment (PGSE) increased technical data requirements.
MILCON:	Addition of MILCON associated with flight simulator facilities.

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanations --

(1) RDT&E	(Dollars in Millions) Base-Year	Then-Year
Application of January 1990 DA/OSD inflation factors to outyear estimates (Economic)	0.0	+1.1
Termination of funding for the Multi Stage Improvement Program		
Initial funding for Multi Stage Improvement Program (MSIP) (Engineering)	-19.0	-55.2
Estimating changes for MSIP (Estimating)	-13.5	-42.0
Application of revised inflation factors to historical costs (Estimating)	+ 1.2	0.0
Increased development cost for the Cockpit Emergency Procedures Trainer (CEPT) (Support)	+ .2	+ .5
(2) Procurement		
Application of January 1990 DA/OSD Inflation Factors to outyear estimates (Economic)	0.0	+133.9
Extension of the procurement objective to 2257 (including 4 aircraft for the DEA)		
Production Cost Estimate (Quantity)	+670.7	+3,604.0
Estimating increases associated with the increased quantity (Estimating)	+758.2	+4,040.5
Cost of Data, Peculiar Ground Support Equipment and Trainers for increased quantity (Support)	+59.6	+301.6
Termination of the Multi-Stage Improvement Program (Engineering)	-37.3	-148.4
Application of revised inflation factors to sunk cost		
For Flyaway Items (Estimating)	-29.0	0.0
For Support Items (Support)	-3.0	0.0

13. Cost Variance Analysis (Cont'd):

	(Dollars in Millions) Base-Year	Then-Year
Reduced cost estimates for flyaway items, (Estimating)	-9.1	-39.9
Reduced support requirements, Primarily initial spares (Support)	-13.0	-53.6
(3) MILCON		
Application of January 1990 DA/OSD inflation factors (Economic)	0.0	+1.8
Reduction of estimates of construction cost for Flight Simulator Facilities (Estimating)	-6.4	-23.5

14. Program Acquisition Unit Cost (PAUC) History: (Then-Year dollars in millions) 1/

Initial SAR (Development) estimate to Current Estimate

PAUC	Changes								PAUC
(Dev Estimate	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	(Current Estimate
2.084	+ .618	+.809	-.019	+.104	+3.284	+.276	+.009	+5.081	7.165

Footnote: 1/ This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purpose of this calculation.

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E: None.

b. Procurement 1/

	Initial Target	Contract Price Ceiling	Qty
United Technologies Corp., Sikorsky Aircraft Division Stratford, CT, DAAJ09-88-C-A003, FFP Award: January 11, 1988 Definitized: January 11, 1988	983.2	N/A	252

Footnote: 1/ Initial SAR dated December 31, 1971.

15. Contract Information (Cont'd): (Then-Year Dollars in Millions)

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
1,340.7	N/A	305	1,340.7	1,340.7

NOTE: For FFP contracts, cost and schedule variance information is not required.

	Initial Target	Contract Price Ceiling	Qty
General Electric Co., Lynn MA DAAJ09-88-C-A084, FFP Award: November 30, 1988 Definitized: November 30, 1988	564.2	N/A	1,156

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
672.9	N/A	1,410	672.9	672.9

NOTE: For FFP contracts, cost and schedule variance information is not required.

c. MILCON - None

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 53.5% (23/43 yrs)

(2) Percent Program Cost Appropriated: 39.4% (6,368.2/16,172.1)

b. Appropriation Summary --

Appropriation	Prior Yrs (FY68-89)	Budget Year (FY90)	Budget Year (FY 91)	Balance to Complete (FY 92-10)	Total
RDT&E	539.6	0.0	0.0	0.0	539.6
Procurement	5,380.6	430.7	469.3	9,328.8	15,609.4
MILCON	17.3	0.0	0.0	5.8	23.1
TOTAL	5,937.5	430.7	469.3	9,334.6	16,172.1

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	FY71 Base-Year Dollars Flyaway				Then-Year Dollars			Escl Rate 1/
	Qty	Nonrec	Rec	Total Base Year $	Program	Obligation	Expended	(%)
Appropriation: RDT&E								
1968				0.6	0.5	0.5	0.5	3.6
1969				1.9	1.8	1.8	1.8	4.7
1970				1.2	1.2	1.2	1.2	5.5
1971				7.7	7.9	7.9	7.9	5.1
1972				21.1	22.7	22.7	22.7	4.6
1973				44.8	50.3	50.3	50.3	4.3
1974				83.9	102.6	102.6	102.6	8.0
1975				39.2	52.7	52.7	52.7	10.9
1976				65.3	93.6	93.6	93.6	6.6
197T				12.5	18.6	18.6	18.6	2.9
1977				50.4	76.0	76.0	76.0	2.6
1978				24.1	39.2	39.2	39.2	6.8
1979				6.3	11.4	11.4	11.4	8.4
1980				1.8	3.6	3.6	3.6	10.6
1981				3.2	7.0	7.0	7.0	10.6
1982				2.9	6.7	6.7	6.7	7.6
1983				3.8	9.1	9.1	9.1	4.9
1984				6.0	15.0	14.8	14.0	3.8
1985				0.0	0.0	0.0	0.0	3.4
1986				6.3	16.7	16.2	14.7	2.8
1987				0.8	2.3	2.2	1.2	2.7
1988				0.0	0.0	0.0	0.0	3.0
1989				0.2	0.7	0.7	0.7	4.2
Subtotal	10/A 0/L			384.0	539.6	538.8	535.5	

1/ In accordance with OSD policy, escalation rates shown are simple compound rates; actual then-year dollars are computed using composite rates.

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal	FY71 Base-Year Dollars Flyaway				Then-Year Dollars			Escl Rate 1/
	Qty	Nonrec	Rec	Total	Program	Obli-gation	Ex-pended	(%)
Appropriation Procurement								
1977	15	19.6	41.7	75.4	140.6	139.6	139.5	3.7	
1978	56	13.4	91.4	124.4	245.8	245.8	245.8	6.0	
1979	92	6.4	140.5	168.9	395.6	392.8	387.8	12.0	
1980	94	3.6	127.4	141.6	380.2	378.7	377.2	19.8	
1981	80	2.1	111.7	149.5	478.0	473.5	458.6	13.5	
1982	96	2.3	161.8	189.7	618.8	613.4	610.9	8.1	
1983	96	8.0	151.1	168.6	540.6	539.1	527.7	-0.3	
1984	84	1.3	118.9	125.4	389.6	389.5	373.4	1.7	
1985	86	0.9	130.4	141.4	436.7	436.7	420.5	-0.3	
1986	78	1.4	124.3	134.0	411.5	411.3	403.9	-1.0	
1987	82	3.6	102.2	124.2	380.8	380.8	338.0	0.2	2/
1988	72	8.4	121.9	147.0	492.3	480.8	430.0	7.6	
1989	72	6.1	111.8	134.3	470.1	437.4	170.8	4.2	
1990	72	6.0	96.0	118.7	430.7	259.6	31.0	4.0	
1991	72	11.1	105.5	124.6	469.3			4.2	
1992	60	6.6	100.2	110.6	431.5			4.0	
1993	60	2.7	94.3	115.4	465.0			3.7	
1994	60	2.6	94.7	117.0	486.2			3.4	
1995	60	3.2	86.7	102.7	440.0			3.1	
1996	60	3.1	91.1	103.9	458.9			3.1	
1997	60	3.2	93.6	103.8	472.5			3.1	
1998	60	3.2	96.6	102.1	479.5			3.1	
1999	60	3.2	94.5	100.0	484.0			3.1	
2000	60	3.2	89.1	94.9	473.4			3.1	
2001	60	3.1	92.6	98.0	504.0			3.1	
2002	60	3.3	94.9	100.5	533.3			3.1	
2003	60	3.2	97.0	102.8	562.2			3.1	
2004	60	3.2	93.5	99.0	558.2			3.1	
2005	60	3.2	88.2	93.7	545.0			3.1	
2006	60	3.1	91.9	97.6	584.5			3.1	
2007	60	3.3	94.0	99.6	615.6			3.1	
2008	60	3.2	90.9	96.4	613.9			3.1	
2009	60	3.2	66.0	71.7	470.9			3.1	
2010	30	1.6	18.9	22.2	150.2			3.1	
Subtotal	2257	155.6	3405.3	3899.6	15609.4	5579.0	4915.1		

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- (Cont'd)

Fiscal	FY71 Base-Year Dollars Flyaway				Then-Year Dollars			Escl Rate 1/
	Qty	Nonrec	Rec	Total	Program	Obligation	Expended	(%)
Appropriation: MILCON								
1987				3.1	9.4	9.4	9.4	2.7
1988				2.5	7.9	7.9	7.9	3.0
1989				0.0	0.0	0.0	0.0	4.2
1990				0.0	0.0	0.0	0.0	4.0
1991				0.0	0.0			4.2
1992				0.0	0.0			4.0
1993				1.5	5.8			3.7
Subtotal				7.1	23.1	17.3	17.3	
Total	2,267			4,296.5	16,172.1			

1/ In accordance with OSD policy, escalation rates shown are simple compound rates; actual then-year dollars are computed using composite rates. Indices for FY88 and prior are historical, system unique factors.

2/ FY87 includes 4 aircraft procured for the Drug Enforcement Agency.

17. Production Rate Data:

a. Annual Production Rates -- The annual production rates shown differ from the annual funded quantities because the funded delivery period does not equal 12 months as shown below

FY	Funded Delivery Period
77	11.5
78	10.9
79	10.9
80	8.5
81	7.9
82	9.5
83	8.4
84	8.9
85	9.4
86	11.7
87	11.7
88	11.4

Production Rates (Quantity/Year)

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1977	15	15	16	16
1978	45	56	62	62
1979	66	129	102	102
1980	165	168	133	133
1981	165	168	122	144
1982	165	168	121	144
1983	165	168	137	144
1984	165	180	113	144
1985	165	180	110	144
1986			79	144
1987			88	144
1988			76	144
1989			74	144
1990			72	144
1991			72	144
1992			60	144
1993			60	144
1994			60	144
1995			60	144
1996			60	144
1997			60	144
1998-10			60	

17. Production Rate Date: (Cont'd)

b. Cost Variances -- Dollars in Millions

Item	Production Estimate	Variance (CE Less Pde)	Current Estimate	Variance (CE Less Max)	Maximum Economic
Prog Acq Cost (BY$)	1,755.6	+ 2,535.1	4,290.7	+198.6	4,092.1
(TY$)	3,402.4	+12,769.7	16,172.1	+2,699.9	13,472.2
(BY$)	1.586	+ .315	1.901	+ .088	1.813
(TY$)	3.074	+ 4.091	7.165	+ 1.196	5.969

c. Schedule Variance --

Item	Production Estimate	Variance (CE Less Pde)	Current Estimate	Variance (CE Less Max)	Maximum Economic
Start Date (MO/Yr)	Oct 78	0	Oct 78	0	Oct 78
Duration (in months)	92	+288	380	+156	224
End Date (Mo/Yr)	Jun 86	+288	Jun 10	+156	Jun 97

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	10/10
Procurement	1003/1003

e. Approved Design to Cost Goal --

	(Average Unit Flyaway Cost) 1/		
	Dev Estimate/ Appr Program	Current Estimate	Latest Approved Threshold
Constant FY 72 $	.951/ .951	1.569	
Then-Year $	1.089/1.089	6.186	---

Quantity: 1107
Peak Airframe Rate: 17 per month
Peak Engine Rate: 60-80 per month within 45 months, for a total of 4,700

Footnote:

1/ System Project Management, System Test and Evaluation, and Warranty are excluded.

18. Operating and Support Costs:

a. Assumptions and Ground Rules -- UH-60 A/L BLACK HAWK cost estimates are based on a flying hour rate of 18.2 hours per aircraft per month with aircraft deployed in three representative units (Combat Aviation Company, Air Cavalry Troop (Air Cavalry Squadron), and Medical Evacuation Company). Personnel cost includes the Pay and Allowances and Permanent Change of Station (MPA appropriation) for crew, maintenance, and support personnel attributable to the BLACK HAWK in the aforementioned units. Consumption includes the cost of replenishment spares and repair parts, war reserve spares and repair parts, and Petroleum, Oil, and Lubricants (POL). Depot maintenance includes the cost of labor, material, and transportation associated with end item and component repair programs. Material modification reflects the estimated hardware cost of modifications applied after aircraft fielding. Other direct costs include the cost of civilian maintenance on the flight simulator as well as the cost of applying material modifications with OLR teams. Other indirect costs include the cost of replacement training for military personnel, as well as the cost of quarters, maintenance, and utilities. Assumptions and ground rules for the UH-1 are the same as for the UH-60, except that the flying hour rate is 20 hours per aircraft per month and flight simulator maintenance and application of modifications are assumed to be completed by military personnel.

b. Costs -- (FY 1971 CONSTANT (BASE-YEAR) DOLLARS)

COST ELEMENT	COST PER FLYING HOUR UH-60 BLACK HAWK	COST PER FLYING HOUR UH-1 IROQUOIS (ANTECEDENT)
Personnel	460.0	355.6
Consumption	205.2	130.2
Depot Maintenance	132.5	135.4
Modifications - Material	58.1	19.4
Other Direct Cost	71.4	0.0
Other Indirect Cost	118.3	153.9
TOTAL	1,045.5	794.5

c. Contractor Support Costs --

(Then-Year Dollars in Millions)

	FY1989 & Prior	FY1990 Year	FY1991 Year	Balance to Complete	Total
O&M	51.7	38.0	32.4	---	122.1
Industrial Fund	---	---	---	---	---
Total	51.7	38.0	32.4	---	122.1

A-17 M1 TANK ~~SECRET~~

SAR-89-120

SELECTED ACQUISITION REPORT (RCS:DD-Comp(Q&A)823)

PROGRAM: TANK, COMBAT, FT. M1/M1A1/M1A2

AS OF DATE: December 31, 1989

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AS AMENDED
CLEARED
FOR OPEN PUBLICATION
MAR 22 1990 21
DIRECTORATE FOR FREEDOM OF INFORMATION
AND SECURITY REVIEW (OASD--PA)
DEPARTMENT OF DEFENSE

1. ( ) Designation and Nomenclature (Popular Name):
M1/M1A1/M1A2 (Abrams)/Tank, Combat, Full Tracked (General Abrams Tank)

2. ( ) DOD COMPONENT: Department of the Army

3. ( ) Responsible Office and Telephone Number:

PM, Abrams Tank System
AMCPM-ABMS
US Army Tank-Automotive Command
Warren, MI 48397-5000

PM: COL John E. Longhouser
ASSIGNED: June 30, 1987
AV: 786-6885
COMM: (313) 574-6885

4. ( ) Program Elements/Procurement Line Items:

RDT&E: PE 64620A Project DG20 (Sunk)
PE 64630A Project D287 (Sunk)
PE 23735A Project D330 (Shared Funding)

PROCUREMENT: Appn 2033 GB 1300
Appn 2033 G8 2917
Appn 2033 GA 0167 (Initial Spares)

MILCON: PE (FY80 NA) Project 704 (Sunk)
PE 85796A Project 295 (Sunk)
PE 84731A Project 333 (Sunk)
PE 72007A Project 096 (Sunk)

Concur in Classification as marked
21 MAR 1990
SECURITY REVIEW OUSD(I)/HQDA

5. ( ) Related Programs:
Tank Main Armament Systems (TMAS); Combat Vehicle Improvement Program.

OASD(PA) DFOISR 90-T-0763/1

~~SECRET~~

~~SEPARATED FROM CLASSIFIED ENCLOSURE~~

6. (U) Mission and Description: The mission of the Abrams tank is to close with and destroy enemy forces on the integrated battlefield using firepower, maneuver, and shock effect. The M1A1 Abrams is currently in production. The 120mm main gun, the powerful 1500 HP turbine engine, the specialized armor, and the levels of NBC protection make the M1A1 Abrams particularly suitable for attacking or defending against large concentrations of heavy armor forces on a highly lethal battlefield. The M1A2 development program will provide an Abrams tank with the necessary improvements in lethality, survivability, and fightability required to defeat the threat of the middle nineteen nineties. Noteworthy improvements being developed for the M1A2 include Survivability Enhancement suites 1 and 2 (SE 1 & 2), Improved Commanders Weapon Station (ICWS), the Commander's Independent Thermal Viewer (CITV), Carbon Dioxide Laser Range Finder (CO2LRF), Position Navigation (POS/NAV) equipment, and distributed data and power architecture. The Abrams tank replaces the M60 tank in selected active Army units and reserve components.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- The M1 Abrams Tank program was formally approved with the release of DCP #117 on January 8, 1973. A Full Scale Engineering Development/Producibility Engineering and Planning (FSED/PEP) contract, for the first generation tank, was awarded on November 12, 1976. The SECDEF authorized production beyond 30 tanks per month on November 19, 1981. The Army Systems Acquisition Review Council (ASARC) met on August 28, 1984 to approve production of the improved M1A1 tank and the Defense Systems Acquisition Review Council (DSARC) followed suit on December 12, 1984. The last of 3,268 105mm M1 Abrams Tanks was accepted by the government on May 30, 1986 and the first M1A1's were fielded in December 1986. Forward fieldings to Europe began in January 1987 and Initial Production Testing of the new tank ended in September 1987. On December 2, 1988, the Defense Acquisition Board (DAB) gave its conditional approval for the Block II improvement program and the M1A2 Full Scale Development (FSD) contract was awarded on December 14, 1988. As of December 31, 1988, total production of the 120mm M1A1 Abrams stood at 2,266 units.

b. (U) Significant Developments Since Last Report -- Seven hundred twenty 120mm M1A1 Abrams Tanks were produced in 1989, bringing total M1A1 production up to 2,986 units, while fieldings continued on schedule. On January 25, 1989, the DEPSECDEF issued an Acquisition Decision Memorandum (ADM) which allowed the Army to proceed with the M1A2 modernization program pending the publication of a complete Cost and Operational Effectiveness Analysis (COEA). The DAB met again on August 31, 1989 to hear the results and the ensuing ADM, signed on October 18th, established a FY91-97 procurement objective of 2,926 3rd generation Abrams Tanks and directed the Army to provide further analytic data justifying serial production of the CO2 LRF, the POS/NAV unit, and Survivability Enhancement Packages 1 and 2. However, subsequent budget decisions eliminated all Abrams tank procurement funding after FY91 and established a FY91 procurement objective of 62 M1A2's to demonstrate readiness for continued production at level rates.

The Abrams series tanks are expected to satisfy the mission requirement.

7. (U) Program Highlights: (Cont'd)

c. (U) Changes Since "As Of" Date. None.

8. (U) Threshold Breaches:

There is an M1A2 cost breach of the DAE Baseline dated October 18, 1989.

9. (U) Schedule:

a. (1) (U) Milestones - - M1	Development Estimate	Approved Program	Current Estimate
Milestone I (DSARC)	Nov 72	NA	Nov 72
Validation Contracts Awarded	Jun 73	NA	Jun 73
Development/Operational Test I			
Started	Feb 76	NA	Feb 76
Completed	May 76	NA	May 76
Milestone II (DSARC)	Jul 76	NA	Nov 76
Full Scale Development Contract Awarded	Jul 76	NA	Nov 76
Development/Operational Test II			
Started	Mar 78	NA	Feb 78
Started	May 78	NA	May 78
Completed	Jul 79	NA	Sep 79
Completed	Dec 78	NA	Feb 79
Milestone III (DSARC)	Feb 79	NA	Apr 79
Low Rate Initial Production Contract Awarded	May 79	NA	May 79
Development/Operational Test III			
Started	May 80	NA	Mar 80
Started	May 80	NA	Sep 80
Completed	Nov 80	NA	Nov 81
Initial Operational Capability (Tank Company)	CY 80	NA	Jan 81
Milestone IIIa(DSARC) (Full Production Decision)	Feb 81	NA	Sep 81
Full Production Contract Awarded	Feb 81	NA	Oct 81
European Operational Capability	NA	NA	CY 82

9. ~~(U)~~ Schedule: (Cont'd)

a. (2) ~~(U)~~ Milestones - - M1A1	Development Estimate	Approved Program	Current Estimate
M1A1 Management Review III (ASARC/DSARC)	NA	Dec 84	Dec 84
FY85 Tank Production Contract Award	NA	Apr 85	Apr 85
FY85 First Production Delivery	NA	Feb 86	Feb 86
Start Initial Production Test	NA	Jun 86	Jun 86
Materiel Release (CONUS-Conditional)	NA	Jul 86	Jul 86
First Unit Equipped (CONUS)	NA	Dec 86	Dec 86
Materiel Release (Europe-Conditional)	NA	Jan 87	Jan 87
First Unit Equipped (Europe)	NA	Jan 87	Jan 87
Start Follow-on Evaluation	NA	Jan 87	Jan 87
Award MY Tank Contract (FY86-FY90)	NA	May 87	May 87
Call-up FY86 and FY87 Tanks	NA	May 87	May 87
First MY Production Delivery	NA	May 87	May 87
End Follow-on Evaluation	NA	Jul 87	Jul 87
Start Live Fire [Survivability] Test	NA	Aug 87	Aug 87
End Initial Production Test	NA	Sep 87	Sep 87
Call-Up FY88	NA	Dec 87	Dec 87
End Live Fire [Survivability] Test	NA	Aug 88	Aug 88
Call-Up FY89	NA	Dec 88	Dec 88
Materiel Release	NA	Feb 89	Feb 89
FY90 Tank Production Contract Award	NA	Dec 89	Dec 89
FY91 Tank Production Contract Award (Omits USMC Requirements)	NA	Dec 90	Dec 90
FY90 First Production Delivery	NA	Apr 91	Apr 91

b. ~~(U)~~ Previous change explanations - - M1A1 development milestones were first introduced in the December 31, 1987 SAR.

c. (U) Current change explanations - - None.

d. (U) References - -

Development Estimate: DCP #117A, May 24, 1978.

Approved Program: DAE Abrams Program Baseline, October 1989.

9. ~~(U)~~ Schedule: (Cont'd)

a. (3) ~~(U)~~ Milestones - - M1A2

	Development Estimate	Approved Program	Current Estimate
Block II ASARC Approval	NA	Feb 85	Feb 85
Awd Block II Preliminary System Dev Contract	NA	Jul 85	Jul 85
Awd ICWS/SE #3 Preliminary Eng Dev Contract	NA	Sep 86	Sep 86
Awd CO2LRF Preliminary Eng Dev Contract	NA	Sep 86	Sep 86
Awd Block II Advanced System Dev Contract	NA	Dec 87	Dec 87
M1A2 Milestone II Decision Review	NA	Dec 88	Dec 88
Awd Block II FSD Contract	Dec 88	Dec 88	Dec 88
DAB Program Review	NA	Aug 89	Aug 89
First Prototype Delivery (FSED)	NA	Jun 90	Dec 90
Start Technical Testing	NA	Jul 90	Jan 91
Start User Testing	NA	Jan 91	Jul 91
End User Testing	Apr 91	Jun 91	Dec 91(Ch-1)
Milestone III Production Decision	Aug 91	Aug 91	Jan 92(Ch-2)
Modify FY91 M1A1 Production Contract to Add Block II Changes.	NA	Sep 91	Jan 92
End Technical Testing	Dec 91	Apr 92	Jun 92(Ch-3)
First M1A2 Delivery	Aug 92	Aug 92	Nov 92(Ch-4)
Start Initial Production Testing	NA	Jun 93	Jun 93 1/
Initial Operational Capability (Training Base)	NA	Jun 93	NA 2/
First Unit Equipped (Europe)	Mar 93	Sep 93	NA(Ch-5) 2/
End Initial Production Testing	NA	Mar 94	NA

b. ~~(U)~~ Previous change explanations - - M1A2 development milestones were first introduced in the December 31, 1988 SAR and are now added to the separate M1A2 section.

c. ~~(U)~~ Current change explanations - -

(Ch-1) - Changed from Apr 91 to Dec 91.
(Ch-2) - Changed from Aug 91 to Jan 92. Milestone IIIA is more appropriate than milestone III because of limited M1A2 procurement objective (62).
(Ch-3) - Changed from Dec 91 to Jun 92.
(Ch-4) - Changed from Aug 92 to Nov 92.
(Ch-5) - Changed from Mar 93 to NA. See footnote 2/.

d. ~~(U)~~ References - -

Development Estimate: M1A2 DCP, April 26, 1989.

Approved Program: DAE Abrams Program Baseline, October 1989.

1/ Follow-on Test and Evaluation is more appropriate than IPT because of limited M1A2 procurement objective (62).
2/ Fielding is not contemplated because of limited M1A2 procurement objective (62).

10. (U) Technical/Operational Characteristics: M1

		Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
a. (U)	Technical - -				
(U)	Weight, Combat Loaded (tons)	58.0	NA/NA	61.5	61.5
(U)	Width (inches)	120-144	NA/NA	144.125	144.125
(U)	Height (inches)(Top of Turret Roof)	90-95	NA/NA	93.5	93.5
(U)	Armament				
(U)	Main Armament (Cannon)(mm)	105-120	NA/NA	105	105
(U)	Coaxial MG(mm)	7.62	NA/NA	7.62	7.62
(U)	Commander's MG(cal)	0.50	NA/NA	0.50	0.50
(U)	Loader's MG(mm)	7.62	NA/NA	7.62	7.62
(U)	Engine Horsepower (hp)	1500	NA/NA	1500	1500
b. (U)	Operational - -				
(U)	Acceleration (seconds) Hard Surface 0% Slope 0-20 MPH (Tactical Idle)	6.0	NA/NA	5.8	7.0
(U)	Speed: Level Terrain X-Country (mph) Sustained	30.0	NA/NA	31.6	30.0
(U)	Cruising Range (miles)	275-325	NA/NA	310	310
(U)	Hit Probability, KE RD, 1500M DT III Test Conditions(%)	(b)(1)			
(S)	Stationary Tank/ Stationary Target				
(U)	Stationary Tank/Moving Target (11 MPH)				
(U)	Moving Tank/Stationary Target (11 MPH)				
(U)	Moving Tank/Moving Target (11 MPH)				
(U)	Combat Mission Reliability (MMBF)	360	NA/NA	372	385
(U)	System Maintainability (Maint. Ratio)	1.00	NA/NA	1.22	1.18
(U)	Power Train Durability (Probability of 4,000 Miles)	0.67	NA/NA	0.66	0.66

c. (U) Previous Change Explanations - -

Engineering changes and allowances for each item in the combat load increased the basic M1 weight from 60.28 to 61.5 tons. Height was measured at 93.5 inches during M1 DT/OT. Added weight increased acceleration time from 6.0 to 7.0 seconds. The current estimates for speed and hit probabilities were demonstrated during DT III. The cruising range was verified by Comparison Production Tests. Maturation of tank production processes improved both combat mission reliability and system maintainability. System availability -- not a DCP requirement -- was deleted.

10. ~~(U)~~ Technical/Operational Characteristics: M1 (Cont'd)

d. (U) Current Change Explanations - - None

e. (U) References - -

Development Estimate: DCP #117A, May 24, 1978.

Approved Program: SDDM Decision, May 8, 1979 and March 12, 1980.

~~(U)~~ Technical/Operational Characteristics: M1A1

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
a. ~~(U)~~ Technical - -				
(U) Max. Width (inches)	NA	144.0/144.0	143.7	144.0
(U) Max. Height (inches) 1/	NA	96.0/96.0	96.0	96.0
(U) Max. Combat Weight (tons)	63.0	67.5/69.5	67.7	67.7(Ch-1)
b. ~~(U)~~ Operational - -				
(U) Min. Range (miles) Paved Roads (0% Slope)				
w/NBC	257-279	257/243	293	278
wo/NBC	270-289	270/256	310	294
(U) Max Speed (mph)				
Paved Roads (0% Slope)	41.5	41.5/41.5	41.5	41.5
Cross Country	30.0	30.0/30.0	30.0	30.0
(U) Acc. 0-20 mph (seconds) Paved Roads (0% Slope)				
w/NBC	7.5	7.5/9.0	7.1	7.5
wo/NBC	7.2	7.2/9.0	6.8	7.2
(U) Combat Mission Reliability (MMBF)	298	360/320	403	360
(U) System Maintainability (Maint. Ratio)	1.40	1.04/1.25	1.04	1.25
(U) Track Life (miles)	670	2000/1000	2600	2600(Ch-2)
(U) Air Transportability	C5A	C5A,C17/C5A,C17	C5A	C5A,C17(Ch-3)

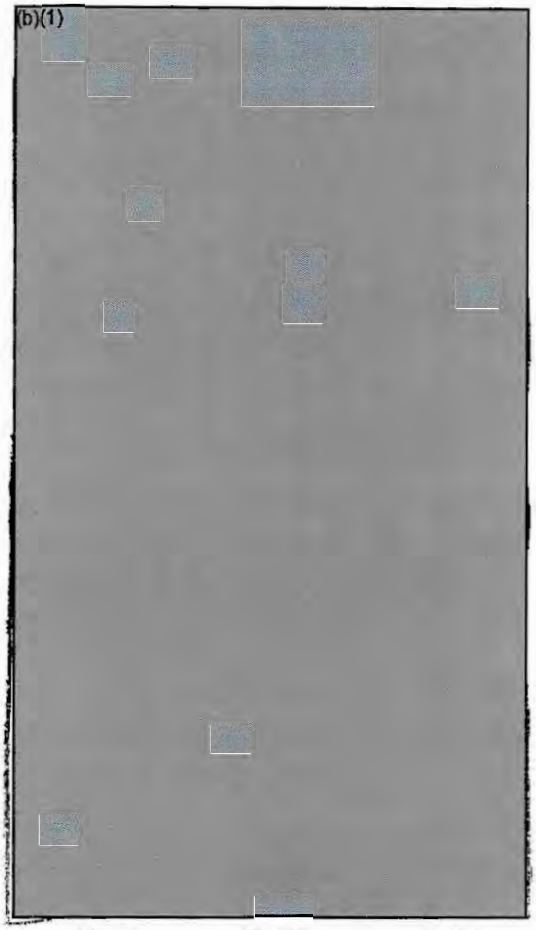
Tank, Combat, FT. M1/M1A1/M1A2, December 31, 1989

10. (U) Technical/Operational Characteristics: M1A1 (Cont'd)

b. (U) Operational - - (Cont'd)

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
(U) Avg. 1st Round Hit Probabilities (%) 2/				
Round /Condition / (Ranges)				
(S) Heat /S-S/(1500-3000M)	NA			
(S) Heat /S-M/(1500-2500M)	NA			
(S) Heat /M-S/(1500-2500M)	NA			
(S) Heat /M-M/(1500-2500M)	NA			
(S) Kinetic Energy/S-S/(1500-3000M)	NA			
(S) Kinetic Energy/S-M/(1500-2500M)	NA			
(S) Kinetic Energy/M-S/(1500-2500M)	NA			
(S) Kinetic Energy/M-M/(1500-2500M)	NA			
(U) Armor Protection (degrees)				
Heat:				
(S) 150mm ATGM (Turret/Hull Front)	NA			
(S) 127mm ATGM 3/ 4/	NA			
(S) 81mm HHIW 3/ 5/	NA			
(S) 81mm HHIW (Turret Bustle Compartment)	NA			
Kinetic Energy:				
(S) 125mm APFSDS at 800-1200M (Turret Front)	NA			
(S) 115mm APFSDS at 800-1200M (Hull Front)	NA			
(S) 115mm APFSDS at 800-1200M 3/ 4/	NA			
(U) Power Train Durability (Probability of Achieving 4000 Miles)	0.50	NA/NA	0.63	0.50
(U) Vehicle Life (Miles Prior to Hull & Turret Structure Being Reparable at Depot)	6000	NA/NA	6000	6000
(U) Weapon Tube Life (rounds)	500	NA/NA	500	500
(U) Sprocket Life (miles)	1500	NA/NA	2078	1900
(U) Road/Idler Wheel Durability (% Replacement in 3000 Miles)	19.0	NA/NA	3.2	5.0

(b)(1)



10. ~~(U)~~ Technical/Operational Characteristics: M1A1 (Cont'd)

c. ~~(U)~~ Previous Change Explanations - -

M1A1 technical/operational characteristics were first introduced in the December 31, 1986 SAR. Engineering changes, including the new T-158 track, and allowances for each item in the combat load increased the weight of the basic M1A1 from 63.0 to 66.83 tons. The ranges demonstrated during IPT with a 63.4 ton vehicle were adjusted downward to reflect the impact of a 66.83 ton vehicle. The new estimates were 278 miles (with NBC) and 294 miles (without NBC). Survivability enhancements were expected to further increase the weight up to 67.5 tons by 1992. Estimates of performance degradation at this higher weight were made and four areas were affected: combat mission reliability went from 403 down to 360 MMBF; system maintainability (in terms of maintenance ratio) went from 1.04 up to 1.25 maintenance hours per operational hour; sprocket life deteriorated from 2,078 miles down to 1,900 miles; and road/idler wheel durability went from 3.2 up to 5.0 per-cent replacement after 3,000 miles. Based on a second power train durability test, the probability of achieving 4,000 miles without a major incident was estimated to be 50 percent -- the same as the requirement established for a much lighter vehicle.

d. ~~(U)~~ Current Change Explanations - -

(Ch-1) - Changed from 66.83 tons to 67.7 tons based on measured weight of October 1989 production tank.

(Ch-2) - Changed from 2000 miles to 2600 miles based on T-158 track certification test results.

(Ch-3) - C17 aircraft added in October 1989 DAE Approved Abrams Program Baseline.

(Ch-4) - 1st Round Hit Probabilities changed [based on preliminary IPT results from TECOM] as follows:



e. ~~(U)~~ References - -

Development Estimate: DCP #117A, May 24, 1978.

Approved Program: DAE Abrams Program Baseline, October 1989.

f. ~~(U)~~ Footnotes - - M1A1

1/ Measured from Ground to Center of Turret Roof.
2/ Condition, Tank-Target (Stationary or Moving).
3/ Hull Side and Turret Side Crew Areas.
4/ Bustle and Hull Ammunition Compartments.
5/ Hull Ammunition Compartment.

~~(U)~~ Technical/Operational Characteristics: M1A2

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
a. ~~(U)~~ Technical - -				
(U) Max. Width (inches)	NA	144.0/144.0	NA	144.0
(U) Max. Height (inches) 1/	NA	96.0/96.0	NA	96.0
(U) Max. Combat Weight (tons)	NA	68.5/69.5	NA	69.0
b. (U) Operational - -				
(U) Min. Range (miles) Paved Roads (0% Slope)				
w/NBC	NA	257/243	NA	243
wo/NBC	NA	270/256	NA	256
(U) Max Speed (mph)				
Paved Roads(0% Slope)	NA	41.5/41.5	NA	41.5
Cross Country	NA	30.0/30.0	NA	30.0
(U) Acc. 0-20 mph (seconds) Paved Roads (0% Slope)				
w/NBC	NA	7.5/9.0	NA	7.5
wo/NBC	NA	7.2/9.0	NA	7.2
(U) Combat Mission Reliability (MMBF)	NA	360/320	NA	320
(U) System Maintainability (Maint. Ratio)	NA	1.04/1.40	NA	1.40
(U) Track Life (miles)	NA	2000/1000	NA	2000
(U) Air Transportability	NA	C5A,C17/C5A,C17	NA	C5A,C17
(U) Fightability				
(U) Improved Commander's Weapon Station Visibility Improvement Over M1A1 (%)	NA	40/25	NA	25
(U) Location Determination (% of Distance Traveled)	NA	±2/±3	NA	±3
(U) Heading Error (After One Hour) (degrees - RMS)	NA	±1/±3	NA	3

10. (U) Technical/Operational Characteristics: M1A2 (Cont'd)

b. (U) Operational - - (Cont'd)

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
(U) Testability				
(U) Built-In Test (BIT) On-Board System Level Detection Capability (%)	NA	95/95	NA	95
(U) Built-In Test (BIT) LRU Fault Isolation Capability (%)	NA	95/90	NA	90
(U) Max. Built-In Test (BIT) False Alarm Rate (%)	NA	5/10	NA	10
(U) Avg. 1st Round Hit Probabilities (%) 2/				
Round /Condition / (Ranges)				
(U) Heat /S-S/(1500-3000M)	NA			
(U) Heat /S-M/(1500-2500M)	NA			
(U) Heat /M-S/(1500-2500M)	NA			
(U) Heat /M-M/(1500-2500M)	NA			
(U) Kinetic Energy/S-S/(1500-3000M)	NA			
(U) Kinetic Energy/S-M/(1500-2500M)	NA			
(U) Kinetic Energy/M-S/(1500-2500M)	NA			
(U) Kinetic Energy/M-M/(1500-2500M)	NA			
(U) Armor Protection (degrees)				
Heat:				
(U) 150mm ATGM (Turret/Hull Front)	NA			
(U) 127mm ATGM 3/ 4/	NA			
(U) RPG-22 HHIW 3/	NA			
(U) 81mm HHIW 3/ 5/	NA			
(U) 81mm HHIW (Turret Bustle Compartment)	NA			
(U) DPICM 6/	NA			
Kinetic Energy:				
(U) 125mm APFSDS at 800-1200M (Turret Front)	NA			
(U) 115mm APFSDS at 800-1200M (Hull Front)	NA			
(U) 115mm APFSDS at 800-1200M 3/ 4/	NA			

(b)(1)

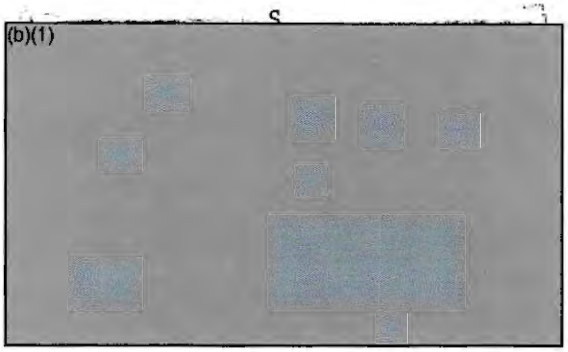
10. (U) Technical/Operational Characteristics: M1A2 (Cont'd)

b. (U) Operational - - (Cont'd)

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
(U) Targets Acquired/Unit Time (% Increase) Improvement Over M1A1	NA			
(U) Range Finder Capability (%) (Compared to Targets Recognized by the Thermal Imaging System)	NA			

S

(b)(1)



c. (U) Previous Change Explanations - - None.

d. (U) Current Change Explanations - - None.

e. (U) References - -

Development Estimate: M1A2 DCP, April 26, 1989.

Approved Program: DAE Abrams Program Baseline, October 1989.

f. (U) Footnotes - - M1A2

1/ Measured from Ground to Center of Turret Roof.
2/ Condition, Tank-Target (Stationary or Moving).
3/ Hull Side and Turret Side Crew Areas.
4/ Bustle and Hull Ammunition Compartments.
5/ Hull Ammunition Compartment.
6/ Turret Crew Area and Bustle Ammo.

11. (U) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. (U) Cost - -			
Development (RDTE)	422.6	2000.2	777.9
Primary Veh/105mm Gun	(422.6)	(1243.7)	(457.8)
Primary Veh/120mm Gun	(0.0)	(756.5)	(320.1)
Procurement	1970.2	29986.2	6093.1
Primary Veh/105mm Gun	(1900.4)	(8679.3)	(2537.6)
Primary Veh/120mm Gun	(0.0)	(19119.6)	(3144.7)
Initial Spares	(69.8)	(1735.5)	(290.1)
Training Devices	(0.0)	(451.8)	(120.7)
Construction (MILCON)	0.0	26.4	9.0
Total FY72 Base-Year $	2392.8	NA	6880.0
Adjustment FY72 BY to FY89 BY 1/	4339.7	NA	16090.1
Development (RDTE)	(705.4)	(NA)	(1349.0)
Procurement	(3634.3)	(NA)	(14724.1)
Construction (MILCON)	(0.0)	(NA)	(17.0)
Total FY89 Base-Year $	6732.5	32012.8	22970.1
Escalation	-1953.1	-967.5	-2547.0
Development (RDTE)	(-543.4)	(-645.4)	(-638.1)
Procurement	(-1409.7)	(-318.1)	(-1905.3)
Construction (MILCON)	(0.0)	(-4.0)	(-3.6)
Total Then-Year $	4779.4	31045.3	20423.1
b. (U) Quantities - -			
Development (RDTE)			
105mm Gun	13	13	13
120mm Gun	0	0	0
Procurement			
105mm Gun	3312	3268	3268
120mm Gun	0	7240	4521
Total	3325	10521	7802

c. (U) Foreign Military Sales - -

Customer	Case	Description of Items or Services	End Item Qty	Case Value (Millions)
Egypt	NER	Intensive Management Office	NA	17.0
Egypt	NEP	Manufacturing Technical Assistance	NA	187.5
Egypt	NES	Facilitization	NA	154.5
Egypt	UKJ	Field Support Hardware	NA	263.0
Egypt	NEM	Production Hardware	15 M1A1's and 540 M1A1 Kits	1611.4
Egypt	NET	120mm Cannon and Gun Mount	NA	3.0
Egypt	NEQ	Technical Data Package	NA	0.1

11. (U) Program Acquisition Cost: (Cont'd)

d. (U) Nuclear Costs - - None

e. (U) References - -

Development Estimate: DCP #117A, May 24, 1978; M1A2 DCP, April 26, 1989.

Approved Program: DAE Approved Abrams Program Baseline, October 1989.

1/ Factors used to adjust Development Estimate and Current Estimate from FY72 to FY89 Base-Year:

	Development Estimate	Current Estimate	
RDTE:	2.669	2.734	2.87
Procurement:	2.845	3.416	3.56
MILCON:	NA	2.912	2.87

(U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

		Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a.	(U) Program Acquisition	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
	(1) Cost	20423.1	26401.3	20423.1
	(2) Quantity	7789	9304 *	7789
	(3) Unit Cost	2.6	2.8	2.6
b.	(U) Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
	(1) Cost	1291.1	1291.1	762.3
	Less CY Adv Proc	245.0	245.0	0.0
	Plus PY Adv Proc	400.6	400.6	245.0
	Net Total	1446.7	1446.7	1007.3
	(2) Quantity	481	481	225
	(3) Unit Cost	3.0	3.0	4.5

* This value has been revised to exclude 13 R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation.

13. [redacted] Cost Variance Analysis:

a. Summary -- [Current (Then-Year) Dollars in Millions]

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	584.6	4194.8	--	4779.4
Previous Changes:				
Economic	-47.2	153.8		106.6
Quantity		12326.4		12326.4
Schedule		846.6		846.6
Engineering	444.9	1679.0		2123.9
Estimating	269.4	5213.0	22.4	5504.8
Other				
Support	98.5	615.1		713.6
Subtotal	765.6	20833.9	22.4	21621.9
Current Changes:				
Economic	-0.2	-1047.1		-1047.3
Quantity		-4264.8		-4264.8
Schedule		-41.9		-41.9
Engineering	103.5	-691.0		-587.5
Estimating	35.3	997.3		1032.6
Other				
Support		-1069.3		-1069.3
Subtotal	138.6	-6116.8		-5978.2
Total Changes	904.2	14717.1	22.4	15643.7
Current Estimate	1488.8	18911.9	22.4	20423.1

21401.3

-- [FY 1989 Constant Dollars in Millions]

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1128.0	5604.5	--	6732.5
Previous Changes:				
Quantity		12218.6		12218.6
Schedule		191.4		191.4
Engineering	516.9	1445.1		1962.0
Estimating	222.5	4790.8	26.0	5039.3
Other				
Support	130.4	358.5		488.9
Subtotal	869.8	19004.4	26.0	19900.2

7942.6

24632.7

13. ~~(U)~~ Cost Variance Analysis: (Cont'd)

-- [FY 1989 Constant Dollars in Millions] (Cont'd)

	RDT&E	PROC	MILCON	TOTAL
Current Changes:				
Quantity		-3449.1		-3449.1
Schedule		-88.1		-88.1
Engineering	89.7	-566.5		-476.8
Estimating	39.4	1137.4		1176.8
Other				
Support		-825.4		-825.4
Subtotal	129.1	-3791.7		-3662.6
Total Changes	998.9	15212.7	26.0	16237.6
Current Estimate (FY89 $)	2126.9	20817.2	26.0	22970.1

b. ~~(U)~~ Previous Change Explanations - -

~~(U)~~ RDTE:

Economic: Revised escalation indices.

Engineering: Added 120mm system and Block II improvements.

Estimating: Turbine engine improvements. Revised 120mm system integration effort. Additional expense for contractor and government logistic support to technical and user testing [formerly developmental and operational testing].

~~(U)~~ Procurement:

Economic: Revised escalation indices.

Quantity: Increase from 3,312 to 9,304 tanks.

Schedule: Lengthened build-up and procurement schedule.

Engineering: 120mm gun, Chemical Agent Resistant Coating (CARC), Reliability, Availability, Maintainability, Durability (RAM-D) investments, optical improvements, and Block II.

13. ~~(U)~~ Cost Variance Analysis: (Cont'd)

b. ~~(U)~~ Previous Change Explanations - - Cont'd)

~~(U)~~ Procurement: (Cont'd)

Estimating: Initial production facilities investments. Transmission and final drive savings. Revised estimates for basic vehicle, engine, fire control, other hardware items, and government engineering/product assurance. Additional special projects and test programs.

Support: Revised estimates for peculiar support equipment (special tools and test sets), initial spares, training devices, and system technical support.

~~(U)~~ MILCON:

Estimating: Changed to include MILCON in December 31, 1982 SAR.

c. ~~(U)~~ Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) ~~(U)~~ RDTE:		
Revised escalation indices. (Economic)	--	-0.2
Increased requirements for Block II configuration changes to current M1A1 production model. (Engineering)	89.7	103.5
Historical program adjustment; current and prior year inflation offset. (Estimating)	39.4	35.3
(2) ~~(U)~~ Procurement:		
Revised escalation indices. (Economic)	--	-1047.1
Decrease for deletion of 1,515 tanks. (Quantity)	-3449.1	-4264.8
Sixty-nine tanks were rescheduled from FY91-92 to FY88 and FY90 funded delivery periods. (Schedule)	-88.1	-41.9

13. (U) Cost Variance Analysis: (Cont'd)

c. (U) Current Change Explanations -- (Cont'd)

	(Dollars in Millions) Base-Year	Then-Year
(2) (U) Procurement: (Cont'd)		
Net decrease for cancellation of planned Block II configuration changes to 1,515 M1A1 model tanks. (Engineering)	-566.5	-691.0
Historical program adjustment, current and prior year inflation offset, and revised hardware price estimates. (Estimating)	1137.4	997.3
Revised requirements for training devices, spares, and other weapon system costs. (Support)	-825.4	-1069.3
(3) (U) MILCON: NA	--	--

14. (U) Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

a. (U) Initial SAR Estimate to Current Baseline Estimate - -

PAUC (Initial SAR Estimate)	Changes								PAUC (Development Estimate)
	Eco	Qty	Sch	Eng	Est	Oth	Spt	Total	
0.90	+.58	--	-.03	-.09	--	+.06	+.02	+.54	1.44

b. (U) Current Baseline Estimate to Current Estimate - -

PAUC (Development Estimate)	Changes								PAUC (Current Estimate)
	Eco	Qty	Sch	Eng	Est	Oth	Spt	Total	
1.44	-.12	+.21	+.10	+.20	+.84	--	-.05	+1.18	2.62

15. ~~(U)~~ Contract Information: (Then-Year Dollars in Millions)

a. ~~(U)~~ RDT&E - -

Abrams Block II Full Scale Development (FSD)
General Dynamics Corp., Land Systems Div.
Warren, MI 48397-5000
DAAE07-89-C-R045 (CLIN 0001)
CPIF
Award: December 14, 1988
Definitized: July 31, 1989

Initial Contract Price		
Target	Ceiling	Quantity
187.8	187.8	NA

Current Contract Price		
Target	Ceiling	Quantity
187.8	187.8	NA

Estimated Price at Completion	
Contractor	Program Manager
249.7	207.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date (11/26/89)	$-14.5	$-26.1
Net Change	$-14.5	$-26.1
Cumulative Variance Change Percent	NA	NA

Explanation of Change: Accomplishments during 1989 came slower than planned and their associated cost was higher. In December 1988, after the DAB had imposed a $300 thousand (FY89 constant dollar) production unit cost cap for the M1A2 Block Improvements, the aquisition strategy was revised to solicit Not-to-Exceed (NTE) production option prices from all subcontractors in order to obtain a low risk transition to serial production. Some awards were delayed up to four months as negotiations were more difficult than usual. The NTE ceilings were passed on to production vendors [relying on concurrent engineering efforts and hard tooling] instead of job shops featuring faster manual procedures at the outset, but costlier results in the long run. The M1A2 program milestones are being re-planned so that they will be in sync with the FY90/91 Presidents's Budget.

b. ~~(U)~~ Procurement - -

Laser Range Finder, 8th-11th Year, and Thermal Imaging System, 8th-12th Year, Production (MYP)
Hughes Aircraft Co, Electro-Optical Div.
El Segundo, CA 90245-0000
DAAA09-85-G-0029/0026
FFP
Award: May 31, 1986
Definitized: September 26, 1987

Initial Contract Price		
Target	Ceiling	Quantity
370.0	NA	3299

Current Contract Price		
Target	Ceiling	Quantity
452.0	NA	3449

Estimated Price at Completion	
Contractor	Program Manager
452.0	452.0

For FFP contracts, cost and schedule variances information is not required.

15. ~~(U)~~ Contract Information: (Then-Year Dollars in Millions) (Cont'd)

Track, T-158, FY88-FY92 Production
FMC, Steel Products Division
Anniston, AL 36202-4223
DAAE07-88-C-R021
FFP/EPA
Award: February 24, 1988
Definitized: February 24, 1988

Initial Contract Price		
Target	Ceiling	Quantity
59.7	NA	391,092

Current Contract Price		
Target	Ceiling	Quantity
66.8	NA	391,092

Estimated Price at Completion	
Contractor	Program Manager
66.8	66.8

For FFP contracts, cost and schedule variances information is not required.

Transmission 11th Year Production
Allison Transmission Div, Gen Mtrs
Indianapolis, IN 46206-0894
DAAE07-89-C-A012
FFP
Award: May 24, 1989
Definitized: May 24, 1989

Initial Contract Price		
Target	Ceiling	Quantity
79.4	NA	581

Current Contract Price		
Target	Ceiling	Quantity
79.4	NA	581

Estimated Price at Completion	
Contractor	Program Manager
79.4	79.4

For FFP contracts, cost and schedule variances information is not required.

Engine, 8th-12th Year Production
Textron Lycoming
Stratford, CT 06497-0000
DAAE07-86-C-A050
FFP
Award: June 13, 1986
Definitized: March 31, 1987

Initial Contract Price		
Target	Ceiling	Quantity
301.6	NA	840

Current Contract Price		
Target	Ceiling	Quantity
1050.6	NA	3299

Estimated Price at Completion	
Contractor	Program Manager
1050.6	1050.6

For FFP contracts, cost and schedule variances information is not required.

Tank, 8th-12th Year Production, MYP
General Dynamics Corp., Land Systems Div.
Warren, MI 48397-5000
DAAE07-85-C-A043
FFP
Award: April 1, 1985
Definitized: May 29, 1987

Initial Contract Price		
Target	Ceiling	Quantity
3569.8	NA	3000

15. [redacted] Contract Information: (Then-Year Dollars in Millions) (Cont'd)

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Quantity	Contractor	Program Manager
3691.8	NA	3000	3691.8	3691.8

For FFP contracts, cost and schedule variances information is not required.

c. [redacted] MILCON - - NA

16. [redacted] Program Funding Summary: (Current Estimate in Millions of Dollars)

a. [redacted] Program Status - -

(1) Percent Program Completed: 86.4% (19 yrs/22 yrs)

(2) Percent Program Cost Appropriated: 95.3% ($19453.7/$20423.1).

b. [redacted] Appropriation Summary - -

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY72-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-93)	Total
[redacted]T&E	1276.2	45.8	82.7	84.1	1488.8
Procurement	16818.1	1291.1	762.3	40.4	18911.9
MILCON	22.4	0.0	0.0	0.0	22.4
Total	18116.7	1336.9	845.0	124.5	20423.1

c. [redacted] Annual Summary - -

Fiscal Year	Qty	Flyaway FY89 Dollars Nonrec	Flyaway FY89 Dollars Rec	Total Base Year $	Total Then Year $ Program	Total Then Year $ Obligated	Total Then Year $ Expended	Escl Rate (%)
Appropriation: RDT&E								
1972				53.1	20.0	20.0	20.0	
1973				54.8	21.5	21.5	21.5	4.3
1974				125.9	53.8	53.8	53.8	8.0
1975				138.4	65.0	65.0	65.0	10.9
1976	2			105.4	52.8	52.8	52.8	6.6
197T				75.5	39.3	39.3	39.3	2.9

16. (U) Program Funding Summary: (Cont'd)

Fiscal Year	Qty	Flyaway FY89 Dollars		Total Base Year $	Total Then Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E (Cont'd)								
1977				187.0	98.6	98.6	98.6	2.6
1978	11			221.6	125.8	125.8	125.8	6.8
1979				146.1	92.3	92.3	92.3	8.4
1980				99.9	68.7	68.7	68.7	10.6
1981				127.2	96.4	96.4	96.4	10.6
1982				141.0	113.7	113.7	113.7	7.6
1983				81.9	69.0	69.0	69.0	4.9
1984				100.4	87.6	87.6	87.6	3.8
1985				54.5	49.0	49.0	49.0	3.4
1986				24.5	22.7	22.7	22.7	2.8
1987				25.7	24.5	24.5	22.1	2.7
1988				73.0	72.0	72.0	70.1	3.0
1989				100.8	103.5	63.0	17.0	4.2
1990				42.9	45.8	17.0	0.0	4.0
1991				74.4	82.7			4.2
1992				72.9	84.1			4.0
Sub-total	13			2126.9	1488.8	1252.7	1185.4	
Appropriation: Procurement								
1977		43.8		43.8	21.2	21.2	21.2	
1978		208.0		314.0	164.8	155.7	155.7	7.1
1979	90	240.6	283.6	663.0	402.6	380.9	375.7	9.0
1980	309	201.8	725.9	1120.3	725.2	659.4	648.0	11.8
1981	569	229.6	1290.1	1864.1	1406.1	1345.0	1325.4	11.6
1982	665	63.4	1370.2	1903.0	1551.3	1468.8	1445.7	14.3
1983	855	118.6	1547.1	2228.8	1962.2	1864.7	1851.8	9.0
1984	840	62.2	1532.8	1893.5	1718.7	1559.6	1542.2	8.0
1985	854	49.0	1713.4	2049.9	1906.8	1896.8	1850.9	3.4
1986	811	5.3	1623.9	1966.0	1889.3	1763.6	1703.4	2.8
1987	810	0.6	1645.9	1872.3	1851.9	1781.1	1587.5	2.7
1988	725		1424.9	1715.1	1774.6	1445.8	1124.3	3.0
1989	555		1143.1	1340.8	1443.4	1059.1	147.3	4.2
1990	481	77.8	1060.8	1153.2	1291.1	10.5	0.0	4.0
1991	225	68.2	703.8	656.3	762.3			4.2
1992				16.3	19.6			4.0
1993				16.8	20.8			3.7
Sub-total	7789	1368.9	16065.5	20817.2	18911.9	15412.2	13779.1	

16. (U) Program Funding Summary: (Cont'd)

Note: Obligations and expenditures for initial spares are not included in the above, since finance and accounting records containing this information are not available to the PM Abrams.

Fiscal Year	Qty	Flyaway FY89 Dollars Nonrec	Flyaway FY89 Dollars Rec	Total Base Year $	Total Then Year $ Program	Total Then Year $ Obligated	Total Then Year $ Expended	Escl Rate (%)
Appropriation: MILCON								
1980				7.5	5.8	5.8	5.8	
1981								10.6
1982								7.6
1983				10.6	9.4	9.4	9.4	4.9
1984				4.8	4.3	4.3	4.3	3.8
1985				3.1	2.9	2.9	2.9	3.4
Sub-total				26.0	22.4	22.4	22.4	
TOTAL	7802	1368.9	16065.5	22970.1	20423.1	16687.3	14986.9	

17. (U) Production Rate Data:

a. (U) Annualized Production Rates - - The annualized production rates differ from the fiscal year buy quantities because the funded delivery periods for Army requirements alone are not equal to 12 months for the following years:

FY	Dev Estimate	Current Est	Max Economic
85		12.200	
86		11.586	
87		13.500	
88	11.000	12.083	10.900
89		9.250	
90		8.365	

The annualized rates for the Current Estimate also support the National Guard's FY89 requirement for 58 tanks, the Marine Corps' FY89-90 procurements of 66 and 155 tanks, and 15 FY90 funded tanks for sale to Egypt.

17. ~~(U)~~ Production Rate Data: (Cont'd)

	Production Rates (Quantity/Year)			
Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1979	110	NA	90	90
1980	352	NA	309	309
1981	360	NA	569	569
1982	360	NA	665	665
1983	360	NA	855	855
1984	360	NA	840	1080
1985	360	NA	840	1080
1986	360	NA	840	1080
1987	360	NA	720	1080
1988	360	NA	720	1080
1989		NA	720	
1990		NA	690	
1991		NA	225	

b. ~~(U)~~ Cost Variance - - Dollars in Millions (NOTE: Subject to the limitations on production rates above.)

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost (BY $)	NA	NA	22970.1	+864.2	22105.9
(TY $)	NA	NA	20423.1	+1357.0	19066.1
PAUC (BY $)	NA	NA	2.9	+0.1	2.8
(TY $)	NA	NA	2.6	+0.2	2.4

c. ~~(U)~~ Schedule Variance - - (NOTE: Subject to the limitations on production rates above.)

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	NA	NA	02/80	0	02/80
Duration (in Months)	NA	NA	157	+37	120
End Date (Mo/Yr)	NA	NA	03/93	+37	02/90

d. ~~(U)~~ Deliveries (Planned/Actual) - -

	To Date
RDT&E	13/13
Procurement	6224/6254

17. (U) Production Rate Data: (Cont'd)

e. (U) Approved Design-to-Cost Goal - -

(Average Unit Rollaway Cost)

	Development Estimate	Current Estimate	Latest Approved Threshold
@ Qty 3312			
@ Prod Rate: 60/Month			
FY72 Base-Year $	0.6	0.6	NA
Then-Year $	1.2	1.4	NA

18. ~~(U)~~ Operating and Support Costs:

a. Assumptions and Ground Rules --

The costs in paragraph 18.b. are a re-summarization of the costs for Alternative #2 in the M1A2 Decision Coordinating Paper (DCP) dated April 26, 1989. They are based on a total Abrams procurement objective of 10,421 systems made up of 3,268 M1's, 4,227 M1A1's and 2,926 M1A2's. Vehicle life is assumed to be 20 years and annual operating mileage ranges from 306 for National Guard units up to 960 for certain vehicles in the Training Base. However, some systems which were projected for fielding to POMCUS or War Reserves are assumed to accrue zero annual miles per tank on the philosophy that their operation adds a negligible amount to the total world-wide mileage for the entire fleet. Each active vehicle has four dedicated crew members while no dedicated crew is assumed for all Training Base vehicles. Candidates for depot overhaul are chosen on the basis of Combat Vehicle Evaluation Criteria which are expected to result in a a total number of overhauls which is roughly equivalent to one per active tank per 20 year life cycle.

b. Costs -- [FY 1989 Constant (Base-Year) Dollars in Millions]

Cost Element	Life Cycle Total Cost	Average Annual Cost Per Tank
Military Personnel	21073.4	0.101
Consumption	17577.2	0.084
Depot Maintenance	4108.9	0.020
Modifications/Kits	1047.3	0.005
Other Direct Support	456.0	0.002
Indirect Support	4454.3	0.022
Total	48717.1	0.234

c. Contractor Support Costs -- [(Current (Then-Year Dollars in Millions]

Funding	FY1989 & Prior	FY1990	FY1991	Balance To Complete	Total
O&M	102.4	58.3	53.7	--	214.4
Industrial Fund				--	
Total	102.4	58.3	53.7	--	214.4

A-3 AH-64

~~CONFIDENTIAL~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: AH-64 (APACHE)

AS OF DATE: December 31, 1989

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Concur in Classification as marked
21 MAR 1990
SECURITY REVIEW, OUCSINT HQDA

1. [redacted] Designation and Nomenclature (Popular Name): AH-64A/Advanced Attack Helicopter (APACHE)

2. [redacted] DoD Component: Department of the Army

3. [redacted] Responsible Office and Telephone Number:

Advanced Attack Helicopter
Program Manager
4300 Goodfellow Boulevard
St. Louis, MO 63120-1798

Colonel Curtis J. Herrick, Jr.

Assigned: August 17, 1987
AV: 693-1911; COMM (314) 263-1911

4. [redacted] Program Elements/Procurement Line Items:

RDT&E: PE 23744 Project D423

PROCUREMENT: APPN 2031 SSN A06605/AA0951/AA0968/A09000

MILCON: Project 1304/2131/9186320

1/ Sunk RDTE Projects D425 and DB54, and MILCON projects 9186310/9248660/9221240 deleted IAW DODI 7000.3.

CLEARED AS AMENDED
FOR OPEN PUBLICATION
MAR 22 1990 21
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

5. [redacted] Related Programs: HELLFIRE, 30MM Ammunition, AH-64 Combat Mission Simulator, 2.75" Rockets.

6. [redacted] Mission and Description: The AH-64 is a twin engine rotary wing aircraft, designed as a stable, manned aerial weapon system capable of defeating a wide range of targets, including armored vehicles. It provides responsive direct aerial fires as an integral element of the ground units and is capable of performing its mission at night and under adverse weather conditions. It contributes highly mobile and effective firepower to the anti-armor capability of the Army in the field. Aircraft armament

OASD(PA) DFOISR 90-T-0703/1

~~CLASSIFIED BY: AAH SCG~~
~~PADS/PNVS SCG~~
~~DECLASSIFY ON: 31 DEC 91~~
~~Regraded Unclassified When Separated from Classified Enclosures:~~

~~CONFIDENTIAL~~

6. (U) Mission and Description (Cont'd):
includes the HELLFIRE anti-tank missile system, 30MM automatic gun and 2.75" ckets. This aircraft is the platform for the Target Acquisition Designation ght/Pilot Night Vision Sensor (TADS/PNVS) which will provide day and night acquisition and designation of targets and hand-off capabilities in support of HELLFIRE and other guided munitions. APACHE's Stage I of a LONGBOW APACHE Program has been initiated, which substantially improves current capabilities of AH-64A to withstand the projected threat from 1995 to 2005 in close, deep, and rear operations. This SAR includes RDTE portion of LONGBOW integration costs. A separate SAR has been established for the LONGBOW Program. The AH-64 does not replace another defense system.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- In September 1972, the U.S. Army approved the Advanced Attack Helicopter System. On 22 June 1973, competitive Phase 1 Development contracts were awarded to Hughes Helicopter and Bell Helicopter Textron, Inc. On 7 December 1976, the AAH DSARC approved the AAH entry into full scale engineering development (Phase 2), and the Secretary of the Army selected Hughes (Model YAH-64) as the Phase 2 prime aircraft systems contractor. The Target Acquisition Designation Sight/Pilot Night Vision Sensor (TADS/PNVS) subsystems were subsequently directed for development as a competitive program, with contracts awarded to Martin Marietta Orlando Aerospace (MMOA) and Northrop Corporation on 10 March 1977. On 30 January 1981 the Army awarded a LLTI contract to MMOA (TADS/PNVS) and on 20 February 1981 to Hughes (LLTI for production AH-64s). OT II (Jun-Aug 81) was completed on time at Ft Hunter-Liggett. ASARC III was completed on 18 ovember 1981. The Defense Systems Acquisition Review Council (DSARC III), at ich initial production of the APACHE was approved, was held on 26 March 82. Production contracts for the first production quantity of 11 aircraft and associated equipment were awarded to Hughes, MMOA and General Electric in April 1982. McDonnell Douglas Helicopter Company (MDHC) rolled out the first production vehicle (PV01) on 26 January 1984. The first production lot of Air Vehicles (11 ea) was completed on 20 October 1984. MDHC acquired Hughes Helicopters in early 1984. Initial hand-off of APACHEs to FORSCOM occurred at Ft. Hood (6th Cavalry Brigade's 7th Squadron, 17th cavalry) on 25 February 1986. First Unit Equipped (FUE) was 10 May 1986. Initial Operational Capability (IOC) was 22 July 1986. First two production Combat Mission Simulators (CMSs) were installed at Fts. Rucker and Hood. APACHE MSIP Program renamed LONGBOW APACHE May 1989.

b. (U) Significant Developments Since Last Report -- A total of 539 production APACHEs have been delivered through 31 December 1989. A decision was made to proceed to a combined LONGBOW/LONGBOW APACHE ASARC (Milestone V for the APACHE Program) in May 1990 to determine if LONGBOW APACHE is prepared to continue Phase 2 full scale development effort. On 30 August 1989 a Phase 2 LONGBOW APACHE 51 month contact was awarded to MDHC for continued development to include 4 prototype aircraft. Currently, 16 Attack Helicopter Battalions (AHBs) have been fielded and are combat ready - 8 at FORSCOM, 5 at USAREUR, and 3 with the National Guard. Four units are in training at Ft. Hood. As of 31 December 1989, fielded APACHEs had flown approximately 186,000 hours.

The AH-64 system is expected to satisfy the current mission requirement.

c. (U) Changes Since "As Of" Date -- None.

8. Threshold Breaches: There are currently no breaches to the AAE Baseline dated 26 February 1990.

[redacted] Schedule:

a. [redacted] Milestones --	Development Estimate	Approved Program	Current Estimate
Milestone I (DSARC I)	Sep 72	N/A	Sep 72
Issue Request for Proposal (RFP)	Nov 72	N/A	Nov 72
Contract Award (Phase I Eng Dev)	Jun 73	N/A	Jun 73
Mockup Review Completed	May 74	N/A	May 74
Critical Design Review Completed	May 74	N/A	May 74
First T700 Engine Delivery	Oct 74	N/A	Oct 74
Initial Ground Test Vehicle Oper	Jun 75	N/A	Jun 75
First Flight	Sep 75	N/A	Sep 75
DT/OT I Completed	Sep 76	N/A	Sep 76
Milestone II (DSARC II)	Dec 76	N/A	Dec 76
Contract Award (Phase 2 Eng Dev)	Dec 76	N/A	Dec 76
Competitive TADS Fly-Off Compl	Dec 79	N/A	Mar 80
Long Lead Time Contracts Awarded	Jun 80	Feb 81	Feb 81
OT II Completed	Feb 81	N/A	Aug 81
Milestone III (ASARC III)	N/A	Nov 81	Nov 81
Milestone III (DSARC III)	May 80	Mar 82	Mar 82
First Prod Contract Award (FY82)	Oct 80	Apr 82	Apr 82
Second Prod Contract Award (FY83)	N/A	Nov 82	Nov 82
Third Prod Contract Award (FY84)	N/A	Nov 83	Nov 83
Production Tests Verification and Validation Start (Ongoing)	N/A	Jan 84	Jan 84
First Prod Deliveries Start	Jun 82	Jan 84	Jan 84
Fourth Prod Contract Award (FY85)	N/A	Nov 84	Nov 84
Second Prod Deliveries Start	N/A	Dec 84	Dec 84
Fifth Prod Contract Award (FY86)	N/A	Nov 85	Nov 85
Third Prod Deliveries Start	N/A	Dec 85	Dec 85
FUE (Initial Deployment) (CONUS)	N/A	Apr 86	Apr 86
IOC (Initial IOC)	May 83	Jul 86	Jul 86
Prod Tests: First Article Test Complete	N/A	Oct 86	Oct 86
Sixth Prod Contract Award (FY87)	N/A	Nov 86	Nov 86
Fourth Prod Deliveries Start	N/A	Nov 86	Nov 86
Full Rate Prod (12 A/C per month)	N/A	Jan 87	Jan 87
Production Tests Verification and Validation Complete	N/A	Oct 87	Oct 87
Seventh Prod Contract Award (FY88)	N/A	Nov 87	Nov 87
Fifth Prod Deliveries Start	N/A	Jan 88	Jan 88
FUE (USAREUR)	N/A	Feb 88	Feb 88
Contract Award (Preliminary MSIP Design AH-64)	N/A	Aug 88	Aug 88
Contract Award (Preliminary MSIP Design TADS/PNVS)	N/A	Sep 88	Sep 88
Sixth Prod Deliveries Start	N/A	Dec 88	Dec 88
Eighth Prod Contract Award (FY89)	N/A	Dec 88	Dec 88
APACHE MSIP Program Review - DA	N/A	May 89	May 89
Seventh Prod Deliveries Start	N/A	Nov 89	Nov 89
Ninth Prod Contract Award (FY90)	N/A	Nov 89	Nov 89
Eighth Prod Deliveries Start	N/A	Jul 90	Jul 90

9. [redacted] Schedule (Cont'd):

	Development Estimate	Approved Program	Current Estimate
Tenth Prod Contract Award (FY90)	N/A	Nov 90	Nov 90
Ninth Prod Deliveries Start	N/A	Jul 91	Jul 91
Tenth Prod Deliveries Start	N/A	Jul 92	Jul 92
Final Prod Delivery	N/A	Sep 93	Sep 93
Last Unit Equipped (LUE)	N/A	Feb 94	Feb 94

b. (U) Previous Change Explanations —

(U) The development estimate reflected a 50-month schedule with a LLTI award in June 1980. The current estimate reflects a 56-month schedule for completion of Operational Test II with a LLTI contract in February 1981 and a production decision in March 1982. Complete single rather than split operational testing permitted deletion of OT IIa and completion of EDT 5 in January 1981 rather than June 1981. DSARC III Prod Decision, LLTI Contract Award, First Production Delivery, and Initial Operational Capability delayed due to program restructuring. First Production Delivery reflects actual delivery. Prior to Dec 85, IOC dates were FUE. Contract schedule change due to program restructuring and incorporation of Stage I of MSIP. Decreased procurement quantity eliminates Eleventh and Twelfth Prod Contract Award, changes Final Prod Delivery from May 95 to Sep 93 and revises LUE from Sep 95 to Feb 94.

c. (U) Current Change Explanation — None

d. (U) References —

(U) Development Estimate: Dep Sec Def Memo, January 5, 1977, subject: "Advanced Attack Helicopter (AAH) DSARC II."

(U) Approved Program: AAE Approved Baseline dated 26 February 1990.

10. ~~(U)~~ Technical/Operational Characteristics:

a. (U) Technical --

(C) Target Detection (km) Max
Da
Ni
(C) Target Recognition (km) M
Da
Ni
(C) Target Designation (km) M
Da
Da
Ni

(b)(1)

b. (U) Operational --

	Dev Est	Approved Program Goal/Thr	Demonstrated Devf	Current Estimate
(U) Primary Mission Gross Weight(PMGW) lbs. w/8 HF Msls, 320 Rds, 30MM	13,910	N/A	14,448	14,765
(U) Maximum Mission Gross Weight 1/	N/A	15200/15200	15,200	15,200
(U) Cruise Airspeed @ PMGW - KTAS	145-175	148/145	145	145
(U) Vertical Rate of Climb @ PMGW-FPM	450-500	1007/450	1,100	800
(U) Mission Reliability (MTBF)	19.5	20.7/19.5	20.7	19.5
(U) AVUM/AVIM Direct Maintenance MMH per FH	8-13	4.01/13	4.01	13
(C) Weapon Accuracy (PH)				
30MM				
HELLFIRE				
(U) Ordnance Load				
HELLFIRE (No.)	N/A	16/8	16	16
30MM RDS.	N/A	1200/320	1200	1200
(U) Endurance (hrs)-Primary Mission	1.83	1.83/1.83	1.83	1.83
-Alternate Mission	2.5-2.8	2.5/2.5	2.5	2.5
(U) System Reliability (MTBF)	N/A	4.0/2.8	4.0	2.8
(U) Operational Availability	N/A	.62/.62	.73	.72
(U) TADS System Reliability (MTBF)	N/A	125/63	126	126
(U) PNVS System Reliability (MTBF)	N/A	219/160	253	253

(b)(1)

1/ Maximum weight at which aircraft can achieve performance parameters. Calculated based on First Article Test data.

c. (U) Previous Change Explanations --

(U) Technical characteristics portray current estimate for production aircraft. PMGW and VROC are due to decision to incorporate T700-GE-701 engine in production vehicles. Weapon accuracy reflects demonstrated performance during Armament Fire Control Demonstrated and Survey, and Airworthiness and Flight Characteristics Test. TADS/PNVS System Reliability (MTBF) changed to reflect latest RAM/Log data.

d. (U) Current Change Explanations -- none.

e. (U) References --

~~(U)~~ Development Estimate: Dep Sec Def Memo, 5 January 1977, subject, "Advanced Attack Helicopter (AAH) DSARC II."

~~(U)~~ Approved Program: AAE Approved Baseline dated 26 February 1990.

AH-64A, December 31, 1989

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. (U) Cost —			
Development	$609.4	$818.4	$812.3
Procurement	1283.0	3158.7	3100.7
Acft Flyaway	(998.0)	(2421.5)	(2399.3)
HF Launcher (APA)	(-0-)	(18.7)	(19.0)
HF Launcher (Other)	(15.4)	(5.5)	(5.5)
Total Flyaway	(1013.4)	(2445.7)	(2423.8)
Initial Spares (Acft)	(136.0)	(295.6)	(285.5)
Initial Spares (HF)	(1.3)	(5.6)	(3.1)
Other Wpn Sys Cost	(132.3)	(411.8)	(388.3)
Construction	-0-	36.0	25.7
Total FY 72 Base Year	1892.4	4013.1	3938.7
Escalation	1897.4	7950.0	7849.9
Development (RDT&E)	(326.3)	(661.0)	(653.5)
Procurement	(1571.1)	(7222.6)	(7146.5)
Acft	((1556.1))	((7157.3))	((7086.9))
HF Launcher (APA)	((-0-))	((55.6))	((49.9))
HF Launcher (Other)	((15.0))	((9.7))	((9.7))
Construction (MILCON)	(-0-)	(66.4)	(49.9)
Total Then-Year $	$ 3789.8	$11,963.1	$11,788.6
b. (U) Quantities —			
Development (RDT&E)	9	9	9
Procurement	536	807	807
Total	545	816	816

c. (U) Foreign Military Sales — One primary FMS case with Federal Republic of Germany for three TADS/PNVS systems, IHADSS and related equipment for PAH-2 helicopter. Two additional FMS Cases for developmental work and transfer of data related to the primary FMS case. Total of all three cases is $25.0M.

d. (U) Nuclear Costs — None

e. (U) References —

Development Estimate: Dep Sec Def Memo, January 1977, subject: "Advanced Attack Helicopter (AAH) DSARC II."

Approved Program: AAE Approved Baseline dated 26 February 1990.

2. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est (Dec 89 SAR)	UCR Baseline (Dec 88 SAR)	UCR Baseline (Dec 89 SAR)
a. (U) Program Acquisition —			
(1) ([redacted]) Cost	11788.6	13845.4	11788.6
(2) ([redacted]) Quantity	807	975 1/	807
(3) ([redacted]) Unit Cost	14.61	14.20	14.61
b. [redacted] Current Procurement —	(FY 1990)	(FY 1990 Appn)	(FY 1991)
(1) (U) Cost	1535.9	1535.9	104.2
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	78.6	78.6	0.0
Net Total	1614.5	1614.5	104.2
(2) ([redacted]) Quantity	132	132	0
(3) ([redacted]) Unit Cost	12.23	12.23	N/A

1/ This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully - configured end items for the purposes of this calculation.

3. (U) Cost Variance Analysis:

a. (U) Summary — (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	935.7	2854.1	0	3789.8
Previous Changes:				
Economic	+23.4	+637.3	-10.5	+650.2
Quantity	—	+1417.8	—	+1417.8
Schedule	+200.4	+407.2	—	+607.6
Engineering	+61.9	+194.2	—	+256.1
Estimating	+225.6	+3222.3	+112.9	+3560.8
Other	—	—	—	—
Support	+32.4	+1648.4	—	+1680.8
Subtotal	+543.7	+7527.2	+102.4	+ 8173.3
Current Changes:				
Economic	-5.0	-60.6	-3.0	-68.6
Quantity	—	—	—	—
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	-8.6	+19.7	-23.8	-12.7
Other	—	—	—	—
Support	—	-93.2	—	-93.2
Subtotal	-13.6	-134.1	-26.8	-174.5
Total Changes	+530.1	+7393.1	+75.6	+7998.8
Current Estimate	1465.8	10247.2	75.6	11788.6

13. (U) Cost Variance Analysis (Cont'd):
(FY 1972 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	609.4	1283.0	0	1892.4
Previous Changes:				
Quantity	—	+532.7	—	+532.7
Schedule	+94.6	+46.2	—	+140.8
Engineering	+27.6	+62.4	—	+90.0
Estimating	+69.4	+817.4	+36.0	+922.8
Other	—	—	—	—
Support	+17.4	+417.0	—	+434.4
Subtotal	+209.0	+1875.7	+36.0	+2120.7
Current Changes:				
Quantity	—	—	—	—
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	-6.1	-21.9	-10.3	-38.3
Other	—	—	—	—
Support	—	-36.1	—	-36.1
Subtotal	-6.1	-58.0	-10.3	-74.4
Total Changes	+202.9	+1817.7	+25.7	+2046.3
Current Estimate	812.3	3100.7	25.7	3938.7

b. (U) Previous Change Explanations —

(1) (U) RDT&E

Economic: Revised escalation indices.

Schedule: Phase 2 sched adjustment (56 mos); 3 mos sustaining prog effort; accidental crash of prototype.

Engineering: Correction of technical difficulties in tail section; addition of Optical Improvement Program.

Estimating: Application of revised FY 80-72 deflators; approval of OSD historical indices through Jan 83; withdrawal of funds by AMC for development of TPS for depot support which will remain with the contractor. Congressional/Gramm Rudman cuts and reprogramming actions. Reprogrammed funding for Optical Improvement Program. Addition of Multistage Improvement Program. Removal of non-APACHE related Black Program, change in OSD Historical Deflators and addition of composite factors for prior years.

Support: SPA, obscurant tests; increased log support for OT-II testing: FY 82-84 budget cuts.

(2) (U) Procurement

Economic: Revised escalation indices.

Quantity: Reduction of 90 aircraft (from 536 to 446); increase of 69 additional helicopters (446 to 515); increase of 160 aircraft (515 to 675); reduction of 82 aircraft (675 to 593); increase of 82 aircraft (593 to 675): Increase of 300 aircraft (675 to 975); Decrease of 168 aircraft (975 to 807).

13. (U) Cost Variance Analysis (Cont'd)

Schedule: BLACKHAWK sched extension; AAH sched extension to accommodate LLTI; early year program slips; revision to max rate(12/mo); additional tooling for accelerated (515 A/C) schedule. Movement of 6 Acft from FY 85 to 88.

Engineering: Incorp of T700-GE-701 engine; transfer of HELLFIRE Launcher costs from HELLFIRE SAR; addition of Optical Improvement Program (OIP). Additional Airborne Target Handover System (ATHS) Work; incorporation of ATHS, Blue/Green lighting, OIP, Wirestrike Protection System and Integrated Flight Information Data System modifications.

Estimating: Nov 77 BCE; T700-GE-700 cost increases; DTC review impacts; revised prog estimates resulting from 1979 reviews; DTC/BCE/final assembly and electrical work; application of reserve for additional quantity; use of OSD historical inflation indices on base year $; changes applicable to increase of 160 aircraft; changes applicable to HF missile launcher funds decrease due to competitive procurement; labor and overhead rates; failure to achieve multiyear procurement savings; changes applicable to increase of 82 aircraft and period of performance; movement of 6 aircraft from FY85 to 88; changes applicable to increase of 300 aircraft; changes applicable to decrease of 168 aircraft and period of performance.

Support: Reduction of initial spare rqmts; new rqmts (Alt Msn Eqp, GSE, Cmd Spt); installation of support eqpt and assoc data and training; sched revisions; cost of kits; FAT; PDSSF, bigger training base; increase to support additional (69) helicopters; addition of HELLFIRE (HF) support costs; support of 160 additional aircraft; HF missile launcher funds increase due to acft qty increase. Revised spares definition. Support of 82 additional aircraft; additional ATHS effort; support of additional 300 aircraft; funding of Flight Simulator and Procedures Training Devices. Decrease of Special Mission Kits, ASE Suites, Ground Spt Equipment and Spares as a result of smaller fleet size (807 vs 975).

(3) (U) MILCON

Economic: Revised escalation indices.

Estimating: Reidentification of system peculiar construction projects into APACHE SAR.

c. (U) Current Change Explanations —

	(Dollars in Millions) Base-Year	Then-Year
(1) (U) RDT&E		
Revised Jan 90 economic escalation rates (Economic)	N/A	-5.0
Program Budgetary Reductions causing downscope in LONGBOW APACHE negotiated contract if not restored in outyears (Estimating)	-6.1	-8.6

13. (U) Cost Variance Analysis (Cont'd):

(2) (U) Procurement	Base-Year	Then-Year
Revised Jan 90 economic escalation rates (Economic)	N/A	-60.6
o Changes applicable to Budgetary Adjustments (Estimating)	- 21.9	+ 19.7
o Decrease of Special Mission Kits, ASE Suites, Ground Spt Equipment, Trainers and Spares as a result Budgetary Adjustments (Support)	- 36.1	- 93.2

(3) (U) MILCON		
Revised Jan 90 economic escalation rates (Economic)	N/A	-3.0
Decrease due to deletion of FY92 system specific construction projects for APACHE (Estimating)	-10.3	-23.8

14. (U) Program Acquisition Unit Cost (PAUC) History: (Millions of then-year dollars) 1/

a. (U) Initial SAR Estimate to Current Baseline Estimate —

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
3.838	1.546	.059	.755	.494	.241	.059	.079	3.233	7.071

b. (U) Current Baseline Estimate to Current Estimate —

PAUC (Dev Est)	Changes								PAUC (Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
7.071	+ .721	-.618	+.753	+.317	+4.397	—	+1.967	+7.537	14.608

1/ This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation.

AH-64A, December 31, 1989

15. [redacted] Contract Information: (Then-Year Dollars in Millions)

a. [redacted] RDTE—

Airframe	Initial Target	Contract Ceiling	Price Qty
McDonnell Douglas Helicopter Co. Mesa, AZ DAAJ09-89-C-A086, CPIF Award: August 30, 1989 Definitized: August 30, 1989	$194.7	N/A	4

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
194.7	N/A	4	194.7	194.7

Note: Contractor Performance Data will be available after the first Contractor Performance Report is received in January 1990.

b. [redacted] Procurement—

TADS/PNVS-Hardware	Initial Target	Contract Ceiling	Price Qty
Martin Marietta Orlando Aerospace Orlando, FL DAAJ09-85-C-A011, FFP, Award: November 25, 1986 Definitized: November 25, 1986	$317.6	N/A	261

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$368.2	N/A	292	$368.2	$368.2

Note: For FFP contracts, cost and schedule variance information is not required.

Engine	Initial Target	Contract Ceiling	Price Qty
General Electric Co., Lynn, MA DAAJ09-85-C-A481, FFP MY, Award: February 11, 1986 Definitized: February 11, 1986	$348.2	N/A	791

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$285.6	N/A	652	$285.6	$285.6

ote: For FFP contracts, cost and schedule variance information is not required.

AH-64A, December 31, 1989

15. [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

Airframe	Initial Contract Price Target	Ceiling	Qty
McDonnell Douglas Helicopter Co. Mesa, AZ DAAJ09-86-C-A013, FFP, Award: November 1, 1985 Definitized: February 20, 1987	$ 68.9	N/A	N/A

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$ 86.3	N/A	N/A	$ 86.3	$ 86.3

Note: For FFP contracts, cost and schedule variance information is not required.

Airframe	Initial Contract Price Target	Ceiling	Qty
McDonnell Douglas Helicopter Co. Mesa, AZ DAAJ09-87-C-A009, FFP, Award: February 20, 1987 Definitized: February 20, 1987	$1454.0	N/A	217

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$1592.2	N/A	284	$1592.2	$1592.2

Note: For FFP contracts, cost and schedule variance information is not required.

Airframe	Initial Contract Price Target	Ceiling	Qty
McDonnell Douglas Helicopter Co. Mesa, AZ DAAJ09-89-C-A003, FFP, Award: November 1, 1985 Definitized: August 31, 1989	$105.1	N/A	82

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$662.4	N/A	82	$662.4	$662.4

Note: Reflects full funding of the definitized price of 82 aircraft. For FFP contracts, cost and schedule variance information is not required.

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16. [redacted] Program Funding Summary: (Current Estimate in Millions of Dollars)

a. [redacted] Program Status —

(1) ([redacted]) Percent Program Completed: 81.8% (18 yrs/22 yrs)

(2) ([redacted]) Percent Program Cost Appropriated: 96.9% (11422.8/11788.6)

b. [redacted] Appropriation Summary —

	(Then-Year Dollars in Millions)				
Appropriation	Current & Prior Yrs (FY73-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-94)	Total
RDT&E	1292.6	66.5	60.5	46.2	1465.8
Procurement	8463.6	1535.9	104.2	143.5	10247.2
MILCON	64.2	0.0	0.0	11.4	75.6
Total	9820.4	1602.4	164.7	201.1	11788.6

c. [redacted] Annual Summary —

Fiscal Year	Qty	Flyaway FY72 Dollars Nonrec	Flyaway FY72 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: RDT&E								
1973				18.6	20.0	20.0	20.0	4.4
1974	2			42.0	49.1	49.1	49.1	8.0
1975				47.3	60.8	60.8	60.8	11.0
1976				54.0	73.9	73.9	73.9	6.6
197T				12.6	17.9	17.9	17.9	2.9
1977	7			90.7	130.8	130.8	130.8	2.6
1978				107.2	166.4	166.4	166.4	6.8
1979				103.9	179.4	179.4	179.4	8.4
1980				93.6	176.0	176.0	176.0	10.6
1981				83.5	172.8	172.8	172.8	10.6
1982				41.6	91.7	91.7	91.7	7.6
1983				9.6	22.1	22.1	22.1	4.9
1984				9.2	22.0	22.0	22.0	3.8
1985				10.2	24.9	24.9	24.9	3.4
1986				5.2	13.3	13.2	7.0	2.8
1987				0.0	0.0	0.0	0.0	2.7
1988				9.1	24.5	24.5	20.0	3.0
1989				16.7	47.0	46.1	13.6	4.2
1990				22.8	66.5	28.6	.3	4.0
1991				19.9	60.5	0.0	0.0	4.2
1992				14.6	46.2	0.0	0.0	4.0
Subtotal	9			812.3	1465.8	1320.2	1248.7	

16. [redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. [redacted] Annual Summary (Cont'd) —

Fiscal Year	Qty	Flyaway FY72 Dollars Nonrec	Flyaway FY72 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: Procurement (APA, APACHE)								
1981	LLT	7.8	12.5	23.6	61.2	61.2	61.2	11.6
1982	11	44.5	112.2	196.5	545.7	545.7	544.2	14.3
1983	48	17.8	200.5	304.8	909.7	909.7	908.2	9.0
1984	112	15.3	334.4	441.1	1354.1	1354.1	1349.1	8.0
1985	138	1.3	358.5	451.5	1428.8	1428.8	1420.5	3.4
1986	116	.1	293.1	370.9	1212.9	1209.7	1182.4	2.8
1987	101	0.0	256.0	327.4	1094.6	1090.3	899.2	2.7
1988	77	0.0	199.2	243.6	852.0	816.7	649.3	3.0
1989	72	3.8	197.7	274.9	1004.6	862.2	241.0	4.2
1990	132	0.0	338.9	405.2	1535.9	222.2	0.0	4.0
1991		0.0	17.2	26.6	104.2	0.0	0.0	4.2
1992		0.0	13.0	18.2	73.8	0.0	0.0	4.0
1993		0.0	0.0	11.3	47.6	0.0	0.0	3.7
1994		0.0	0.0	5.1	22.1	0.0	0.0	3.4
Subtotal	807	90.6	2333.2	3100.7	10247.2	8500.6	7255.1	
Appropriation: Procurement (APA, HELLFIRE)								
1981			(0.9)	(0.9)	(2.4)	(2.4)	(2.4)	11.6
1982			(4.6)	(4.6)	(12.8)	(12.8)	(12.8)	14.3
1983			(4.6)	(4.6)	(13.7)	(13.7)	(13.7)	9.0
1984			(3.5)	(3.7)	(11.5)	(11.5)	(11.1)	8.0
1985			(3.2)	(3.8)	(12.0)	(12.0)	(11.3)	3.4
1986			(2.3)	(2.8)	(9.1)	(9.1)	(5.3)	2.8
1987			(1.2)	(1.8)	(6.1)	(6.1)	(.8)	2.7
1988			(0.6)	(1.1)	(3.8)	(3.8)	(1.7)	3.0
1989			(1.5)	(2.0)	(7.2)	(4.0)	(0.0)	4.2
1990			(2.1)	(2.2)	(8.3)	(0.3)	(0.0)	4.0
1991			(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	4.2
1992			(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	4.0
1993			(0.0)	(0.1)	(0.2)	(0.0)	(0.0)	3.7
1994			(0.0)	(0.0)	(0.1)	(0.0)	(0.0)	3.4
Subtotal			(24.5)	(27.6)	(87.2)	(75.7)	(59.1)	
Appropriation: MILCON								
1983				3.4	8.7	8.7	8.7	4.9
1984				1.2	3.1	3.1	3.1	3.8
1985				5.8	15.6	15.6	15.6	3.4
1986				3.4	9.3	9.3	9.3	2.8
1987				1.3	3.7	3.7	3.7	2.7
1988				0.0	0.0	0.0	0.0	3.0
1989				7.5	23.8	15.0	3.8	4.2
1990				0.0	0.0	0.0	0.0	4.0
1991				0.0	0.0	0.0	0.0	4.2
1992				0.0	0.0	0.0	0.0	4.0
1993				0.0	0.0	0.0	0.0	3.7
1994				3.1	11.4	0.0	0.0	3.4
Subtotal				25.7	75.6	55.4	44.2	
Total	816	90.6	2333.2	3938.7	11788.6	9876.2	8548.0	

17. (U) Production Rate Data:

a. (U) Annual Production Rates —

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1982	14	11	11	11
1983	78	48	48	48
1984	96	112	112	112
1985	96	144	138	138
1986	96	144	116	138
1987	96	56	101	138
1988	60	—	77	138
1989	—	—	72	138
1990	—	—	132	—
1991	—	—	—	—
1992	—	—	—	—
1993	—	—	—	—
1994	—	—	—	—

b. (U) Cost Variance — Dollars in Millions

Item		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY $)	2712.2	+1226.5	3938.7	—	3938.7
	(TY $)	7402.4	+4386.2	11788.6	—	11788.6
PAUC 1/	(BY $)	5.27	-.39	4.88	—	4.88
	(TY $)	14.37	+.24	14.61	—	14.61

1/ This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation.

c. (U) Schedule Variance —

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	1/84	-0-	1/84	-0-	1/84
Duration (in Months)	63	+53	116	+12	104
End Date (Mo/Yr)	4/89	+53	9/93	+12	9/92

d. (U) Deliveries (Plan/Actual) —

	To Date
RDT&E	9/9
Procurement	546/539

e. (U) Approved Design to Cost Goal —

	(Average Unit Flyaway Cost)		
	Development Estimate	Current Estimate	Lastest Approved Threshold
@ Qty: 515		807	
@ Peak Rate: 12/mo		12/mo	
FY 72 Base Year $	1.804	3.00	3.314

18. (U) Operating and Support Costs

a. (U) Assumptions and Ground Rules — AH-64 APACHE Cost estimates are based on an 18 helicopter battalion with a flying hour rate of 20 hours per aircraft per month. Replenishment cost includes replenishment spares and replenishment repair parts. POL cost includes JP-4 fuel as well as oil and other lubricants. Ammunition cost includes 30mm ammunition rounds, 2.75" rockets, and HELLFIRE training and dummy missiles. Depot Maintenance includes the cost of labor, material, and transportation associated with end item and component repair programs. Field Maintenance cost includes the civilian labor on training aircraft. System specific replacement training cost includes the O&M funded portion of replacement training courses for maintenance personnel and crew. Military personnel cost includes Pay and Allowances, and Permanent Change of Station (MPA) for crew, maintenance, and support personnel. Modification kit cost includes the estimated hardware cost of modifications applied to the aircraft after fielding; it does not include LONGBOW APACHE retrofit costs. Other sustainment cost includes quarters, maintenance and utilities cost and other indirect O&M costs for military personnel. All costs are taken from the latest validated Baseline Cost Estimate for APACHE dated October 1988.

b. (U) Costs —

(FY72 Constant (Baseyear) in Dollars)

Cost Element	Cost Per Flying Hour
Replenishment	321
Petroleum, Oil & Lubricants	26
Ammunition	175
Depot Maintenance	197
Field Maintenance	32
System Specific Replacement Training	24
Military Personnel	717
Modification Kits	49
Other Sustainment	80
Total	1621

c. (U) Contractor Support Costs —

(Then-Year Dollars in Millions)

	FY1989 & Prior 1/	FY1990 Year	FY1991 Year	Balance to Complete	Total
O&M	82.0	64.3	58.8	—	205.1

1/ Includes FY 1988 and FY 1989

N-8 CG 47 AEGIS

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SAR-89-009

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: CG-47 AEGIS CRUISER

AS OF DATE: December 31, 1989

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1. [redacted] Designation and Nomenclature (Popular Name): CG 47 AEGIS Cruiser Class/Guided Missile Cruiser (AEGIS Cruiser)

2. [redacted] DoD Component: NAVY

3. [redacted] Responsible Office and Telephone Number:
AEGIS Shipbuilder Program Manager — RADM (SEL) J.T. HOOD, USN
PMS 400 — Assigned: September 26,1989
Naval Sea Systems Command — AV 332-7395 COMM (703)-602-7395
WASHINGTON, DC 20362

4. [redacted] Program Elements/Procurement Line Items:
PROCUREMENT:
APPN 1611 ICN 24292N (Navy)

5. [redacted] Related Programs: DDG 51, SM-2 (MR), HARPOON, TOMAHAWK, PHALANX, MK-46, LAMPS MK-I/MK-III, VERTICAL LAUNCH, and VERTICAL LAUNCH ANTI-SUBMARINE ROCKET.

6. [redacted] Mission and Description: To destroy enemy aircraft, missiles, submarines, and surface ships in order to prohibit the employment of such forces against U.S. forces. CG 47 Class ships will normally be assigned to carrier battle groups or surface action groups.

AS AMENDED

MAR 22 1990

90-C-0675

No Security Objection to Open Publication
(AS AMENDED)
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OASD(PA) DFOISR 90-T-0641/8

6. (U) Mission and Description (Cont'd):

The design of the TICONDEROGA (CG 47) Class is based on the Fleet-demonstrated hull and gas turbine propulsion system of the SPRUANCE (DD 963) Class. The combat system is based on the Fleet-demonstrated armaments of the VIRGINIA (CGN 38) Class and eleven years at-sea operation in the AEGIS test ship, USS NORTON SOUND (AVM 1). With AEGIS, SM-2, HARPOON, TOMAHAWK, 5-inch guns, SEAHAWK helicopter, MK-46 torpedoes, anti-submarine rockets, Vertical Launch System, (MK-26 Guided Missile Launch System CG 51 and prior), SQQ-89 ASW system, and advanced electronic systems, the CG 47 Class is the most heavily armed surface combatant constructed by the U.S. since World War II. Augmented by passive protection devices including fragmentation protection of launchers and magazines, she provides operational commanders great flexibility.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- The contract for the construction of the lead ship of the class, TICONDEROGA, was awarded to Litton Industries Ingalls Shipbuilding Division, Pascagoula, Mississippi in September 1978. Construction of the TICONDEROGA began in July 1979. She launched in April 1981; began acceptance trials in November 1982, was commissioned in January 1983 and completed Post Shakedown Availability in July 1983. CG 47 has satisfied all mission requirements.

b. (U) Significant Developments Since Last Report -- The keel was laid on three ships in 1989 - CG 66 in February, CG 67 and CG 68 in August. Three ships were launched in 1989 - CG 63 in March, CG 64 in July and CG 65 in September. Four ships were commissioned in 1989 - USS PRINCETON(CG 59) in February, USS PHILIPPINE SEA(CG 58) in March, USS CHANCELLORSVILLE(CG 62) in November and USS NORMANDY(CG 60) in December. With the commissioning of USS NORMANDY(CG 60) there are now fifteen AEGIS Cruisers in active service.

c. (U) Changes Since As Of Date -- In January 1990 BIW and the Navy agreed to extend delivery dates for CG 63, 64, and 67 by 20, 18, and 4 weeks respectively. These adjustments were required to accommodate complex hull modifications.

8. (U) Threshold Breaches: There are currently no DAE baseline breaches dated December 1988).

9. (U) Schedule:

a. (U) Milestones

	Development Estimate	Approved Program	Current Estimate
DSARC III	JAN 78	JAN 78	JAN 78

a. Milestones -- Continued

	Development Estimate	Approved Program	Current Estimate
Ship Construction Contract Award (CG 47)	SEP 78	SEP 78	SEP 78
Launch TICONDEROGA (CG 47)	AUG 81	APR 81	APR 81
Ship Commissioning, TICONDEROGA (CG 47)	APR 83	JAN 83	JAN 83
Complete Post Shakedown Availability (CG 47)	MAR 84	JUL 83	JUL 83
TICONDEROGA Deployed		OCT 83	OCT 83
Ship Commissioning, YORKTOWN (CG 48)		JUL 84	JUL 84
Ship Commissioning, VINCENNES (CG 49)		JUL 85	JUL 85
Ship Commissioning, VALLEY FORGE (CG 50)		JAN 86	JAN 86
Ship Commissioning, BUNKER HILL (CG 52)		SEP 86	SEP 86
Ship Commissioning, MOBILE BAY (CG 53)		FEB 87	FEB 87
Ship Commissioning, ANTIETAM (CG 54)		JUN 87	JUN 87
Ship Commissioning, THOMAS S. GATES (CG 51)		AUG 87	AUG 87
Ship Commissioning, LEYTE GULF (CG 55)		SEP 87	SEP 87
Ship Commissioning, SAN JACINTO (CG 56)		JAN 88	JAN 88
Ship Commissioning, LAKE CHAMPLAIN (CG 57)		AUG 88	AUG 88

b. Previous Change Explanations --

The current estimate for the launch, commissioning and completion of post shakedown availability for CG 47 was revised based on the construction schedule.

c. Current Change Explanations -- None.

d. References --

Development Estimate: AEGIS DCP #16 Revision #2 and CG 47 Class Guided Missile Cruiser DCP #134 were approved 2 March 1978.

Approved Program: DAE Baseline approved 31 December 1988.

~~(U)~~ Technical/Operational Characteristics:

a. ~~(U)~~ Technical --	Development Estimate	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
Length (overall ft)	563	567	567	567
Beam (ft)	55	55	55	55
Draft Navigational (ft)	31.7	31.7	31.7	31.7
Displacement (LT)	9100	9600	10200	9500
Propulsion				
- Type	LM 2500 Gas Turbine	LM 2500 Gas Turbine	LM 2500 Gas Turbine	LM 2500 Gas Turbine
- Horsepower (2 Shafts)	80000	80000	80000	80000
Accommodations				
- Officers	33	33	37	37
- CPO's and Enlisted	327	372	372	372
b. ~~(U)~~ Operational --				
Speed	30	30	30	30
Endurance (@ (b)(1) knots)	(b)(1)			
Armament				
- Anti-Submarine Warfare				
- Under Water Fire Control System	MK-116 Mod4	MK-116 Mod6	MK-116 Mod6	MK-116 Mod6
- Sonar System	AN/SQS-53A	AN/SQS-53C	AN/SQS-53B	AN/SQS-53C
- Towed-Array Sonar System	AN/SQR-19	AN/SQR-19	AN/SQR-19	AN/SQR-19
- Helo System	Seahawk	Seahawk	Seahawk	Seahawk
- MK 46 Torpedoes	MK-46	MK-46	MK-46	MK-46
- Anti-Submarine Rocket	ASROC	VLA	ASROC	VLA
- Anti-Air Warfare				
- AEGIS Weapon System	MK-7 Mod 3	MK-7 Mod 3	MK-7 Mod 3	MK-7 Mod 5
- Guided Missile Launching System	MK-26 Mod 1	MK-41 VLS	MK-41 VLS	MK-41 VLS
- Long Range Air Search Radar System	AN/SPS-49	AN/SPS-49	AN/SPS-49	AN/SPS-49
- PHALANX	MK-15 Mod 0	MK-15 Mod 2 Block I	MK-15 Mod 0	MK-15 Mod 2 Block I
- Electronic Warfare	SLQ-32	SLQ-32	SLQ-32	SLQ-32
- STANDARD Missile	SM-2	SM-2	SM-2	SM-2
- Anti-Surface Warfare				
- Surface Search Radar	AN/SPS-55	AN/SPS-55	AN/SPS-55	AN/SPS-55
- HARPOON Weapon System/Launchers	Quad Can.	Quad Can.	Quad Can.	Quad Can.
- 5"54 Rapid Fire Guns	MK-45	MK-45	MK-45	MK-45
- Cruise Missile Control System	N/A	TOMAHAWK	TOMAHAWK	TOMAHAWK

c. (U) Previous Change Explanations --

The overall length of the TICONDEROGA (CG 47) was planned as 563 feet. All CG 47 Class Cruisers are constructed to 567 feet, the additional four feet is for the bulwark on the bow. 10,200 LT represents limiting displacement. Accommodations were increased beginning with CG 49 to support an increase in the Combat Systems. The Underwater Fire Control System, starting with CG 56, changed MK-116 to Mod 6 and AN/SQS-53A to AN/SQS-53B. Incorporation of the AN/SQR-19 was in CG 54 and beyond during construction. Incorporation of Seahawk was in CG 49 and beyond during construction. CG 47 and CG 48 are armed with Sea Sprites. ASROC is on CG 47 through CG 51. VLA replaces ASROC beginning with CG 52. Vertical Launch System MK 41 replaces MK 26 Mod 1 starting with CG 52. MK 15 Mod 2 Block I was approved for limited production in November 1985 with installation beginning on the FY86 ships. TOMAHAWK begins on CG 52. The AEGIS Weapon System changed from SPY-1A to SPY-1B (MK-7/Mod 5) starting with CG 59. Displacement was decreased by 100 tons with the change of the Sonar System from AN/SQS-53B to AN/SQS-53C beginning with CG 68. Accommodations were increased to meet operating requirements.

d. (U) Current Change Explanations -- None.

e. (U) References --

Development Estimate: AEGIS DCP #16 Revision #2 and CG 47 Class Guided Missile Cruiser DCP #134 were approved 2 March 1978.

Approved Program: DAE Baseline approved 31 December 1988.

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. (U) Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	55.5	68.2	68.2
Procurement	8958.2	14258.8	13939.6
Basic Ship Cost	(3440.3)	(5064.5)	(5037.3)
AEGIS Weapon System	(2598.8)	(3532.4)	(3367.6)
Other GFE	(1874.6)	(5025.2)	(4940.5)
Other Cost	(832.9)	(217.5)	(185.9)
OF/PD	(211.6)	(419.2)	(408.3)
Total Flyaway	(8958.2)	(14258.8)	(13939.6)
Other Wpn Sys Cost	(0.0)	0.0)	0.0
Peculiar Support	(0.0)	0.0)	0.0
Initial Spares	0.0)	0.0)	0.0
Construction	0.0	14.1	14.4
Ops. and Maint. (O&M)	0.0	0.0	0.0
Total FY 78 Base Year $	9013.7	14341.4	14022.2

a. [redacted] Cost -- (Cont'd)	Development Estimate	Approved Program	Current Estimate
Escalation	5069.8	9729.5	9468.9
Development (RDT&E)	(1.8)	(7.9)	(7.9)
Procurement	(5068.0)	(9712.3)	(9451.7)
Construction (MILCON)	(0.0)	(9.3)	(9.3)
Ops. and Maint. (O&M)	(0.0)	(0.0)	(0.0)
Total Then-Year $	14083.5	24070.9	23491.1
b. [redacted] Quantities --			
Development (RDT&E)	0	0	0
Procurement	16	27	27
Construction (MILCON)	0	0	0
Total	16	27	27

c. ( ) Foreign Military Sales -- None.

d. ( ) Nuclear Costs -- None.

e. ( ) References --

Development Estimate: AEGIS DCP #16 Revision #2 and CG 47 Class Guided Missile Cruiser DCP #134 were approved 2 March 1978.

Approved Program: DAE Baseline approved 31 December 1988.

12. [redacted] Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. [redacted] Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1) Cost	23491.1	24070.9	23491.1
(2) Quantity	27.0	27.0	27.0
(3) Unit Cost	870.04	891.51	870.01
b. [redacted] Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	66.0	66.0	84.5
Less CY Adv Proc	66.0	66.0	84.5
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	0.0	0.0	0.0
(2) Quantity	0.0	0.0	0.0
(3) Unit Cost	-	-	-

Paragraph 12 Comments:
The cost category "Less CY Adv Proc" includes $66.0M in FY 1990 and $84.5M in FY 1991 for Outfitting and Post Delivery.

13. (U) Cost Variance Analysis:

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	57.3	14026.2	0.0	14083.5
Previous Changes:				
Economic	+1.8	-897.7	-0.9	-896.8
Quantity	-	+11739.0	-	+11739.0
Schedule	-	+435.4	-	+435.4
Engineering	+9.7	+970.9	-	+980.6
Estimating	+7.3	-2747.7	-	-2740.4
Other	-	-	-	-
Support	-	+445.0	+24.6	+469.6
Subtotal	+18.8	+9944.9	+23.7	+9987.4
Current Changes:				
Economic	-	+7.6	-	+7.6
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-573.2	-	-573.2
Other	-	-	-	-
Support	-	-11.2	-	-14.2
Subtotal	-	-579.8	-	-579.8
Total Changes	+18.8	+9365.1	+23.7	+9407.6
Current Estimate	76.1	23391.3	23.7	23491.1

13. [redacted] Cost Variance Analysis (Cont'd):

(FY 1978 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	55.5	8958.2	0.0	9013.7
Previous Changes:				
Quantity	-	+5491.4	-	+5491.4
Schedule	-	-2.6	-	-2.6
Engineering	+7.6	+586.0	-	+593.6
Estimating	+5.1	-981.7	-	-976.6
Other	-	-	-	-
Support	-	+207.5	+14.4	+221.9
Subtotal	+12.7	+5300.6	+14.4	+5327.7
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-308.2	-	-308.2
Other	-	-	-	-
Support	-	-11.0	-	-11.0
Subtotal	-	-319.2	-	-319.2
Total Changes	+12.7	+4981.4	+14.4	+5008.5
Current Estimate	68.2	13939.6	14.4	14022.2

b. [redacted] Previous Change Explanations --

RDT&E
Economic: Revised escalation indices.
Engineering: HDF and SDMS design changes.
Estimating: Refinement of RDT&E estimates.

b. Previous Change Explanations -- (Cont'd)

PROCUREMENT
- Economic: Revised escalation indices.
- Quantity: Addition of 11 cruisers.
- Schedule: Procurement Profile compressed from 2-2-1 (FY88-90) to 5-0-0 (FY88-90).
- Engineering: Engineering enhancements including introduction of the Vertical Launch System, the upgrade of the Underwater Fire Control System and the change in the AEGIS Weapon System from SPY-1A to SPY-1B. Deletion of the Level IIA Collective Protection System.
- Estimating: Refinement of procurement estimates. Program buy out.
- Support: Adjustment of outfitting and post delivery costs corresponding to program changes.

MILCON
- Economic: Revised escalation indices.
- Support: Funds for training and support sites.

O & M

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
(2) PROCUREMENT		
Revised Jan 90 economic escalation rates. (Economic)	N/A	-7.6
Revised estimates for all ship systems, adjustments to projected ship construction contract requirements, and plans requirements. (Estimating)	-308.2	-573.2
Adjustment of outfitting and post delivery costs corresponding to program changes. (Support)	-11.0	-14.2
(3) MILCON		
(4) O & M		

14. (U) Program Acquisition Unit Cost (PAUC) History: (Then-Year Dollars in Millions)

a. (U) Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
880.2	--	--	--	--	--	--	--	--	880.2

b. (U) Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
880.2	-32.93	+76.19	+16.13	+36.32	-122.7	--	+16.87	-10.16	870.0

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) Procurement
CG 62, 65:
Ingalls Shipbuilding Inc.
Pascagoula, MI
N00024-85-C-2035, FPI
Award: November 26, 1984
Definitized: November 26, 1984

Initial Contract Price		
Target	Ceiling	Qty
$238.6	$267.5	1.0

Current Contract Price		
Target	Ceiling	Qty
$501.0	$560.6	2.0

Estimated Price At Completion	
Contractor	Program Manager
$481.9	$481.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$47.9	$-20.6
Cumulative Variances To Date (12/31/89)	$55.2	$-22.0
Net Change	$7.3	$-11.1

Explanation of Change: The cost variance improvement occurred primarily in labor/overhead due to continued production efficiencies. The deterioration in the schedule variance occurred primarily in material and was driven by a lag in billings. CG-62 delivered on 28-Aug-89, 3 weeks ahead of schedule. Currently, CG-65 is ahead of schedule. The Program Manager's assessment at completion remains well below target price.

Estimated Price at Completion incorporates authorized change orders and cost underrun estimates which are not included in Current Contract Target

15. [illegible] Contract Information (Cont'd): (Then-Year Dollars in Millions)

and Ceiling Price.

CG 60, 61, 63, 64:

Bath Iron Works
Bath, ME
N00024-85-C-2036, FPI
Award: November 26, 1984
Definitized: November 26, 1984

Initial Contract Price		
Target	Ceiling	Qty
$383.6	$430.4	2.0

Current Contract Price		
Target	Ceiling	Qty
$806.7	$904.4	4.0

Estimated Price At Completion	
Contractor	Program Manager
$883.1	$904.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-38.6	$-11.4
Cumulative Variances To Date (11/30/89)	$-45.4	$-17.4
Net Change	$-6.8	$-6.0

Explanation of Change: The slight changes in cost and schedule variances experienced during this period are considered insignificant on a four ship contract. The cumulative unfavorable cost and schedule variance are driven by Production labor inefficiencies.

Estimated Price at Completion incorporates authorized change orders and cost overrun estimates which are not included in Current Contract Target and Ceiling Price.

CG-66/68:

Ingalls Shipbuilding Inc.
Pascagoula, MI
N00024-87-C-2030, FPI
Award: April 16, 1987
Definitized: April 16, 1987

Initial Contract Price		
Target	Ceiling	Qty
$368.0	$390.6	2.0

Current Contract Price		
Target	Ceiling	Qty
$377.8	$401.2	2.0

Estimated Price At Completion	
Contractor	Program Manager
$405.0	$102.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$8.9	$10.0
Cumulative Variances To Date (12/31/89)	$11.7	$36.6
Net Change	$5.8	$26.6

Explanation of Change: The improvement in cost and schedule variances are primarily due to continued production labor hour efficiencies.

5. [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

Estimated Price at Completion for ship construction contracts incorporates budgeted change orders and cost overrun estimates which are not included in Current Contract Target and Ceiling Price.

CG 69, 71, 72, 73:	Initial Contract Price Target	Ceiling	Qty
Ingalls Shipbuilding Inc. Pascagoula, MI N00024-88-C-2034, FPI Award: February 25, 1988 Definitized: February 25, 1988	$769.1	$819.0	4.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$777.6	$829.8	4.0	$800.8	$801.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.4	$-1.6
Cumulative Variances To Date (12/31/89)	$5.2	$6.5
Net Change	$4.8	$8.1

Explanation of Change: The cost and schedule variances at this early stage of the contract are not considered significant. Fabrication for CG-69 and 71 began roughly 11 and 22 weeks ahead of their respective contract schedules. Contractor and Program Manager's estimates at completion are well below final estimated target price.

Estimated Price at Completion incorporates budgeted change orders and cost underrun estimates which are not included in Current Contract Target and Ceiling Price.

15. [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

CG 70:	Initial Contract Price Target	Ceiling	Qty
Bath Iron Works Bath, ME N00024-88-C-2178, FPI Award: February 25, 1988 Definitized: February 25, 1988	$226.1	$242.3	1.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$228.8	$245.2	1.0	$244.2	$253.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date (11/30/89)	$-2.2	$9.3
Net Change	$-2.2	$9.3

Explanation of Change: The cost and schedule variances at this early stage of the contract are not considered significant.

Estimated Price at Completion incorporates budgeted change orders and cost overrun estimates which are not included in Current Contract Target and Ceiling Price.

The DDG 53 and CG 70 deliveries have been rescheduled to maximize production efficiency at Bath Iron Works. The effect was to move the CG 70 delivery forward and the DDG 53 delivery back 7 months. This scheduling change was accomplished for the convenience of the shipbuilder at no cost to the government.

AEGIS Weapon System:	Initial Contract Price Target	Ceiling	Qty
GE Government System Div Moorestown, NJ N00024-88-C-5140, FPI Award: January 14, 1988 Definitized: January 14, 1988	$265.2	$393.4	5.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$705.2	$758.6	10.0	$735.5	$735.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$5.3	$-4.6
Cumulative Variances To Date (11/30/89)	$13.5	$-31.1
Net Change	$18.2	$-26.5

Explanation of Change: Favorable cost variance is attributable to performance on CG 66-73 in Manufactured Support and Production Project.

15. (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

The unfavorable schedule variance is due to the shifting of manpower to earlier systems to meet production milestones. However, the contractor's schedule variance is supporting contract delivery dates.

This is a combined procurement contract for the CG 66-73 and DDG 52, 53. It is reported in the SARs of each program.

Estimated Price At Completion incorporates budgeted change orders, overrun estimates and amortization for special tooling and special test equipment which are not included in Current Contract Target Price.

16. (U) Program Funding Summary:

a. (U) Program Status --

(1) Percent Program Completed: 76.5% (13 yrs/17 yrs)

(2) Percent Program Cost Appropriated: 98.9% ($23222.0 / $23491.1)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY78-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-94)	Total
RDT&E	76.1	--	--	--	76.1
Procurement	23056.2	66.0	84.5	184.6	23391.3
MILCON	23.7	--	--	--	23.7
O&M	--	--	--	--	--
Total	23156.0	66.0	84.5	184.6	23491.1

c. (X) Annual Summary --

Fiscal Year	Qty	Flyaway FY78 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: 1319 Research, Development, Test & Eval, Navy								
1978				39.4	39.4	39.4	39.4	
1979				10.0	10.8	10.8	10.8	8.4
1980				5.4	6.5	6.5	6.5	10.6
1981				3.4	4.5	4.5	4.5	10.6
1982				5.0	7.2	7.2	7.2	7.6
1983				2.1	3.1	3.1	3.1	4.9
1984				1.0	1.5	1.5	1.5	3.8
1985				1.0	1.6	1.6	1.6	3.4
1986				0.6	1.0	1.0	1.0	2.8
1987				0.3	0.5	0.5	0.5	2.7
Subtot	0			68.2	76.1	76.1	76.1	
Appropriation: 1611 Shipbuilding and Conversion, Navy								
1978	1		666.9	666.9	927.7	927.7	920.4	
1979					1.7	1.7	1.7	9.6
1980	1		498.0	498.0	796.6	796.6	775.6	9.9
1981	2		1012.3	1013.1	1785.3	1783.1	1719.0	9.6
1982	3		1774.7	1776.9	2708.2	2700.4	2602.8	7.5
1983	2		1191.3	1502.3	2392.7	2385.2	2287.5	8.8

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY78 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: 1611 Shipbuilding and Conversion, Navy (Cont'd)								
1984	3		1645.5	1661.9	2718.5	2684.3	2447.0	3.6
1985	3		1475.6	1498.8	2599.7	2529.4	2110.8	2.1
1986	3		1400.5	1432.9	2431.8	2204.3	1661.1	1.0
1987	3		1431.0	1497.0	2590.6	2055.9	1247.1	1.5
1988	5		2135.5	2178.7	4047.3	2929.6	782.6	2.5
1989				33.4	56.1	48.6	29.4	2.8
1990				37.7	66.0	0.4	0.4	4.0
1991				46.3	84.5			4.2
1992				50.6	96.0			4.0
1993				35.3	69.4			3.7
1994				9.5	19.2			3.4
Subtot	27		13531.3	13939.6	23391.3	21047.2	16615.1	
Appropriation: 1205 Military Construction, Navy								
1982				1.2	1.9	1.9	1.9	7.9
1983				6.8	10.8	10.8	10.8	1.9
1984				2.6	4.2	4.2	4.2	3.8
1985								
1986								
1987				3.8	6.8	6.8	6.8	2.7

c. [redacted] Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY78 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: 1205 Military Construction, Navy (Cont'd)								
Subtot	0			14.4	23.7	23.7	23.7	
Total	27		13531.3	14022.2	23491.1	21147.0	16715.2	

Paragraph 16 Comments:
* Since spend-out rates are not shown, the escalation rates cannot be used to verify the composite index.

17. [redacted] Production Rate Data: None.

a. ( ) Annualized Production Rates -- None.

b. ( ) Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Acq. Cost (BY $)	N/A	N/A	0.0	0.0	0.0
(TY $)	N/A	N/A	0.0	0.0	0.0
PAUC Cost (BY $)	N/A	N/A	0.000	0.000	0.000
(TY $)	N/A	N/A	0.000	0.000	0.000

c. [redacted] Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)		0		0	
Duration (in mon)	0	0	0	0	0
End Date (Mo/Yr)		0		0	

d. [redacted] Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
Procurement	15/15
MILCON	0/0
O & M	0/0

e. [redacted] Approved Design-to-Cost Goal --

	Development Estimate	Current Estimate	Latest Approved Threshold
	(Average Unit Flyaway Cost)		
@ Qty 0 - @ Peak Rate: 0/mo			
FY 78 Base-Year $	510.0	526.5	0.0
Then Year $	864.8	852.8	0.0
@ Qty 0 (1st three years) - @ Peak Rate: 0/mo			
FY 78 Base-Year $	0.0	0.0	0.0
Then Year $	0.0	0.0	0.0

Paragraph 17 Comments:
17e. Approved Design to Cost Goal - The CG 47 production estimate is based on average follow ship's unit procurement cost for 15 ships as approved by DCP #134, dated 2 March 1978. This goal is based upon the execution of the procurement plan shown in DCP #134 and does not include the cost of LAMPS aircraft, expendable shipfill ordnances, ship design, or outfitting and post delivery costs. The current estimate is the average unit procurement cost computed on ships 2 through 16 in the FYDP estimate.

18. [redacted] Operating and Support Costs:

a. [redacted] Assumptions and Ground Rules

None.

b. [redacted] Costs -- None.

c. Contractor Support Costs -- (Current (Then-Year) Dollars in Millions)

Funding	FY1990 & Prior	FY1991	FY1992	Balance To Complete	Total
O&M	183.9	102.6	---	---	286.5
Industrial Fund	---	---	---	---	---
Total	183.9	102.6	---	---	286.5

Paragraph 18 Comments:
18c. Contractor Support Costs -- The Contractor Support Costs are combined costs for both the CG 47 AEGIS Class Cruiser and DDG 51 Class Destroyer programs.
- Funding for FY 1990 & prior includes FY 1988 through FY 1990 only.
- Total of 286.5 does not include funds required for FY 1992 and outyears.

① N-10 CVN 68 CLASS-1

SAR-89-003

[redacted]

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

Program: CVN 68 CLASS (CVN 72/73, CVN 74/75)
As Of Date: Dec 31, 1989

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AS AMENDED

MAR 22 1990

1. (U) Designation/Nomenclature: CVN 72, ABRAHAM LINCOLN
CVN 73, GEORGE WASHINGTON; CVN 74, JOHN C. STENNIS
CVN 75, UNITED STATES

2. (U) DoD Component: Department of the Navy

3. (U) Responsible Office and Telephone Number:
Aircraft Carrier Program Office
Naval Sea Systems Command (PMS 312)
Washington D.C.

PM: Capt F. C. Holmes, USN
Assigned: August 23, 1985
Phone number: (703) 602-7280
Autovon number: 8-332-7280

4. (U) Program Elements:
RDT&E: 0605567N
PROCUREMENT: 24112N

5. (U) Related Programs: SSN new construction, submarine and carrier overhauls

90-L-0663

(b)(1)

[redacted]

Classified by ERDA-DOD Classification
Guide CG-RN-1 Dated January 1977
Declassify on OADR
This document shall not be used as a basis
for derivative classification guidance

This [redacted]

[redacted]

(U) Mission and Description: Nuclear aircraft carriers (CVN 68 Class) support and operate aircraft to engage in attacks on targets afloat and ashore which threaten our use of the sea and to engage in sustained operations in support of other forces. The CVN 68 Class carriers have two nuclear reactors and nuclear fuel for 15 years of normal carrier operations, the equivalent of 11 million barrels of propulsion fuel oil. Speeds of over 30 knots were achieved during NIMITZ (CVN 68) trials. The ship's overall length is 1,092 feet with an extreme breadth of 252 feet. Combat load displacement is approximately 97,000 tons. The flight deck area is about 4.5 acres. The ship has four propellers, four aircraft elevators and four catapults. The CVN 68 Class is expected to meet all its mission requirements.

7. (U) Program Highlights:

a. Significant Historical Developments -- Construction of the CVN 68 Class aircraft carriers began in October 1967 with the start of the NIMITZ (CVN 68). To date five ships have been delivered. The USS NIMITZ (CVN 68), USS DWIGHT D. EISENHOWER (CVN 69), USS CARL VINSON (CVN 70), USS THEODORE ROOSEVELT (CVN 71) and USS ABRAHAM LINCOLN (CVN72) were delivered in 1975, 1977, 1982, 1986 and 1989, respectively. There are three ships under construction at Newport News Shipbuilding, the GEORGE WASHINGTON (CVN 73), JOHN C. STENNIS (CVN 74) and UNITED STATES (CVN 75). Construction of CVN 73 began in February 1983 and has a contract delivery date of 03 July 1992. The CVN 74 construction began in November 1988. Target delivery date is Dec 1995 and contract delivery date is June 1996. CVN 75 construction began in November 1989 and contract delivery date is June 1998.

b. Significant Developments Since Last Report -- ABRAHAM LINCOLN (CVN 72) was delivered on 30 October 1989.

c. Changes Since "As Of" Date -- None

8. (U) Threshold Breaches: There are currently no DAE baseline breaches. Approved DAE baseline for CVN 73 dated 28 Feb 89; for CVN 74/75 5 Jun 89.

[redacted]

Schedule:	Development Estimate	Approved Program	Current Estimate	
a. Milestones (CVN 72)				
(1) Establish Final Characteristics CVN 68 Class	10/66	10/66	10/66	
(2) Definitization of Contract	1/83	1/83	12/82	
(3) Start Production	2/83	2/83	2/83	
(4) Lay Keel	11/84	11/84	11/84	
(5) Launch	9/87	9/87	2/88	
(6) Complete Acceptance Trial	9/89	9/89	9/89	
(7) Contract Delivery	12/89	12/89	10/89	(CH-1)
(8) Complete Final Contract Trial	6/90	6/90	3/90	(CH-2)
(9) War Ready	2/91	2/91	1/91	
Milestones (CVN 73)				
(1) Definitization of Contract	1/83	1/83	12/82	
(2) Start Production	2/83	2/83	2/83	
(3) Lay Keel	8/86	8/86	8/86	
(4) Launch	9/89	9/89	7/90	(CH-3)
(5) Complete Acceptance Trial	9/91	N/A	5/92	(CH-3)
(6) Delivery	12/91	7/92	7/92	
(7) War Ready	2/93	2/93	9/93	(CH-3)
Milestones (CVN 74)				
(1) Definitization of Contract	8/88	6/88	6/88	
(2) Start Production	1/89	11/88	11/88	
(3) Lay Keel	10/91	12/90	12/90	
(4) Launch	1/94	12/93	12/93	
(5) Delivery	FY96	6/96	6/96	1/
Milestones (CVN 75)				
(1) Definitization of Contract	8/88	6/88	6/88	
(2) Start production	1/89	11/89	11/89	
(3) Lay Keel	4/93	8/92	8/92	
(4) Launch	7/96	12/95	12/95	
(5) Delivery	FY97	6/98	6/98	

1/ Target delivery date is 12/95

(unclassified)

. Schedule: (cont)

b. Previous change explanations:
Contract mod to extend the delivery date of CVN-73 to 7/3/92 for the mutual benefit of NNS and the Navy. CVN-74 and CVN-75 current estimates dates reflect schedule IAW contract award 6/30/88.
Contract mod to extend delivery of CVN-72 to 1/90 vice 12/89 as a result of adverse weather.
Revised CVN 73 launch date to coincide with later delivery.

c. Current change explanations:
(CH-1) Actual delivery date.
(CH-2) Trial date advanced as a result of early delivery
(CH-3) Reflects Contractor revised schedule issued 12/30/89.

d. References:
Development Estimate: Defense Appropriations Act of 1979
Approved Program: DAE Baseline for CVN 73 dated 28 Feb 89; for CVN 74/75 5 Jun 89.

[redacted]

10. (U) Technical/Operational Characteristics:

[redacted]. Technical	DEV EST	Approved Program Goal/Threshold	Demo-strated Perf	Current Estimate
(1) Length overall	1,092	1,092	1,092	1,092
(2) Beam	134	134	134	134
(3) Maximum width	252	252	252	252
(4) Draft (Combat load) (feet)	38.4	38.4	38.4	38.9
(5) Displacement (tons)	96,300	96,300	93,405 1/	97,337
(6) Propulsion	Nuclear	Nuclear	Nuclear	Nuclear
(7) (U) (Shaft horsepower)	(b)(1) [redacted]			
(8) Core life (yrs)	13	13	-- 2/	15
(9) Num of reactors	2	2	2	2
(10) Crew including air wing	6,280	N/A	6,040	6,048

b. Operational

(1) (U) Trial Speed (kts)	(b)(1) [redacted]			
(2) (U) Endurance (at (b)(1) [redacted] (miles)				
(3) Stores (days)	75	75	75	75
(4) Close In Weapon Sys	4	4	4	4
(5) NATO Sea Sparrow Missile Systems	3	3	3	3
(6) Aviation Strike Ordnance (long tons)	2400	2,400	2,451	2,451
(7) (U) Av. Fuel (gals)	(b)(1) [redacted]			
(8) Operational number of aircraft (deck multiple in A4 equivalents) 3/	151	151	151	151

c. Previous change explanations:
CVN 72 projected estimates at delivery
Reflects 122 accommations which have been converted to training spaces.

d. Current change explanations: NONE

e. References ---
Development Estimate: Defense Appropriations Act of 1979
Approved Program: Approved DAE Baseline for CVN 73 dated 28 Feb 89; for CVN 74/75 5 Jun 89.

1/ Actual based on CVN 68c1 standardization trials

2/ Requires extensive operational data and is dependent on actual core life. The USS NIMITZ, the first CVN 68 class ship, was delivered in 1975 and has not been refueled.

3/ The operational number of aircraft (deck multiple) in A7 equivalents is 156.

[redacted]

11.Program Acquisition Cost:(Current Estimate in Millions of Dollars)

	Developement Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	--	1.5	1.5
Procurement	5265.5	5338.1	5290.1
Basic Ship Costs	(3261.4)	(3631.4)	(3597.0)
Government furn. equip costs	(1900.7)	(1569.0)	(1558.9)
Other Costs	(14.3)	(32.7)	(32.8)
Total production costs	(5176.4)	(5233.1)	(5188.7)
Ship Design	(0.9)	( )	( )
Outfitting & Post Delivery	(88.2)	(105.0)	(101.4)
Total FY 82 Base-Year $	5265.5	5339.6	5291.6
Escalation			
Development	(--)	(0.1)	(0.1)
Procurement	(2153.4)	(983.9)	(974.5)
Total Then-Year $	7418.9	6323.6	6266.2
b. Quantities			
Procurement	2	2	2
Total	2	2	2

c. Foreign Military Sales -- NONE
d. Nuclear Costs -- Not available.
e. References --
Approved Program: DAE approved baseline dated 28 Feb 1989.

12. Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then Year) Dollars in Millions)

	Current Year(FY90)		Budget Year(FY91)
	Current Est (DEC 89 SAR)	UCR Baseline (DEC 88 SAR)	UCR Baseline (DEC 89 SAR)
a. Program Acquisition			
(1) Cost	6266.2	6323.6	6266.2
(2) Quantity	2	2	2
(3) Unit Cost	3133.1	3161.8	3133.1
b. Current Procurement	(1990)	(1990)	(1991)
(1) Cost	N/A	N/A	N/A
Less PY Adv Proc	N/A	N/A	N/A
Plus CY Adv Proc	N/A	N/A	N/A
Plus OF/PD	51.3	42.6	22.0
Net Total	51.3	42.6	22.0
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

[redacted] CVN-68 CLASS(CVN-74\75) December 31,1989

[redacted].Program Acquisition Cost:(Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	--	--	--
Procurement	5911.0	5815.8	5700.7
Basic Ship Costs	(3744.9)	(3696.1)	(3632.5)
Government furn. equip costs	(1998.1)	(1971.9)	(1938.0)
Other Costs	(28.4)	(27.9)	(27.4)
Total production costs	(5771.1)	(5695.9)	(5597.9)
Ship Design	( )	( )	( )
Outfitting & Post Delivery	(139.9)	(119.9)	(102.8)
Total FY 88 Base-Year $	5911.0	5815.8	5700.7
Escalation			
Development	(--)	(--)	(--)
Procurement	(1055.0)	(564.3)	(663.2)
Total Then-Year $	6966.0	6380.1	6363.9
b. Quantities			
Procurement	2	2	2
Total	2	2	2 *

c. Foreign Military Sales -- NONE

[redacted] Nuclear Costs -- Not available.

References --

Approved Program: DAE approved baseline dated 5 Jun 1989.

* Excludes $1183.3 million for advance procurement for ships beyond FY 1994.

12. Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then Year) Dollars in Millions)

	Current Year(FY90)		Budget Year(FY91)
	Current Est (DEC 89 SAR)	UCR Baseline (DEC 88 SAR)	UCR Baseline (DEC 89 SAR)
a. Program Acquisition			
(1) Cost	6363.9	6380.1	6363.9
(2) Quantity	2	2	2
(3) Unit Cost	3182.0	3190.1	3182.0
b. Current Procurement	(1990)	(1990)	(1991)
(1) Cost	N/A	N/A	N/A
Less PY Adv Proc	N/A	N/A	N/A
Plus CY Adv Proc	N/A	N/A	N/A
Plus OF/PD	N/A	N/A	N/A
Net Total	N/A	N/A	N/A
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

13. Cost Variance Analysis

Summary -- (Current (Then-Year Dollars in Millions)

	RDT&E	PROC	TOTAL
Development Estimate	-	7418.9	7418.9
Previous Changes			
Economic	-	-348.3	-348.3
Estimating	1.6	-234.0	-232.4
Support	-	-14.6	-14.6
Subtotal	1.6	-1096.9	-1095.3
Current Changes			
Economic	-	-41.6	-41.6
Estimating	-	-10.6	-10.6
Support	-	-5.2	-5.2
Subtotal	-	-57.4	-57.4
Total Changes	1.6	-1154.3	-1152.7
Current Estimate	1.6	6264.6	6266.2

(FY 1982 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	TOTAL
Development Estimate	-	5265.5	5265.5
Previous Changes	-		
Estimating	1.5	80.2	81.7
Support	-	-7.6	-7.6
Subtotal	1.5	72.6	74.1
Current Changes	-	-	-
Estimating	-	-43.9	-43.9
Support	-	-4.1	-4.1
Subtotal	-	-48.0	-48.0
Total Changes	1.5	24.6	26.1
Current Estimate	1.5	5290.1	5291.6

[redacted] CVN-68 CLASS(CVN-74\75)December 31,1983

13. Cost Variance Analysis

a. Summary -- (Current (Then-Year Dollars in Millions)

	RDT&E	PROC	TOTAL
Development Estimate	-	6966.0	6966.0
Previous Changes			
Economic	-	38.2	38.2
Estimating		-134.8	-134.8
Schedule	-	-644.4	-644.4
Support	-	155.1	155.1
Subtotal	0.0	-585.9	-585.9
Current Changes			
Economic	-	82.1	82.1
Estimating	-	-91.2	-91.2
Support	-	-7.1	-7.1
Subtotal	-	-16.2	-16.2
Total Changes	0.0	-602.1	-602.1
Current Estimate	0.0	6363.9	6363.9

(FY 1988 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	TOTAL
Development Estimate	-	5911.0	5911.0
Previous Changes	-		
Schedule	-	-124.1	-124.1
Estimating	-	-91.0	-91.0
Support	-	119.9	119.9
Subtotal	0.0	-95.2	-95.2
Current Changes	-	-	-
Estimating	-	-110.2	-110.2
Support	-	-4.9	-4.9
Subtotal	-	-115.1	-115.1
Total Changes	0.0	-210.3	-210.3
Current Estimate	0.0	5700.7	5700.7

[redacted]

b. Previous Change Explanations --

[redacted]&E

Estimating: Revised Requirement.

Procurement

Economic: Revised economic rates.

Estimating: Congressional reduction of funds for management reserves, contractor support services, and Independent Research and Development/Bid and Proposal (IR&D/B&D). Also adjustments were made for revised economic indices. Transfer to the FY 1985 Peacekeeper program. Reduced program reserves. Increased change order and shipbuilding contract cost.

Support: Revised estimates for outfitting.

c. Current Change Explanation --

(1) Procurement	(Dollars in Millions) Base-Year	Then-year
Revised economic indicies. (Economic)	0	-41.6
Reduced contract overrun [redacted]inement of program estimates timating).	-8.8 24.9	-10.6
Recalculation of previous change for contract overrun.	-60.0	
Revised estimates for Outfitting and Post Delivery costs (Support).	-4.1	-5.2

14. Program Acquisition Unit Cost (PAUC) History: (Millions of then-year dollars)

a. Initial SAR Estimate to Current Baseline Estimate (Same as Current Baseline)

b. Current Baseline Estimate to Current Estimate

PAUC	Changes								PAUC
(DE)	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	(Current Estimate)
3709.5	-445.0				-121.5	-9.9		-576.5	3133.1

b. Previous Change Explanations --

Procurement

Schedule: Funding of two ships in FY 1988 vice one in Fy 1990 and one in FY 1993. Congresional reduction. Revised economic rates. Revised estimates for Outfitting and Post Delivery.

c. Current Change Explanations --

(1) Procurement	(Dollars in Millions) Base-Year	Then-year
Revised Dec 89 economic rates. (Economic)	N/A	82.1
Gramm-Rudman reduction	-8.2	-9.1
Refinement of program estimates (Estimating).	-70.1	-82.1
Correction of base year dollar calculation. (Estimating)	-31.9	
Revised outfitting estimate. (Support)	-4.9	-7.1

14. Program Acquisition Unit Cost (PAUC) History: (Millions of then-year dollars)

a. Initial SAR Estimate to Current Baseline Estimate (Same as Current Baseline)

b. Current Baseline Estimate to Current Estimate

PAUC	Changes								PAUC
(DE)	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	(Current Estimate)
3483.0	60.2		-322.2		-113.0	74.0		-301.1	3182.0

15. Contract Information:

RDT&E -- N/A

Procurement --

pbuilding Contract	Target	Ceiling	Qty
Newport News Shipbuilding and Dry Dock Co. Newport News,Va. N00024-83-C-2033, FPIF Award/Definitized: December 27, 1982	3143.0	3454.0	2

Current Target Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
3321.3	3647.1	2	3437.3	3539.0

Explanation of Change: This contract does not contain a provision requiring CPR reporting. Progam mamager has funds available to cover funding difference between Est. Price and PMEAC.

Nuclear Components Contracts	Initial Contract Price		
	Target	Ceiling	Qty
General Electric Co. Schenectady, New York N00024-82-C-4004, CPFF Award/Definitized:December 29, 1982	399.8	--	--

Current Target Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
N/A	339.8	N/A	339.8	339.8

Westinghouse Electric Corp. Pittsburgh,Pa N00024-82-C-5002, CPFF Award/Definitized:December 29,1982	Initial Contract Price		
	Target	Ceiling	Qty
	540.1	--	--

Current Target Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
N/A	530.1	N/A	530.1	530.1

c. MILCON -- N/A

15. Contract Information:

. Procurement --

Shipbuilding Contract	Target	Ceiling	Qty
Newport News Shipbuilding and Dry Dock Co. Newport News,Va. N00024-88-C-2055,FPIF Award/Definitized: June 30,1988	3674.0	4318.6	2

Current Target Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
3686.7	4318.6	2	3620.4	3686.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date (12/31/89)	$22.1	$5.0
Net Change	$22.1	$5.0

Explanation of Change:Cost variance is in overhead due to shipyard forecasted work and reduced fringe benefits. Schedule variance reflects shipyard projected material receipts are more consistent with meeting the contract delivery date.

partment of Energy 0024-67-F-5110 Lonomy Act Order Award/Definitized:February 1,1988	Initial Contract Price Target	Ceiling	Qty
	454.3	--	--

Current Target Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
N/A	454.3	N/A	454.3	454.3

Westinghouse Electric Corp. Pittsburgh,Pa N00024-88-C-4007, CPFF Award/Definitized:February 2,1988	Initial Contract Price Target	Ceiling	Qty
	506.2	--	--

Current Target Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
N/A	506.2	N/A	506.2	506.2

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --
(1) Percent Program Completed: 66.7% (6 Yrs/9 Yrs)
(2) Percent Program Cost Appropriated: 99.8% ($6214.5\$6266.2)

b. Appropriation Summary --
(Then-year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY82-90)	Budget Year (FY91)	Balance To Complete (FY92-95)	TOTAL
RDT&E	1.6	-	-	1.6
Procurement	6214.5	22.0	28.1	6264.6
Total	6216.1	22.0	28.1	6266.2

c. Annual Summary --

FISCAL YEAR	QTY	Sailaway FY 82 Dollars Nonrec	Sailaway FY 82 Dollars Rec	Total Base Year	Then-Year Dollars Program	Then-Year Dollars Obligated	Then-Year Dollars Expended	Escl Rate %
APPROPRIATION: RDT&E								
1983	-	1.5	-	1.5	1.6	1.6	1.5	4.9
Total	-	1.5	-	1.5	1.6	1.6	1.5	
APPROPRIATION: SCN								
1982	-	-	427.0	427.0	475.0	462.7	438.2	7.5
1983	2	-	4761.7	4761.7	5661.8	5329.0	4344.4	3.8
1987	-	-	-	6.8	7.7	7.5	7.0	1.5
1988	-	-	-	10.0	11.5	10.7	9.2	2.5
1989	-	-	-	13.4	15.9	13.9	8.0	2.8
1990	-	-	-	34.2	42.6	0.8	-	4.0
1991	-	-	-	16.6	22.0	-	-	4.2
1992	-	-	-	19.8	27.1	-	-	4.0
1993	-	-	-	0.6	1.0	-	-	3.7
1994	-	-	-	-	-	-	-	3.4
Total	2	-	5188.7	5290.1	6264.6	5824.6	4806.8	

[redacted] CVN-68 CLASS(CVN-74/75) December 31,1989

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --
(1) Percent Program Completed: 11.1% (1 Yrs/9 Yrs)
(2) Percent Program Cost Appropriated: 97.7% ($6215.8\$6363.9)

b. Appropriation Summary --

(Then-year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-98)	TOTAL
RDT&E	-	-	-	-	0
Procurement	6215.9		-	148.0	6363.9
Total	6215.9		0.0	148.0	6363.9

c. Annual Summary --

FISCAL YEAR	QTY	Sailaway FY 88 Dollars Nonrec	Sailaway FY 88 Dollars Rec	Total Base Year	Then-Year Dollars Program	Then-Year Dollars Obligated	Then-Year Dollars Expended	Escl Rate %
APPROPRIATION: SCN								
1988	2	-	5597.9	5597.9	6215.9	5751.0	440.5	2.5
1993	-	-	-	12.9	17.0	-	-	3.7
1994	-	-	-	9.8	13.2	-	-	3.4
1995	-	-	-	17.2	24.1	-	-	3.1
1996	-	-	-	30.6	44.7	-	-	3.1
1997	-	-	-	9.2	13.7	-	-	3.1
1998	-	-	-	23.1	35.3	-	-	3.1
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
Total	2	-	5597.9	5700.7	6363.9	5751.0	440.5	

17. Production Rate Data:

a. Annualized Production Rates -- N\A
b. Cost Variance -- N\A
c. Schedule Variance -- N\A
d. Deliveries (PLan/Actual) --

	To Date
RDT&E	0/0
Procurement	1/1

18. a.- c. Operating and Support Costs: N/A

SAR-89-081

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AF-21 NAVSTAR GPS/USEREQMT

NAVSTAR GPS, December 31, 1989

~~SELECTED~~ ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

~~PROGRAM:~~ NAVSTAR GPS/Space and Control and User Equipment

AS OF DATE: December 31, 1989

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AS AMENDED
MAR 1 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

1. ~~Designation and Nomenclature (Popular Name)~~: Navstar GPS/Navstar Global Positioning System (Navstar)/Joint Designation: USArmy, USNavy.

2. ~~DoD Component~~: U.S. Air Force (Lead Service User Equipment) U.S. Army, U.S. Navy, U.S. Marine Corps.

3. ~~Responsible Office and Telephone Number~~:

Navstar GPS Joint Program Office
Space Division
P.O. Box 92960
Los Angeles AFB, CA 90009-2960

Colonel Marty T. Runkle
Assigned: October 21, 1988
AV 833-1526; COMM (213) 643-1526

4. ~~Program Elements/Procurement Line Items~~:

RDT&E: PEs 0305164F, 35164A, 35164N, 0305165F (Shared Funding)
0603421F, 0604478F, 0604777N, 0604778A, 0206626M

PROCUREMENT:
AF APPN 3020 ICN MGPS 00
AF APPN 3010 ICN Multiple
AF APPN 3080 ICN 833280
NAVY APPN 1810
NAVY APPN 1506
NAVY APPN 1611
ARMY APPN 2031
ARMY APPN 2035

MILCON: PE 0305165F
O&M: AF APPN 3400 NAVY APPN 1804 MARINE CORPS APPN 1106

~~Classified by GPS SCG Jul 84~~
~~Classify of OADR~~

~~SECRET~~

5. (U) Related Programs: NUDET Detection System (NDS); Space Shuttle Operations (PAM-D, Shuttle): and Space Boosters Program (Delta II)

6. (U) Mission and Description: The NAVSTAR Global Positioning System (GPS) is a space-based radio positioning, navigation and time distribution system. The GPS will provide precise, continuous, all-weather, common grid worldwide positioning, navigation and time reference capability to a variety of users. Mission areas supported include navigation and position fixing, air interdiction, close air support, special operations, strategic attack, counter-air and aerospace defense, theater and tactical command, control communications and intelligence, and ground and sea warfare. While NAVSTAR GPS does not replace any existing USAF weapon system, it provides the capability to replace part or all of the following support systems: VHF Omnidirectional Range (VOR), Long Range Aid to Navigation (LORAN), OMEGA, Tactical Air Navigation (TACAN), and Distance Measurement Equipment (DME).

7. (U) Program Highlights:

a. Significant Historical Developments -- During Phase I, satellites were launched to support testing at various locations. Highly accurate bombing and navigation resulted in all test objectives being met. In August 1979, GPS was approved to enter Full Scale Development. In 1979 a $500 million DoD funding reduction, spread over FY 1981 - FY 1986, resulted in a restructuring of the program. This restructuring reduced the number of satellites from 24 to 18 (+3 on-orbit spares), delayed the production of user equipment and reduced the number of monitor stations.

Between Sep 78 and Oct 85 ten Block I satellites have been launched to support user equipment testing. Navstar Block I satellites have experienced gradual degradation, however, their performance has been outstanding and six are still fully operational. In September 1982 the long lead contract for the 28 Block II GPS production satellites was let. In May 83 a fixed price multiyear production contract followed the long lead effort. These satellites were to be launched on the Shuttle, but, because of the Challenger accident, a 24 month launch standdown resulted. To minimize the effects of this delay, GPS satellites were designed to be launched both on the Medium Launch Vehicle and the Shuttle. The Block II qualification satellite successfully completed qualification testing in May 1986.

A GPS control segment was developed during the GPS Phase I development program. In Phase II the control segment began to transfer operations from Vandenberg AFB to the Consolidated Space Operations Center at Falcon AFS. The development and deployment of the Operational Control Segment began in September 1980. This system consists of three ground antenna systems and five monitor stations installed at various locations worldwide and a master control station. Operational Control Segment operations were transferred from Vandenberg AFB to Falcon AFS supporting the current GPS operations.

User Equipment full scale development began in July 1979. Following extensive competition during the development phase, a user equipment production program was awarded to Rockwell Collins in April 1985 with production options beginning in March 1986. Initial Operational Test and Evaluation on user equipment was completed in February 1986 surfacing reliability and

maintainability problems. Several reliability improvement initiatives were incorporated into the production program. Based upon these improvements and upon completion of an integrated multi-service test plan for production equipment, the Low Rate Initial production of user equipment was approved in June 1986. The Army re-baselined the GPS program in FY88 and deleted the requirement for 297 user equipment sets. The DAB Milestone IIIB has slipped from Mar 89 to Sep 89 to allow additional test data to be collected to support a full rate production decision.

Twenty replenishment satellites (Block IIR) were added to the program in FY88. In addition, the multi-year satellite production contract (for 28 Block II satellites) was restructured to meet projected space shuttle and Delta II schedules. Ground support equipment and necessary satellite hardware changes were incorporated into the program for the Delta II launch vehicle. The ground control segment program management responsibility transferred to Warner Robins Air Logistics Center on 1 Oct 87. The Air Force accepted delivery of three production Block II satellites in FY89. The first production satellite was launched in Feb 89 at Cape Canaveral on a Delta II launch vehicle. The mission operation support complex became operational at Rockwell International, Seal Beach. In addition, a contract for STS launch delay was awarded. The GPS Block IIR planned acquisition cost was reduced by $209.2M as a result of pursuing a competitive multiyear procurement strategy. The Air Force accepted delivery of 459 user equipment sets for test and evaluation to support a revised full rate DAB IIIB production decision in June 90. In addition, flight test began on 14 aircraft and 10 Army and Navy platforms. The Air Force has conducted IOT&E tests with an F-16 aircraft. The total quantity of user equipment sets decreased 1536 to accompany revised schedule and force structure requirements. The Army changed the procurement appropriation for aircraft user equipment sets to the other appropriation for sets procured starting in FY88.

b. Significant Developments since Last Report -- The Air Force launched five NAVSTAR satellites. The Air Force awarded the Global Positioning System (GPS) Block IIR satellite contract with production options. Also, the Integrated Support Facility contract (ISF) - (The largest Small disadvantaged business contract at Space Systems Division) and the Operational Control System (OCS) Residual Tasks contracts were all successfully awarded. Option 5 of the User Equipment contract was awarded to procure 1177 user sets under the Low Rate Initial Production (LRIP) program. A Non-Developed Item (NDI) competitive contract for the fabrication and delivery of 1012 small Lightweight GPS Receivers (SLGR) was awarded. Draft specifications for acquisition of the Miniaturized Airborne GPS Receiver (MAGR) was released to industry in March 89. Twenty-five companies requested a copy of the draft specifications. The CBD announcement for MAGR was released to industry in December 89. Operational test and evaluation of Air and Sea 5 channel sets was completed. Air Force system level testing was completed. Selective availability anti-spoofing capabilities became compatible with all segments. The Ground Control Segment completed DT&E testing and started OT&E. Block IIA satellite testing is scheduled to begin in July 90. GPS/Operational Control System is on schedule for turnover to AFSPACECOM in April 90. The competitively awarded Block IIR satellite contract resulted in a $209 million savings from the government estimate. This savings was the result of competition and the use of multiyear contract.

The Navstar GPS system is expected to satisfy the mission requirement.

c. Changes Since "As of Date" -- None.

8. Threshold Breaches: There are currently no DAE Baseline (dated Dec 22, 89) threshold breaches.

9. Schedule:

	Development Estimate	Approved Program	Current Estimate
a. Milestones:			
DSARC I (JRMB I)	Dec 73	Dec 73	Dec 73
DSARC II (JRMB II)	Jun 79	Jun 79	Jun 79
Space Segment:			
*Replenishment Satellite Contract Award	Oct 79	N/A	Oct 79
*Block II Satellite Contract Award	Dec 80	N/A	Dec 80
*Satellite Production Contract	Jan 82	N/A	Sep 82
*First Launch Ready Satellite	Apr 85	N/A	May 87
First Production Satellite Launch	Jan 87	Feb 89	Feb 89
Block IIR Contract Award	N/A	Jun 89	Jun 89
Depot Capability	N/A	Sep 92	Sep 92 (Ch-1)
21 Satellites on-orbit	N/A	Mar 93	Mar 93 (Ch-1)
First Block IIR Satellite Launch	N/A	Oct 95	Oct 95 (Ch-2)
Control Segment:			
*Development Contract Award	Sep 80	N/A	Sep 80
Control Segment Turnover to AFSPACECOM	N/A	6 months after 3rd launch	Apr 90 (Ch-3)
*Operat Control Segment (FOC)	Nov 87	N/A	Apr 91
User Segment:			
*Phase IIB FSED Contract Awards	Jul 79	N/A	Jul 79
*Begin DT&E/IOT&E	Jan 83	N/A	Aug 84
*Complete DT&E/IOT&E	Aug 83	N/A	May 86
*Production Contract Award	Jan 84	N/A	Aug 86
AF Begin DT User Equip	N/A	Jul 88	Jul 88
AF End DT User Equip	N/A	May 89	Aug 89 (Ch-4)
Begin UE OT&E	N/A	Jun 89	Jun 89 (Ch-4)
End UE OT&E	N/A	Nov 89	Dec 89 (Ch-4)
First Full-Rate UE Prod Del	N/A	Dec 91	Dec 91

. Schedule (Cont.):

Program:	Development Estimate	Approved Program	Current Estimate
** JRMB Milestone IIIA	Sep 83	Jun 86	Jun 86
** DAB IIIB	Mar 89	Jun 90	Jun 90
*** 3-D Cap (24 hrs/day)	Dec 87	Mar 93	Mar 93 (Ch-5)

* These Milestones are no longer applicable and will be eliminated in subsequent Selected Acquisition Reports (SARs). All future scheduled milestones will reflect the approved Baseline.

** Formerly DSARC . It is anticipated that the U.S. Army production decision will be delayed.

*** 3-Dimensional Capability will be dropped from subsequent SARs & replaced by the mileetone 21 Satellites on-orbit. This milestone more accurately describes the milestone event.

b. Previous Change Explanations --

Satellite contract award date changed based upon 28 satellite block buy contract strategy vice annual buy contract strategy, with reprogramming approval also contributing to the delay. Delay of first launch ready satellite due to slip in schedule of contract award date. Slip of 3-D capability due to OSD reallocation of procurement satellite funding. Delivery of the first Block II atellite slipped from Aug 86 to Jan 87 due to first satellite production roblems. Launch of the first Block II satellite slipped from Jan 87 to Jan 89 due to the Shuttle standdown. 3-D capability also slipped from Dec 88 to Mar 91 as a result of the Shuttle standdown. IOT&E was delayed by user equipment design and host vehicle integration problems. Source Selection was added to the schedule milestones in Dec 84. JRMB Milestone III (IIIA) was delayed 8 months from Sep 83 to May 84 due to user equipment contractor schedule slip. The UE production contract award was delayed 9 months due to user equipment contractor schedule slip and to comply with Public Law 9894. Field testing difficulties further slipped that milestone into late 1985, and retesting did not provide sufficient data to support the milestone, which caused a elip to Feb 86. Reliability and maintainability problems identified during Phase II dictated additional testing which delayed completion of user equipment DT&E and IOT&E and the subsequent Milestone IIIA decision from Feb 86 to May 86. Phase III PDR (Dec 85), Phase III CDR (Jun 86) and JRMB IIIB (Mar 89) milestones were also added. Milestone IIIB, user equipment full rate production, is required to comply with Public Law 9894. The exercise of the first LRIP option was delayed from Mar 86 to Aug 86 and the Phase III CDR slipped from Jan 86 to Dec 86. The PMD has been revised to incorporate the STS standdown. In addition, the full operational capability of the GPS Control Segment has slipped from Nov 87 to Apr 91 due to the STS standdown. Navstar 13 was not launch ready as originally planned. The GPS program will achieve three dimensional capability five months earlier than planned. The JRMB Milestone IIIB for user equipment has been delayed to allow additional testing data to be collected to support congrassional approval for a full rate production decision. The launch schedule has been normalized to assure consistent support, constellation build, and to ooth resulting satellite replenishment requirement. Delay in Delta II initial

9. (U) Schedule (cont'd):

launch capability to Feb 89. Delayed Delta II launches have slipped the three dimensional capability dates. The DAB IIIB decision was changed due to delay in the launch of the first Block II Satellite, late user equipment deliveries for operational testing and increased coordination between the multi-services at the conclusion of testing and the DAB IIIB decision.

c. Current Change Explanations --

(Ch-1) Previously not reported.
(Ch-2) First Block IIR Satellite Launch current estimate changed from Mar 96 to Oct 95 IAW the approved acquistion baseline dated 22 Dec 89.
(Ch-3) Control Segment Turnover to AFSPACECOM provided with current estimate of Apr 90.
(Ch-4) User Equipment current estimate slipped due to late deliveries from Rockwell. Current estimate also slipped because DOT&E (Director Operational Test & Evaluation)withheld approval of the IOT&E start.

(Ch-5) 3-D capability (Blk II Satellite) current estimate changed from Sep 92 to Mar 93.

d. References --

Development Estimate:

(1) Decision Coordinating Paper (DCP) #133, Revision B,1 Feb 1980
(2) Decision Coordinating Paper (DCP) Jun 1986 (User Equipment).

Approved Program: DAE baseline dated 22 December 1989.

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10. (U) Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf A/	Current Estimate
a. (U) Technical --				
Expected Ground Power (End of Life) (dBW)				
a. L1 (C/A) B/	-160	N/A/-160	-155	-160
b. L1 (Precision Code) B/	-163	N/A/-163	-158	-163
c. L2 (Precision Code)	-166	N/A/-166	-159	-166
Cesium Clock Stability (f/f) B/	$2x10^{-13}$	N/A/$2x10^{-13}$	$1.3x10^{-13}$	$2x10^{-13}$
Time Transfer (Universal Coordinated Time) (nsec)	+/-100	+/-100/+/-100	+/-25	+/-100
User Equipment Reliability Mean Time Between Operational Failures (hrs) C/				
a. Airborne				
1) 5 - Channel	550	590/500	130	500
2) 2 - Channel	550	929/500	130	500
b. Ground	850	2000/500	216	500
c. Sea	900	680/680	300	680
User Equipment Maintainability Manhours to Repair (hrs) E/				
a. Airborne				
1) 5 - Channel	1.3	1.0/1.0	0.75	1.0
2) 2 - Channel	1.3	0.75/0.75	0.75	0.75
b. Ground	1.2	0.75/0.75	TBD	0.75
c. Sea	1.3	1.5/1.5	0.77	1.5
Performance				
a. Satellite Maximimum Weight (lbs) (Delta II) (Ch-1)	N/A	4480/4480	4480	4480
b. Expected Ground Power (End of Life) (dbw)				
L1 (C/A)	-160	-160/-160	-160	-160
L1 (Precision Code)	-163	-163/-163	-163	-163
L2 (Precision Code)	-166	-166/-166	-166	-166
c. Cesium Clock Stability (f/f)	$2x10^{-13}$	$2x10^{-13}$/$2x10^{-13}$	$2x10^{-13}$	$2x10^{-13}$
Block II Satellite Design Life (Yrs)	N/A	7.5/7.5	1	7.5

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10. (U) Technical/Operational Characteristics (Cont'd):

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf A/	Current Estimate
b. (S) Operational —				
(U) 3-D Position Accuracy				
(U) of User Equipment B/				
(U) Spherical Error				
(U) Probable (SEP)(m)	16	16/16	10 F/	16
(U) Block II Satellite				
(U) Mean Mission				
(U) Duration (yrs) B/	6	NA/6	5 G/	6
(U) System Availability(%) B/D/	98	98/98	N/A	98
Performance				
a. (U) 3-D System Positioning				
Accuracy for 180 days (m)				
(U) After last Nav update				
Block II	N/A	10/10km	TBD	10km
Block IIR	N/A	16/16km	TBD	16km
b. (S) Satellite Survivability				
(S) Nuclear Threat	(b)(1)			
(S) Gamma Dose Rate				
(S) X-Ray Fluence				
(S) Neutron				
(S) Total Dose				
(S) Laser Threat				
(S) Anti-jam Margins				
(S) User Equipment while Signal Tracking (do J/S)				
(S) Unaided Set				
(S) With Inertial Aiding				
(S) With Inertial Aiding Plus Adaptive Antenna B/				
(S) Time Required Level of Change Degradation				
(S) Level of Clear				
(S) Acquisition (C/A)				
(S) Signal (hrs) H/				
(S)	(b)(1)			
(S)				

A/ The test results under demonstrated performance represent best trials data using prototype equipment that is representative of production equipment. Where no values appear, data is not yet available.

B/ DCP Threshold.

C/ Approved program changes requirement to measure mean time between operational failures.

D/ Probability that a minimum of 21 satellites are operational at any time.

E/ Approved program changed requirement to measure mean time to repair I-level.

F/ The 16 meter objective corresponds to 10 meters achieved with DT&E satellite spacing.

G/ Demonstrated performance of 5.2 years has been obtained for Block I Spacecraft which have a design mean mission duration of 4.0 years. A 6 year mean mission duration represents Block II production satellite design.

H/ Time required to change the degradation level of the selective availability.

c. Previous Change Explanations -- The mean time between maintenance was decreased for the airborne, ground and sea user equipment sets at Milestone IIIB. In addition, airborne user equipment 2 and 5 channel sets were separated for mean time between maintenance and maintainability manhours to repair.

d. (U) Current Change Explanations -- None

e. (U) References:

Development Estimate: Decision Coordinating Paper (DCP) #133, Revision B, dated 1 Feb 80.

Approved Program: DAE Baseline approved 22 December 89.

11. ~~[illegible]~~ Program Acquisition Cost: Satellite (Air Force)

(Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	$967.6	919.3	$956.4
Procurement	623.4	1435.3	1441.3
Spacecraft Flyaway	(583.6)	(1,267.9)	(1,209.9)
Other Weapon System Cost	(39.8)	(167.4)	(231.4)
Construction (MILCON)	8.4	4.7	4.7
Total FY 79 Base-Year $	1599.4	2359.3	2402.4
Escalation	707.3	1681.1	1964.1
Development (RDT&E)	(204.9)	(273.4)	(332.6)
Procurement	(496.1)	(1,405.1)	(1,628.9)
Construction	(6.3)	(2.6)	(2.6)
Total Then-Year $	$2306.7	4040.4	4366.5
b. Quantities			
Development (RDT&E)	12	12	12
Procurement	28	48	54
Total	40	60	66

c. Foreign Military Sales -- None.

d. Nuclear Costs -- None.

e. References --

Development Estimate: Decision Coordination Paper (DCP) #133, Revision B, dated 1 Feb 80.

Approved Program: DAE Baseline dated 22 December 89.

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11. [redacted] Program Acquisition Cost: User Equipment (Tri-Service)

(Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	$941.8	847.0	$937.2
Procurement	1613.1	1372.4	1818.4
Flyaway Cost	(1115.9)	(1,100.5)	(1,184.2)
Other Weapon System Cost	(497.2)	(271.9)	(634.2)
O&M	0	32.6	42.4
Total FY 79 Base-Year $	2554.9	2252.0	2798.0
Escalation	2320.9	1878.0	2970.5
Development (RDT&E)	(441.9)	(368.1)	(483.8)
Procurement	(1879.0)	(1,479.7)	(2,443.7)
O&M	0	(30.2)	(43.0)
Total Then-Year $	4875.8	4130.0	5768.5
b. Quantities			
Development (RDT&E)	129	202	248
Procurement	27210	25377	54624
Total	27339	25579	54872

c. Foreign Military Sales -- Sales to date include 30 to West Germany for $10.6M, and 3 to Canada for $.3M.

d. Nuclear Costs -- None.

e. References --

Development Estimate: Decision Coordination Paper (DCP) dated Jun 86.

Approved Program: DAE Baseline dated 22 December 89.

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12. [U] Program Acquisition/Current Procurement Unit Cost Summary: Satellite (Air Force)

(Current (Then Year) Dollars in Millions)

a. Program Acquisition --	Current Estimate (Dec 89 SAR)	Current Year UCR Baseline (Dec 88 SAR)	Budget Year UCR Baseline (DEC 89 SAR)
(1) Cost	4366.5	4040.4	4366.5
(2) Quantity	66	60	66
(3) Unit Cost	66.159	67.340	66.159
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)*	(FY 1991)
(1) Cost	48.0	48.0	201.7
Less CY Adv Proc	--	--	80.8
Plus PY Adv Proc	--	--	--
Net Total	48.0	48.0	120.9
(2) Quantity	0	0	0
(3) Unit Cost	N/A	N/A	N/A

12. [U] Program Acquisition/Current Procurement Unit Cost Summary: User Equipment (Tri-Service)

(Current (Then Year) Dollars in Millions)

a. Program Acquisition --	Current Estimate (Dec 89 SAR)	Current Year UCR Baseline (Dec 88 SAR)	Budget Year UCR Baseline (DEC 89 SAR)
(1) Cost	5768.5	4130.0	5768.5
(2) Quantity	54872	25579	54872
(3) Unit Cost	0.105	0.161	0.105
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)*	(FY 1991)
(1) Cost	136.3	136.3	173.8
Less CY Adv Proc	--	--	--
Plus PY Adv Proc	--	--	--
Net Total	136.3	136.3	173.8
(2) Quantity	680	680	927
(3) Unit Cost	0.200	0.200	0.187

* Adjusted to reflect FY90 Appropriations Act in accordance with congressional change to SAR law.

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13. Cost Variance Analysis: Satellite (Air Force)

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1172.5	1119.5	14.7	2306.7
Previous Changes:				
Economic	-38.6	-82.8	-1.4	-122.8
Quantity	--	844.9	--	844.9
Schedule	6.8	616.8	--	623.6
Engineering	269.1	344.0	--	613.1
Estimating	-275.9	-274.4	0.5	-549.8
Other	--	--	--	0.0
Support	58.8	272.4	-6.5	324.7
Subtotal	20.2	1720.9	-7.4	1733.7
Current Changes:				
Economic	8.3	139.7	--	148.0
Quantity	--	114.4	--	114.4
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	88.0	-253.3	--	-165.3
Other	--	--	--	--
Support	--	229.0	--	229.0
Subtotal	96.3	229.8	0.0	326.1
Total Changes	116.5	1950.7	-7.4	2059.8
Current Estimate	1289.0	3070.2	7.3	4366.5

13. [redacted] Cost Variance Analysis: Satellite (Air Force)

(FY 1979 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	967.6	623.4	8.4	1599.4
Previous Changes:				
Quantity	--	376.0	--	376.0
Schedule	4.5	--	--	4.5
Engineering	149.4	239.0	--	388.4
Estimating	-235.3	69.3	0.4	-165.6
Other	--	--	--	--
Support	33.1	127.6	-4.1	156.6
Subtotal	-48.3	811.9	-3.7	759.9
Current Changes:				
Quantity	--	48.6	--	48.6
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	37.1	-106.6	--	-69.5
Other	--	--	--	--
Support	--	64.0	--	64.0
Subtotal	37.1	6.0	--	43.1
Total Changes	-11.2	817.9	-3.7	803.0
Current Estimate	956.4	1441.3	4.7	2402.4

b. Previous Change Explanations:

RDT&E:

Economic: Revised economic escalation indices.

Schedule: One year acceleration in design/development of flexible modular interface for tailoring user equipment to host vehicles.

Engineering: Support requirement to develop and to integrate product improvement on the Block II space vehicle. Funds were deleted for GPS User charges with the GPS Survivability Program being redefined. Increased development and test associated with addition of replenishment satellite procurement and ground operations through the year 2000.

Estimating: Funding for additional year in support of Control and User Segments partially offset by funds reprogrammed for the NUDET Detection System (NDS) Ground Command terminal. Transfer of funds from aircraft procurement appropriation to RDT&E for integration studies on user equipment host vehicle platforms. Funds provided in FY 87 to allow more Phase II host vehicle integration studies and in FY 86-88 for necessary control segment modifications for interface with Block II satellites. Funds decreased due to reduced testing of

13. (U) Cost Variance Analysis: Satellite (Air Force)

b. Previous Change Explanations (cont'd)

with Block II satellites. Funds decreased due to reduced testing of Phase IIB User Equipment. FY 84 contingent liabilities withdrawal, engineering change order reduction to absorb Congressional/DOD unspecified funding cuts for FY 86-91, and adjustment made for prior year escalation changes. Adjustment for current and prior year escalation changes. Correction of FY 87 funding which did not include Block IIR funding. Program funding reductions associated with Block IIR.

Support: Funding reduced for delay in Beneficial Occupancy Data for Master Control Station move into Consolidated Space Operations Center and decreased level of FCRC support. Additional costs to continue control segment support until turnover to Space Command (FY91) and other program support resulting from space shuttle launch delays. Increase in support costs associated with the replenishment satellite development and test effort.

PROCUREMENT:

Economic: Revised economic escalation indices.

Quantity: Twenty Block IIR (replenishment) satellites procured on an annual basis were added to the program.

Schedule: One year delay in satellite production start. Cost associated with delay of STS launch capability have been added. Decreased costs attributable to changing replenishment satellite procurement to four per year.

Engineering: Funding reduced with the deletion of crosslink ranging, additional hardening and aut onomous housekeeping. Engineering variances associated with the increase in 20 replenishment satellites.

Estimating: Change in satellite procurement approach from an annual to a multiyear procurement. Savings partially offset by need to fully fund satellites by Congressional direction. Adjustments made for prior year escalation changes. Intra-appropriation reprogramming to realign the funding levels between GPS, PAM-D and NDS within the approved multiyear funding. Realignment of funds between support equipment and satellite hardware to correctly reflect actual breakout. Funds added for Orbital Insertion Motor and Data Transfer System for GPS satellites. Funds of Engineering Change Orders (ECOs) reduced to absorb Congressional/DOD unspecified funding cuts for FY 86-91. Correction to recategorize current and prior year escalation from support to estimating. Increase in estimating changes applicable to the addition of 20 replenishment satellites.

Support: Flight operations associated with the one year extension in the satellite program and realignment of costs between support equipment and satellite hardware to reflect actual breakout. Additional funds have been added for the Shuttle Recovery Program. Support cost associated with the addition of 20 replenishment satellites.

MILCON:

Economic: Revised economic escalation indices.

Estimating: Adjustment for difference between President's Budget and required funding.

Support: Deletion of Consolidated Space Operation Center (CSOC) contingency funding.

c. Current Change Explanations:

	(Dollars in Millions) Base-Year $	Then-Year $
(1) RDT&E:		
Revised economic escalation indices. (Economic)	-	+8.3
Adjustment for current and prior year escalation change. (Estimating)	-	-0.1
Increased funding for Block IIR Development. (Estimating)	+23.3	+49.3
Additional contract support for Block IIR in years 2001 - 2006. (Estimating)	+13.8	+38.8
(2) PROCUREMENT:		
Revised economic escalation indices. (Economic)	-	+139.7
Adjustment for current and prior year escalation change. (Estimating)	-1.0	-2.3
Addition of 6 satellites. (Quantity)	+48.6	+114.4
Adjustment to reflect contract cost for addition of 6 satellites. (Estimating)	+14.2	+33.5
Additional years funding for support of Block IIR. (Support)	+58.9	+192.2
Benefit of multiyear procurement funds (Estimating)	-118.4	-291.3
Additional years funding for Block IIR. (Estimating)	+8.2	+26.8
Correction of prior SAR Support/Flyaway distribution. (Support)	+5.1	+36.8
Congressional reduction FY90. (Estimating)	-9.6	-20.0

(3) MILCON: None.

13. Cost Variance Analysis: User Equipment (Tri-Service)

a. Summary - (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	O&M	TOTAL
Development Estimate	1383.7	3492.1	--	4875.8
Previous Changes:				
Economic	-8.7	-213.1	--	-221.8
Quantity	--	-80.0	--	-80.0
Schedule	--	132.4	--	132.4
Engineering	--	-54.9	--	-54.9
Estimating	-159.9	41.2	62.8	-55.9
Other	--	--	--	0.0
Support	--	-465.6	--	-465.6
Subtotal	-168.6	-640.0	62.8	-745.8
Current Changes:				
Economic	5.9	276.9	--	282.8
Quantity	--	215.9	--	215.9
Schedule	--	215.1	--	215.1
Engineering	--	--	--	--
Estimating	200.0	438.1	22.6	660.7
Other	--	--	--	--
Support	--	264.0	--	264.0
Subtotal	205.9	1410.0	22.6	1638.5
Total Changes	37.3	770.0	85.4	892.7
Current Estimate	1421.0	4262.1	85.4	5768.5

13. [redacted] Cost Variance Analysis: User Equipment (Tri-Service)

(FY 1979 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	O&M	TOTAL
Development Estimate	941.8	1613.1	--	2554.9
Previous Changes:				
Quantity	--	-35.0	--	-35.0
Schedule	--	--	--	--
Engineering	--	-24.8	--	-24.8
Estimating	-94.8	44.4	32.6	-17.8
Other	--	--	--	--
Support	--	-225.3	--	-225.3
Subtotal	-94.8	-240.7	32.6	-302.9
Current Changes:				
Quantity	--	39.6	--	39.6
Schedule	--	39.3	--	39.3
Engineering	--	--	--	--
Estimating	90.2	278.8	9.8	378.8
Other	--	--	--	--
Support	--	88.3	--	88.3
Subtotal	90.2	446.0	9.8	546.0
Total Changes	-4.6	205.3	42.4	243.1
Current Estimate	937.2	1818.4	42.4	2798.0

b. Previous Change Explanations:

RDT&E:

Economic: Revised economic escalation indices.
Schedule: None.
Engineering: None.
Estimating: Decreased aircraft modification efforts and prior year escalation. Revised platform integration estimates from aircraft manufacturers. Adjustment for current and prior year escalation change.
Support: None.

PROCUREMENT:

Economic: Revised economic escalation indices.
Quantity: Reduced production procurement of Army user (-297) equipment sets. Reduction in flyaway cost associated with the decrease in quantity of 7684 aircraft user equipment sets. Increase in flyaway cost associated with the increase in quantity of 6148 other procurement appropriation user equipment sets.

13. ~~TOY~~ Cost Variance Analysis: User Equipment (Tri-Service)

b. Previous Change Explanations (cont'd):

Schedule:	Procurement schedule restructured toward the outyears due to revised force structure requirements.
Engineering:	Incorporation of Value Engineering Change Proposal for User Equipment Receiver.
Estimating:	Decreased aircraft modification efforts and prior year escalation. Decreased engineering change proposals. Adjustment for current and prior year escalation change. Estimating changes applicable to type of units procured and reduced quantities. Correction of previous SARs related to change in quantity of aircraft user equipment sets. Correction of prior allocation of flyaway (increase) cost for aircraft user equipment sets.
Support:	The associated savings with reduced aircraft modification efforts. Decreased initial spares and support equipment associated with the reduced user equipment procurement (297 sets).equipment sets. Decreased initial spares and support equipment associated with the reduced user equipment procurement. Increased initial spares and support equipment associated with the increased user equipment procurement. Reduction in FY88-89 support equipment and technical data estimates. Correction of prior allocation of support (reduce) for aircraft user equipment sets.

O&M:

Estimating:	Installation funding for Air Force user equipment modifications which will be performed at Air Force Logistics centers.

c. Current Change Explanations:

	(Dollars in Millions) Base-Year $	Then-Year $
(1) RDT&E:		
Revised economic escalation indices. (Economic)	-	+5.9
Adjustment for current and prior year escalation change. (Estimating)	-	+0.3
Increased cost for Navy group "B" and "A" kits (Estimating)	+90.2	+199.7
(2) PROCUREMENT:		
Revised economic escalation indices. (Economic)	-	+276.9
The Navy added 2424 Minature Airborne GPS Receivers (MAGR) and 2141 sets. The Army added 28094 Small Lightweight GPS Receivers (SLGR) and 238 MAGR sets. (Quantity)	+39.6	+215.9
All services equally attributed to the schedule increase by delaying numerous platform installations due to budget constraints. (Schedule)	+39.3	+215.1
Funding for Navy "A" kit. See Narrative after paragraph 16 on page 35 of this SAR. (Estimating)	+278.8	+438.1
Increased support resulting from schedule delays and program stretch out. (Support)	+88.3	+264.0

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c. Current Change Explanations:

(Dollars in Millions)

	Base-Year $	Then-Year $
(3) O & M:		
Addition of Marine and Navy Shipbuilding and Construction-Navy (SCN)	+9.8	+22.6

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14. [redacted] Program Acquisition Unit (PAUC) History:
Satellite (Air Force) (Millions of Then-Year Dollars)

a. Initial SAR/Development Estimate to Current Estimate

PAUC (Initial SAR /Dev Est)	Changes								PAUC (Curr Est)
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
57.668	0.382	-8.183	9.448	9.289	-10.835	0.000	8.390	8.491	66.159

14. [redacted] Program Acquisition Unit (PAUC) History:
User Equipment (Tri-Service) (Millions of Then-Year Dollars)

a. Initial SAR/Development Estimate to Current Estimate

PAUC (Initial SAR /Dev Est)	Changes								PAUC (Curr Est)
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
0.178	0.001	-.087	0.006	-0.001	0.011	0.000	-0.004	-0.073	0.105

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E --

User Equipment	Initial Contract Price Target	Ceiling	Qty
Rockwell International Collins Cedar Rapids, Iowa F04701-85-C-0038, FPIF, Award: April 1, 1985 Definitized: April 1, 1985	$61.9M	$66.3M	51

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$153.8M	$161.9M	238	$159.7M	$162.2M

	Cost Variance	Schedule Variance
Previous Cumulative Variance	-$13.5M	-$3.5M
Cumulative Variances to Date (12/01/89)	-$11.7M	-$1.5M
Net Change	$ 1.8M	+$2.0M
Cumulative Variance Change Percent	+13.3	+57.1

Explanation of Change:

Cost Variance:

The majority of the cost variance was due to the late completion of required qualification tests on the 5 channel receivers for air & sea applications. The tests have been completed & the cost variance has been decreasing steadily since Jun 89.

Impact to program: None

Schedule Variance:

The schedule variance is due to delays encountered in fabrication & testing of 5 channel receivers.

Impact to Program: Operational testing has been compressed & the DAB IIIB has been rescheduled to Jun 90. The schedule variance has been decreasing steadily since Jun 89 and additional schedule impact is not expected.

b. Procurement --

Satellite	Initial Contract Price Target	Ceiling	Qty
Rockwell International Seal Beach, CA F04701-83-C-0031, FFP/CPFF Award: May 20, 1983 Definitized: May 20, 1983	$1,171.0	N/A	28

15. Contract Information (Cont'd): (Then-Year Dollars in Millions)

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$1350.1	$1350.1	28.0	$1350.1	$1350.1

	Cost Variance	Schedule Variance
Previous Cumulative Variance	$1.5M	-$0.2M
Cumulative Variances to Date (9/30/89)	$1.0M	-$1.6M
Net Change	-$0.5M	-$1.4
Cumulative Variance Change Percent	-33.3%	-700.0%

Explanation of Change: The contract Target/Ceiling price increased from the last reporting period by 4.1M due to addition of the following: Nonsurvivability Upgrade, W-Sensor Filtering of its Transmission Phase I & II and Work Request FSDU-GPS-0017. There is no impact to the contract or program.

User Equipment	Initial Contract Price Target	Ceiling	Qty
Rockwell International Collins Cedar Rapids, Iowa F04701-85-C-0038, FPIF, Award: April 1, 1985 efinitized: April 1, 1985	$55.3M	$56.9M	356

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$271.2 M	$279.1M	4264.0	$279.1M	$286.2M

	Cost Variance	Schedule Variance
Previous Cumulative Variance	- $4.5M	- $13.6M
Cumulative Variances to Date (12/01/89)	-$10.7M	-$11.2M
Net Change	-$6.2M	$2.4M
Cumulative Variance Change Percent	-137.8%	+17.6%

Explanation of Change:

Cost Variance:

The major cost variance is due to the late completion of qualification testing & the beginning of the initial production (LRIP). This slip caused a 12.5% increase to the cost variance which has remained steady and improved since Jun 89. There is no impact to the contract or the program.

Schedule Variance:

The cumulative schedule variance is due to part delays and rework to correct quality issues. The schedule variance has decreased steadily in the past year and additional slips are not expected. There is no impact to the contract or program.

16. [redacted] Program Funding Summary: Satellite (Air Force)

(Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 51.5% (17 yrs/ 33 yrs)

(2) Percent Program Cost Appropriated: 52.3% ($2281.8 / $4366.5)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY74-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-06)	Total
RDT&E	1018.8	32.9	48.9	188.4	1289.0
PROCUREMENT	1174.8	48.0	201.7	1645.7	3070.2
MILCON	7.3	--	--	--	7.3
TOTAL	2200.9	80.9	250.6	1834.1	4366.5

16. [redacted] Program Funding Summary: User Equipment (Tri-Service)

(Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 51.5% (17 yrs / 33 yrs)

(2) Percent Program Cost Appropriated: 30.6% ($1762.5/$5768.5)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY74-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-06)	Total
AF RDT&E	357.3	35.2	12.9	63.2	468.6
Navy RDT&E	456.3	43.2	51.9	249.3	800.7
Army RDT&E	137.7	7.6	6.4	0.0	151.7
TOTAL RDT&E	951.3	86.0	71.2	312.5	1421.0
AF Aircraft	345.6	84.1	103.8	2207.5	2741.0
Navy Aircraft	16.3	10.2	16.4	576.5	619.4
Army Aircraft	25.5	0.0	0.0	0.0	25.5
Scn Aircraft	4.3	2.5	2.4	16.3	25.5
Marine Corps Aircraft	0.0	0.0	0.0	27.2	27.2
Total Aircraft	391.7	96.8	122.6	2827.5	3438.6
AF Other	51.5	9.7	5.5	46.3	113.0
Navy Other	82.1	11.4	13.8	81.6	188.9
Army Other	48.7	18.4	31.9	422.6	521.6
Total Other	182.3	39.5	51.2	550.5	823.5
Total Procurement	574.0	136.3	173.8	3378.0	4262.1

16. [redacted] Program Funding Summary: (cont'd)

b. Appropriation Summary --
(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY74-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-06)	Total
AF O&M	0.0	3.5	0.0	0.0	3.5
Navy O&M	6.6	4.8	7.5	38.1	57.0
Marine Corps O&M	0.0	0.0	0.0	24.9	24.9
Total O&M	6.6	8.3	7.5	63.0	85.4
GRAND TOTAL	1531.9	230.6	252.5	3753.5	5768.5

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- Satellite

Fiscal Year	Qty	Flyaway FY79 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
				Appropriation: RDT&E				
1974	-	-	-	9.4	6.4	6.4	6.4	N/A
1975	-	-	-	25.5	19.1	19.1	19.1	9.8
1976	-	-	-	72.2	58.9	58.9	58.9	9.4
197T	-	-	-	12.0	10.6	10.6	10.6	4.9
1977	-	-	-	56.3	50.2	50.2	50.2	4.6
1978	-	-	-	55.9	53.3	53.3	53.3	7.1
1979	-	-	-	53.9	56.0	56.0	56.0	7.1
1980	-	-	-	88.3	101.9	101.9	101.9	9.4
1981	-	-	-	78.8	100.7	100.7	100.7	11.9
1982	-	-	-	100.6	137.4	137.4	137.4	9.2
1983	-	-	-	67.3	96.2	96.2	96.2	4.9
1984	-	-	-	67.8	100.7	100.7	100.7	3.9
1985	-	-	-	49.1	75.2	75.2	75.2	3.4
1986	-	-	-	28.7	45.1	45.1	44.0	2.8
1987	-	-	-	21.6	35.0	35.0	34.0	2.7
1988	-	-	-	15.4	25.9	25.9	19.6	3.1
1989	-	-	-	26.4	46.2	38.4	6.0	4.2
1990	-	-	-	18.0	32.9	0.2	0.0	4.0
1991	-	-	-	25.8	48.9	0.0	0.0	4.2
1992	-	-	-	18.5	36.4	0.0	0.0	4.0
1993	-	-	-	9.2	18.8	0.0	0.0	3.7
1994	-	-	-	9.3	19.5	0.0	0.0	3.4
1995	-	-	-	8.5	18.5	0.0	0.0	3.1
1996	-	-	-	8.5	19.0	0.0	0.0	3.1
1997	-	-	-	8.4	19.4	0.0	0.0	3.1
1998	-	-	-	2.5	5.9	0.0	0.0	3.1
1999	-	-	-	2.4	6.0	0.0	0.0	3.1
2000	-	-	-	2.4	6.1	0.0	0.0	3.1
2001	-	-	-	2.4	6.2	0.0	0.0	3.1
2002	-	-	-	2.3	6.3	0.0	0.0	3.1
2003	-	-	-	2.3	6.4	0.0	0.0	3.1
2004	-	-	-	2.3	6.5	0.0	0.0	3.1
2005	-	-	-	2.2	6.6	0.0	0.0	3.1
2006	-	-	-	2.2	6.8	0.0	0.0	3.1
Sub-total	12	-	-	956.4	1289.0	1011.2	970.2	

* Reflects Program Office Records as of 31 Dec 89.

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- Satellite

Fiscal Year	Qty	Flyaway FY79 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
				Appropriation: PROCUREMENT				
1982	-	0.7	0.0	13.2	20.1	20.1	20.1	N/A
1983	-	21.9	0.0	69.3	111.5	111.5	111.5	9.0
1984	1	0.0	25.5	152.6	256.0	256.0	256.0	8.0
1985	6	0.0	128.7	192.9	331.4	331.4	323.4	3.4
1986	9	0.0	189.1	114.1	203.4	203.4	149.8	2.8
1987	8	0.0	158.8	46.8	86.7	86.7	47.2	2.7
1988	4	0.0	68.7	47.5	91.4	90.7	25.5	3.1
1989	-	10.4	0.0	36.7	74.3	49.4	7.8	4.2
1990	-	12.4	0.0	22.8	48.0	11.0	0.0	4.0
1991	-	63.9	0.0	92.5	201.7	0.0	0.0	4.2
1992	5	0.0	99.1	118.4	266.9	0.0	0.0	4.0
1993	6	0.0	108.6	121.4	282.7	0.0	0.0	3.7
1994	6	0.0	99.1	113.9	273.3	0.0	0.0	3.4
1995	5	0.0	87.1	92.5	229.0	0.0	0.0	3.1
1996	4	0.0	49.4	49.4	125.9	0.0	0.0	3.1
1997	-	36.7	0.0	36.7	96.6	0.0	0.0	3.1
1998	-	13.4	0.0	13.4	36.4	0.0	0.0	3.1
1999	-	13.4	0.0	13.4	37.6	0.0	0.0	3.1
2000	-	13.4	0.0	13.4	38.7	0.0	0.0	3.1
2001	-	13.4	0.0	13.4	39.8	0.0	0.0	3.1
2002	-	1.7	0.0	13.4	41.1	0.0	0.0	3.1
2003	-	1.7	0.0	13.4	42.4	0.0	0.0	3.1
2004	-	1.7	0.0	13.4	43.7	0.0	0.0	3.1
2005	-	1.5	0.0	13.4	45.1	0.0	0.0	3.1
2006	-	1.5	0.0	13.4	46.5	0.0	0.0	3.1
Sub-total	54	195.8	1014.1	1441.3	3070.2	1160.2	941.3	
				Appropriation: MILCON				
1984	-	-	-	4.7	7.3	7.3	7.3	3.8
Sub-total	-	-	-	4.7	7.3	7.3	7.3	
TOTAL	66	195.8	1014.1	2402.4	4366.5	2178.7	1918.8	

* Reflects Program Office Records as of 31 Dec 89.

16. [redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- User Equipment

Fiscal Year	Qty	Flyaway FY79 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
				Appropriation: RDT&E (Tri-Service)				
1974	-	-	-	9.3	6.3	6.3	6.3	N/A
1975	-	-	-	19.5	14.6	14.6	14.6	9.8
1976	-	-	-	40.8	33.3	33.3	33.3	9.4
197T	-	-	-	6.7	5.9	5.9	5.9	4.9
1977	-	-	-	31.3	27.9	27.9	27.9	4.6
1978	-	-	-	25.5	24.3	24.3	24.3	7.1
1979	-	-	-	37.7	39.2	39.2	39.2	7.1
1980	-	-	-	50.3	58.0	58.0	58.0	9.4
1981	-	-	-	46.4	59.3	59.3	59.3	11.9
1982	-	-	-	47.6	65.0	65.0	65.0	9.2
1983	-	-	-	45.3	64.7	64.7	64.7	4.9
1984	-	-	-	57.1	84.9	84.9	83.2	3.9
1985	-	-	-	59.5	91.1	91.1	86.1	3.4
1986	-	-	-	59.3	93.4	93.4	89.4	2.8
1987	-	-	-	59.8	97.1	97.1	87.5	2.7
1988	-	-	-	57.7	97.1	96.9	69.3	3.1
1989	-	-	-	50.8	89.0	70.2	34.9	4.2
1990	-	-	-	47.2	86.0	21.9	1.3	4.0
1991	-	-	-	37.6	71.2	0.0	0.0	4.2
1992	-	-	-	27.8	54.8	0.0	0.0	4.0
1993	-	-	-	35.7	72.9	0.0	0.0	3.7
1994	-	-	-	19.9	41.8	0.0	0.0	3.4
1995	-	-	-	33.2	72.2	0.0	0.0	3.1
1996	-	-	-	19.4	43.5	0.0	0.0	3.1
1997	-	-	-	11.8	27.3	0.0	0.0	3.1
Sub-tota	248	-	-	937.2	1421.0	954.0	850.2	

* Reflects Program Office Records as of 31 Dec 89.

16. [redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- User Equipment

Fiscal Year	Qty	Flyaway FY79 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
Appropriation: RDT&E (Air Force)								
1974	-	-	-	1.5	1.0	1.0	1.0	N/A
1975	-	-	-	6.4	4.8	4.8	4.8	9.8
1976	-	-	-	19.5	15.9	15.9	15.9	9.4
197T	-	-	-	3.1	2.7	2.7	2.7	4.9
1977	-	-	-	15.5	13.8	13.8	13.8	4.6
1978	-	-	-	14.4	13.7	13.7	13.7	7.1
1979	-	-	-	18.9	19.6	19.6	19.6	7.1
1980	-	-	-	29.8	34.4	34.4	34.4	9.4
1981	-	-	-	19.2	24.5	24.5	24.5	11.9
1982	-	-	-	20.5	28.0	28.0	28.0	9.2
1983	-	-	-	18.1	25.9	25.9	25.9	4.9
1984	-	-	-	13.3	19.8	19.8	19.8	3.9
1985	-	-	-	13.5	20.7	20.7	20.7	3.4
1986	-	-	-	16.4	25.8	25.8	25.8	2.8
1987	-	-	-	17.4	28.3	28.3	28.3	2.7
1988	-	-	-	22.4	37.7	37.7	22.8	3.1
1989	-	-	-	23.2	40.7	25.5	6.9	4.2
1990	-	-	-	19.3	35.2	0.1	0.0	4.0
1991	-	-	-	6.8	12.9	0.0	0.0	4.2
1992	-	-	-	6.6	13.1	0.0	0.0	4.0
1993	-	-	-	15.6	31.9	0.0	0.0	3.7
1994	-	-	-	2.4	5.0	0.0	0.0	3.4
1995	-	-	-	3.8	8.3	0.0	0.0	3.1
1996	-	-	-	2.2	4.9	0.0	0.0	3.1
Sub-tota	146	-	-	329.8	468.6	342.2	308.6	

* Reflects Program Office Records as of 31 Dec 89.

16. [redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- User Equipment

Fiscal Year	Qty	Flyaway FY79 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated *	Ex-pended *	
AGP-Q				Appropriation: RDT&E (Navy)				
1974	-	-	-	6.0	4.1	4.1	4.1	N/A
1975	-	-	-	8.7	6.5	6.5	6.5	9.8
1976	-	-	-	13.5	11.0	11.0	11.0	9.4
197T	-	-	-	1.8	1.6	1.6	1.6	4.9
1977	-	-	-	7.4	6.6	6.6	6.6	4.6
1978	-	-	-	3.8	3.6	3.6	3.6	7.1
1979	-	-	-	9.5	9.9	9.9	9.9	7.1
1980	-	-	-	8.8	10.1	10.1	10.1	9.4
1981	-	-	-	13.4	17.1	17.1	17.1	11.9
1982	-	-	-	22.0	30.0	30.0	30.0	9.2
1983	-	-	-	19.7	28.1	28.1	28.1	4.9
1984	-	-	-	39.9	59.3	59.3	57.6	3.9
1985	-	-	-	38.4	58.8	58.8	53.8	3.4
1986	-	-	-	35.7	56.2	56.2	52.2	2.8
1987	-	-	-	39.6	64.3	64.3	54.7	2.7
1988	-	-	-	29.4	49.4	49.4	38.8	3.1
1989	-	-	-	22.7	39.7	38.9	25.0	4.2
1990	-	-	-	23.7	43.2	20.7	1.2	4.0
1991	-	-	-	27.4	51.9	0.0	0.0	4.2
1992	-	-	-	21.2	41.7	0.0	0.0	4.0
1993	-	-	-	20.1	41.0	0.0	0.0	3.7
1994	-	-	-	17.5	36.8	0.0	0.0	3.4
1995	-	-	-	29.4	63.9	0.0	0.0	3.1
1996	-	-	-	17.2	38.6	0.0	0.0	3.1
1997	-	-	-	11.8	27.3	0.0	0.0	3.1
Sub-total	89	-	-	488.6	800.7	476.2	411.9	

* Reflects Program Office Records as of 31 Dec 89.

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- User Equipment

Fiscal Year	Qty	Flyaway FY79 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
Appropriation: RDT&E (Army)								
1974	-	-	-	1.8	1.2	1.2	1.2	N/A
1975	-	-	-	4.4	3.3	3.3	3.3	9.8
1976	-	-	-	7.8	6.4	6.4	6.4	9.4
197T	-	-	-	1.8	1.8	1.6	1.6	4.9
1977	-	-	-	8.4	7.5	7.5	7.5	4.6
1978	-	-	-	7.3	7.0	7.0	7.0	7.1
1979	-	-	-	9.3	9.7	9.7	9.7	7.1
1980	-	-	-	11.7	13.5	13.5	13.5	9.4
1981	-	-	-	13.8	17.7	17.7	17.7	11.9
1982	-	-	-	5.1	7.0	7.0	7.0	9.2
1983	-	-	-	7.5	10.7	10.7	10.7	4.9
1984	-	-	-	3.9	5.8	5.8	5.8	3.9
1985	-	-	-	7.6	11.6	11.6	11.6	3.4
1986	-	-	-	7.2	11.4	11.4	11.4	2.8
1987	-	-	-	2.8	4.5	4.5	4.5	2.7
1988	-	-	-	5.9	10.0	9.8	7.7	3.1
1989	-	-	-	4.9	8.6	5.8	3.0	4.2
1990	-	-	-	4.2	7.6	1.1	0.1	4.0
1991	-	-	-	3.4	6.4	0.0	0.0	4.2
Subtota	13	-	-	118.8	151.7	135.6	129.7	

* Reflects Program Office Records as of 31 Dec 89.

16. [redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- User Equipment

Fiscal Year	Qty	Flyaway FY79 Dollars Nonrec	Flyaway FY79 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated *	Total Then-Year $ Expended *	Escl Rate (%)
Appropriation: PROCUREMENT (Tri-Service)								
1985	0	0.0	0.0	4.6	8.0	8.0	8.0	3.4
1986	357	17.3	22.6	59.0	101.0	100.7	88.7	2.8
1987	772	15.1	35.5	73.3	131.3	129.6	104.3	2.7
1988	1385	11.8	44.9	92.4	171.7	158.3	101.7	3.1
1989	1179	6.8	37.2	82.4	162.1	128.0	31.0	4.2
1990	680	7.2	27.8	66.8	136.3	0.0	0.0	4.0
1991	927	7.8	35.9	82.2	173.8	0.0	0.0	4.2
1992	3365	18.0	88.4	164.5	360.3	0.0	0.0	4.0
1993	3224	21.5	99.2	180.1	411.4	0.0	0.0	3.7
1994	4912	13.8	109.1	203.4	480.3	0.0	0.0	3.4
1995	5092	11.2	110.5	179.4	435.6	0.0	0.0	3.1
1996	4803	15.9	89.6	155.0	390.1	0.0	0.0	3.1
1997	4636	2.7	85.8	155.2	403.0	0.0	0.0	3.1
1998	4233	4.2	72.4	98.1	261.8	0.0	0.0	3.1
1999	3981	1.1	54.7	70.8	194.6	0.0	0.0	3.1
2000	3547	0.1	36.9	47.9	135.0	0.0	0.0	3.1
2001	3372	0.1	29.8	39.4	113.9	0.0	0.0	3.1
2002	3164	0.1	26.9	33.0	98.1	0.0	0.0	3.1
2003	2656	0.1	13.6	17.8	53.3	0.0	0.0	3.1
2004	2339	0.1	8.5	12.3	37.7	0.0	0.0	3.1
2005	0	0.0	0.0	0.8	2.8	0.0	0.0	3.1
2006	0	0.0	0.0	0.0	0.1	0.0	0.0	3.1
Sub-total	54624	154.9	1029.3	1818.4	4262.1	524.6	333.7	

* Reflects Program Office Records as of 31 Dec 89.

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- User Equipment

Fiscal Year	Qty	Flyaway FY79 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
Appropriation: AIRCRAFT PROCUREMENT (Air Force)								
1985	0	0.0	0.0	4.6	8.0	8.0	8.0	3.4
1986	70	4.9	8.1	27.8	49.1	49.1	45.9	2.8
1987	299	4.5	21.3	41.4	76.3	76.3	72.9	2.7
1988	269	5.6	22.6	56.6	108.5	108.5	74.8	3.1
1989	298	4.7	15.0	51.4	103.7	82.4	25.9	4.2
1990	195	3.9	9.8	40.1	84.1	0.0	0.0	4.0
1991	119	6.2	11.0	47.8	103.8	0.0	0.0	4.2
1992	602	16.4	37.5	101.1	227.2	0.0	0.0	4.0
1993	881	20.7	48.4	119.7	277.7	0.0	0.0	3.7
1994	920	13.7	50.0	137.5	328.8	0.0	0.0	3.4
1995	1045	11.2	51.9	111.5	274.8	0.0	0.0	3.1
1996	1124	15.9	49.7	110.1	279.8	0.0	0.0	3.1
1997	1011	2.7	44.6	108.7	284.8	0.0	0.0	3.1
1998	870	4.2	38.2	60.2	162.6	0.0	0.0	3.1
1999	821	1.1	28.4	41.9	116.5	0.0	0.0	3.1
2000	529	0.1	19.1	28.1	80.7	0.0	0.0	3.1
2001	468	0.1	16.9	25.1	74.2	0.0	0.0	3.1
2002	482	0.1	14.9	19.6	59.9	0.0	0.0	3.1
2003	164	0.1	4.4	7.6	23.9	0.0	0.0	3.1
2004	60	0.1	1.3	4.2	13.7	0.0	0.0	3.1
2005	0	0.0	0.0	0.8	2.8	0.0	0.0	3.1
2006	0	0.0	0.0	0.0	0.1	0.0	0.0	3.1
Sub-total	10227	116.2	493.1	1145.9	2741.0	324.3	227.5	

* Reflects Program Office Records as of 31 Dec 89.

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- User Equipment

Fiscal Year	Qty	Flyaway FY79 Dollars Nonrec	Flyaway FY79 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated *	Total Then-Year $ Expended *	Escl Rate (%)
			Appropriation:		AIRCRAFT PROCUREMENT (Navy)			
1987	1	0.0	0.2	0.2	0.4	0.6	0.4	2.7
1988	43	0.0	2.1	2.3	4.4	2.5	0.7	3.1
1989	119	0.0	5.2	5.7	11.5	5.6	0.5	4.2
1990	88	0.0	4.4	4.9	10.2	0.0	0.0	4.0
1991	125	0.0	6.7	7.5	16.4	0.0	0.0	4.2
1992	184	0.0	12.1	13.6	30.5	0.0	0.0	4.0
1993	443	0.0	24.4	27.0	62.6	0.0	0.0	3.7
1994	593	0.0	32.1	35.4	84.5	0.0	0.0	3.4
1995	628	0.0	33.1	36.5	89.9	0.0	0.0	3.1
1996	495	0.0	23.6	26.1	66.3	0.0	0.0	3.1
1997	580	0.0	27.4	30.2	79.2	0.0	0.0	3.1
1998	476	0.0	22.5	24.8	66.9	0.0	0.0	3.1
1999	305	0.0	15.7	17.2	47.9	0.0	0.0	3.1
2000	164	0.0	7.5	8.3	23.9	0.0	0.0	3.1
2001	68	0.0	3.1	3.4	10.2	0.0	0.0	3.1
2002	54	0.0	2.8	3.1	9.4	0.0	0.0	3.1
2003	28	0.0	1.5	1.6	5.2	0.0	0.0	3.1
Sub-total	4394	0.0	224.4	247.8	619.4	8.7	1.6	

* Reflects Program Office Records as of 31 Dec 89.

The Navy procurement program reflected matches the DAB IIIB Program Office Estimate (POE) which includes requirements that are not budgeted by SPAWAR PMW 142. The delta between the SPAWAR PMW 142 budget and the POE include: (1) in-line production aircraft group "B"; (2) "A" kit for both retrofit and in-line production aircraft; (3) "A" kit (installation) for sea platforms; and (4) spares estimates. Budgets for the above exceptions are allocated to the aircraft and platform manager(s) and not the GPS program.

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- User Equipment

Fiscal Year	Qty	Flyaway FY79 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
				Appropriation: AIRCRAFT PROCUREMENT (Army)				
1986	67	3.6	4.1	7.8	13.8	13.7	13.7	2.8
1987	133	0.8	4.5	6.4	11.7	10.2	9.5	2.7
Subtotal	200	4.4	8.6	14.2	25.5	23.9	23.2	
				Appropriation: AIRCRAFT PROCUREMENT (SCN)				
1986	1	0.0	0.1	0.1	0.2	0.1	0.1	2.8
1987	9	0.0	0.6	0.7	1.3	2.6	0.8	2.7
1988	9	0.0	0.6	0.7	1.3	1.0	0.4	3.1
1989	9	0.0	0.6	0.7	1.5	1.8	0.2	4.2
1990	15	0.0	0.9	1.2	2.5	0.0	0.0	4.0
1991	15	0.0	0.9	1.1	2.4	0.0	0.0	4.2
1992	15	0.0	0.9	1.0	2.3	0.0	0.0	4.0
1993	15	0.0	0.8	1.0	2.3	0.0	0.0	3.7
1994	23	0.0	1.1	1.3	3.2	0.0	0.0	3.4
1995	15	0.0	0.7	0.9	2.1	0.0	0.0	3.1
1996	7	0.0	0.4	0.5	1.3	0.0	0.0	3.1
1997	9	0.0	0.5	0.6	1.5	0.0	0.0	3.1
1998	8	0.0	0.4	0.5	1.4	0.0	0.0	3.1
1999	7	0.0	0.4	0.4	1.2	0.0	0.0	3.1
2000	6	0.0	0.3	0.4	1.0	0.0	0.0	3.1
Subtotal	163	0.0	9.2	11.1	25.5	5.5	1.5	
				Appropriation: AIRCRAFT PROCUREMENT (Marine Corps)				
1992	595	0.0	7.0	8.1	16.6	0.0	0.0	4.0
1993	321	0.0	3.6	4.6	9.8	0.0	0.0	3.7
1994	0	0.0	0.0	0.3	0.6	0.0	0.0	3.4
1995	0	0.0	0.0	0.1	0.2	0.0	0.0	3.1
Subtotal	916	0.0	10.6	13.1	27.2	0.0	0.0	

* Reflects Program Office Records as of 31 Dec 89.

16. ~~(U)~~ Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- User Equipment

Fiscal Year	Qty	Flyaway FY79 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
				Appropriation:	OTHER PROCUREMENT (Air Force)			
1986	87	1.1	2.3	5.7	9.3	9.3	9.1	2.8
1987	121	0.6	2.0	6.5	11.0	11.0	6.9	2.7
1988	757	0.1	3.9	8.5	14.8	13.7	5.3	3.1
1989	445	0.0	5.7	8.9	16.4	15.0	2.5	4.2
1990	146	0.3	2.1	5.1	9.7	0.0	0.0	4.0
1991	70	0.1	1.0	2.8	5.5	0.0	0.0	4.2
1992	60	0.1	0.8	4.8	9.8	0.0	0.0	4.0
1993	145	0.1	1.6	4.0	8.5	0.0	0.0	3.7
1994	235	0.1	1.8	2.3	5.0	0.0	0.0	3.4
1995	20	0.0	0.2	3.3	7.5	0.0	0.0	3.1
1996	190	0.0	2.2	3.3	7.7	0.0	0.0	3.1
1997	180	0.0	2.1	3.3	7.8	0.0	0.0	3.1
Sub-total	2456	2.5	25.7	58.5	113.0	49.0	23.8	

* Reflects Program Office Records as of 31 Dec 89.

16. [redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- User Equipment

Fiscal Year	Qty	Flyaway FY79 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
				Appropriation: OTHER PROCUREMENT (Navy)				
1986	62	5.0	5.0	11.8	19.3	19.3	10.7	2.8
1987	149	7.9	5.6	15.0	25.3	23.6	8.5	2.7
1988	160	1.3	9.3	12.0	21.2	13.2	10.4	3.1
1989	133	0.4	7.2	8.8	16.3	11.1	1.1	4.2
1990	79	0.4	5.1	5.9	11.4	0.0	0.0	4.0
1991	97	0.0	6.2	7.0	13.8	0.0	0.0	4.2
1992	176	0.0	11.2	12.3	25.4	0.0	0.0	4.0
1993	108	0.0	6.6	7.5	16.0	0.0	0.0	3.7
1994	81	0.0	4.2	4.7	10.3	0.0	0.0	3.4
1995	303	0.0	8.6	9.6	21.6	0.0	0.0	3.1
1996	60	0.0	1.5	1.6	3.8	0.0	0.0	3.1
1997	35	0.0	0.4	0.5	1.1	0.0	0.0	3.1
1998	35	0.0	0.4	0.5	1.1	0.0	0.0	3.1
1999	35	0.0	0.4	0.4	1.1	0.0	0.0	3.1
2000	35	0.0	0.4	0.4	1.2	0.0	0.0	3.1
Sub-total	1548	15.0	72.1	98.0	188.9	67.2	30.7	

* Reflects Program Office Records as of 31 Dec 89.

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- User Equipment

Fiscal Year	Qty	Flyaway FY79 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
				Appropriation:	OTHER PROCUREMENT (Army)			
1986	70	2.7	3.0	5.7	9.2	9.2	9.2	2.8
1987	60	1.3	1.3	3.1	5.3	5.3	5.3	2.7
1988	147	4.8	6.4	12.3	21.5	19.4	10.1	3.1
1989	175	1.7	3.5	6.9	12.7	12.1	0.8	4.2
1990	157	2.6	5.5	9.6	18.4	0.0	0.0	4.0
1991	501	1.5	10.1	16.0	31.9	0.0	0.0	4.2
1992	1733	1.5	18.9	23.6	48.5	0.0	0.0	4.0
1993	1311	0.7	13.8	16.3	34.5	0.0	0.0	3.7
1994	3060	0.0	19.9	21.9	47.9	0.0	0.0	3.4
1995	3081	0.0	16.0	17.5	39.5	0.0	0.0	3.1
1996	2927	0.0	12.2	13.4	31.2	0.0	0.0	3.1
1997	2821	0.0	10.8	11.9	28.6	0.0	0.0	3.1
1998	2844	0.0	10.9	12.1	29.8	0.0	0.0	3.1
1999	2813	0.0	9.8	10.9	27.9	0.0	0.0	3.1
2000	2813	0.0	9.6	10.7	28.2	0.0	0.0	3.1
2001	2836	0.0	9.8	10.9	29.5	0.0	0.0	3.1
2002	2628	0.0	9.2	10.3	28.8	0.0	0.0	3.1
2003	2464	0.0	7.7	8.6	24.2	0.0	0.0	3.1
2004	2279	0.0	7.2	8.1	24.0	0.0	0.0	3.1
Sub-total	34720	16.8	185.6	229.8	521.6	46.0	25.4	

* Reflects Program Office Records as of 31 Dec 89.

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- User Equipment

Fiscal Year	Qty	Flyaway FY79 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
Appropriation: OPERATIONS & MAINTENANCE (Navy)								
1988	-	-	-	2.4	4.0	4.0	3.1	1.3
1989	-	-	-	1.5	2.6	2.6	1.3	4.2
1990	-	-	-	2.6	4.8	1.1	0.1	4.0
1991	-	-	-	4.0	7.5	0.0	0.0	4.2
1992	-	-	-	3.2	6.3	0.0	0.0	4.0
1993	-	-	-	3.2	6.5	0.0	0.0	3.7
1994	-	-	-	3.1	6.6	0.0	0.0	3.4
1995	-	-	-	2.8	6.1	0.0	0.0	3.1
1996	-	-	-	2.8	6.3	0.0	0.0	3.1
1997	-	-	-	2.7	6.3	0.0	0.0	3.1
Sub-total	-	-	-	28.3	57.0	7.7	4.5	
Appropriation: OPERATIONS & MAINTENANCE (Marine Corps)								
1992	-	-	-	4.1	8.0	0.0	0.0	4.0
1993	-	-	-	4.2	8.6	0.0	0.0	3.7
1994	-	-	-	3.9	8.3	0.0	0.0	3.4
Sub-total	-	-	-	12.2	24.9	0.0	0.0	
Appropriation: OPERATIONS & MAINTENANCE (Air Force)								
1990	-	-	-	1.9	3.5	0.0	0.0	4.0
Sub-total	-	-	-	1.9	3.5	0.0	0.0	
Sub-total	-	-	-	42.4	85.4	7.7	4.5	
TOTAL	54872	154.9	1029.3	2798.0	5768.5	1486.3	1188.4	

* Reflects Program Office Records as of 31 Dec 89.

17. (U) Production Rate Data: Satellite (Air Force)

a. Annualized Production Rates -- The annualized production rates shown differ from the annual funded buy quantities because the funded delivery period is 39 months for FY84, 42 months for FY85, 54 months for FY86, 42 months for FY87 and 36 months for FY88. Replenishment satellites begin production in FY92 and delivery period is 48 months.

	Production Rates (Quantity/Year)			
Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1984	0.3	0.3	0.3	0.3
1985	1.7	1.7	1.7	1.7
1986	2.0	2.0	2.0	2.0
1987	2.8	2.8	2.3	2.8
1988	1.3	1.3	1.3	1.3
1989	0.0	0.0	0.0	0.0
1990	0.0	0.0	0.0	0.0
1991	0.0	0.0	0.0	0.6
1992	0.0	0.0	1.2	3.0
1993	0.0	0.0	1.5	4.0
1994	0.0	0.0	1.5	3.0
1995	0.0	0.0	1.2	0.5
1996	0.0	0.0	1.0	0.0
1997	0.0	0.0	0.0	0.0

b. Cost Variance -- Dollars in Millions -- Maximum production rate is being reached based on contractor's current two shifts and that the contractor is tooling up as fast as feasible.

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max	Maximum Economic
Prog Acq Cost (BY$)	1599.4	+803.0	2402.4	+2.400	2400.0
(TY$)	2306.7	+2059.8	4366.5	+250.3	4116.2
PAUC (BY$)	39.985	-3.582	36.400	-3.597	40.000
(TY$)	57.668	+8.491	66.159	-5.141	71.300

c. Schedule Variance -- (Note: Subject to the limitations on production rates above.)

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max	Maximum Economic
Start Date (Mo/Yr)	9/83	N/A	9/83	N/A	9/83
Duration (in Months	85	108	193	+48	145
End Date (Mo/Yr)	9/90	N/A	9/1999	N/A	1/1995

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	12/12
PROCUREMENT	7/5

e. Approved Design-to-Cost Goal --

(Average Unit Flyaway Cost)

	Development Estimate	Current Estimate	Latest Approved Threshold
@ Qty - @ Peak Rate: 7/Year			
FY 79 Base-Year $	20.336	26.415	25.000(+10%)
Then-Year $	54.812	30.323	N/A

17. (U) Production Rate Data: User Equipment (Tri-Service)

a. Annualized Production Rates -- Annual production rates shown differ from the annual funded quantities because the funded delivery period is 30 months.

	Production Rates (Quantity/Year)			
Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1986	142.4	199.6	142.8	234.8
1987	269.2	269.2	308.8	784.2
1988	382.4	382.4	554.0	1168.4
1989	974.8	1023.6	471.6	1192.4
1990	1781.2	1781.2	272.0	2042.0
1991	1954.8	1954.8	370.8	1954.8
1992	1972.8	1972.8	1346.0	4372.8
1993	1318.0	1318.0	1289.6	4256.8
1994	694.0	694.0	1964.8	3199.9
1995	456.0	456.0	2036.8	2742.7
1996	317.6	317.6	1921.2	N/A
1997	256.8	256.8	1854.4	N/A
1998	141.6	141.6	1693.2	N/A
1999	198.4	198.4	1592.4	N/A
2000	24.0	24.0	1418.8	N/A
2001	0.0	0.0	1348.8	N/A
2002	0.0	0.0	1265.6	N/A
2003	0.0	0.0	1062.4	N/A
2004	0.0	0.0	935.6	N/A

b. Cost Variance -- Dollars in Millions

Item		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max	Maximum Economic
Prog Acq Cost	(BY$	2554.9	+243.1	2798.0	+818.0	1980.0
	(TY$	4875.8	+892.7	5768.5	+2393.0	3375.5
PAUC	(BY$	0.093	-0.042	0.051	-0.022	0.073
	(TY$	0.178	-0.073	0.105	-0.020	0.125

c. Schedule Variance -- (Note: Subject to the limitations on production rates above.)

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max	Maximum Economic
Start Date (Mo/Yr)	8/86	--	8/86	--	8/86
Duration (in Months	200	--	200	--	200
End Date (Mo/Yr)	3/03	--	3/03	--	3/03

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	147/99
PROCUREMENT	556/459

e. Approved Design-to-Cost Goal --

(Average Unit Flyaway Cost)

	Development Estimate	Current Estimate	Latest Approved Threshold
@ Qty 26889 - @ Peak Rate: 390/mo			
FY 79 Base-Year $	0.041	0.043	0.101
Then-Year $	0.089	0.074	N/A

18. Operating and Support Costs:

Satellite (Air Force) --

a. Assumptions and Ground Rules - N/A

b. Costs - None.

c. Contractor Support Costs -- None

User Equipment (Tri-Service) --

a. Assumptions and Ground Rules - The operations & support costs are the direct costs to repair, replenish & support the GPS UE The maintenance costs includes the material and labor costs at the organizational, intermediate, & depot levels. The training costs necessary to maintain the required quantity of maintenance and operations personnel. The software support costs include all costs to provide life cycle software engineering for GPS UE The support equipment support cost includes the cost of all necessary support and maintenance of the GPS user equipment. The sustaining investment costs include the cost of replenishment spares of air, sea, and ground sets, their respective batteries of memory cells, and their support equipment.

b. Costs -

	AIR FORCE	ARMY	NAVY	TOTAL
OPERATIONS & SUPPORT				
BELOW DEPOT LEVEL	4.9	25.6	7.8	38.3
DEPOT LEVEL	20.4	6.9	28.7	56.0
TRAINING	16.7	3.9	77.5	98.1
TRANSPORTATION	2.7	1.4	3.6	7.7
SOFTWARE SUPPORT	20.9	8.1	13.0	42.0
SE SUPPORT	12.0	3.9	2.9	18.8
SUSTAINING INVESTMENT	27.3	80.0	47.5	154.8
SYSTEM/PROJECT MGT		30.7		30.7
TOTAL	104.9	160.5	181.0	446.4

c. Contractor Support Costs -- Tri-Service Exhibit OP-18 not available.

N-6 AV-8B

SAR-89-013

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SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)
PROGRAM: AV-8B

AS OF DATE: DECEMBER 31, 1989

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1. Destination and Nomenclature: AV-8B/Attack, V/STOL, Close Air Support (HARRIER II)

2. DOD Component: Department of the Navy

3. Responsible Office and Telephone number:

Harrier Program Office
Naval Air Systems Command
Washington, D. C. 20361

PM: Col J. G. Hart
Assigned: 2 September 1988
AV 222-8324; COMM (202) 692-5750

4. Program Elements/Procurement Line Items:

RDT&E: PE 0604214N
PROCUREMENT: PE 0206110M; 0206497M APN 1506 ICN 0124
MILCON: PE 0206496M, 0206497M

5. Related Programs: F/A-18, F-15, GR5 (UK Collaborative Program), and AV-8B(s) Spanish Program.

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6. Mission and Description: The AV-8B (HARRIER II) is a second generation vertical/short takeoff and landing V/STOL light attack jet aircraft to be utilized by the Marine Corps. The primary mission of the AV-8B is to provide responsive close air support for the ground forces. This single piloted advanced V/STOL aircraft can operate from short fields, forward sites, roads and surface ships providing minimum response time to target. The aircraft incorporates basic aerodynamic improvements such as a composite super critical high-lift wing, leading edge root extension, engine inlet modification, lift improvement devices, and composite forward fuselage as well as a modern avionics package. The AV-8B is a transonic aircraft designed to carry up to 9200 lbs. of conventional ordnance including 4 AIM-9 Sidewinder missiles and a 25mm high rate of fire gattling gun. The Marine Corps plans to replace all of its AV-8As and A-4M squadrons with the newer AV-8B, thus transitioning to an all Harrier II light attack force by the early 1990s. A two-seat trainer is being delivered to the Marine Corps Training Squadrons. A night attack version, incorporating a forward looking infrared sensor (FLIR) was introduced to the fleet with delivery of first production Night Attack aircraft in September 1989.

7. Program Highlights:

a. Significant Historical Developments -- DSARC I (March 1976) authorized two prototype aircraft, designated YAV-8Bs, to be built in [redacted]er to validate aspects of the AV-8B. As a result of this flight [redacted]onstration phase (FDP) involving the validation of maximum weight [redacted]ertical takeoff's (VTO's) and short takeoff's (STO's) as well as sustained "G" and cruise performance, a Milestone II decision supported entering full scale development (FSD). FSD utilized the FDP validation phase results wherever possible. Laboratory and ground test results included over 13,000 wind tunnel hours, complete (static, drop, and fatigue) structural qualification, manned flight simulation, and functional avionics integration. FSD flight tests were conducted using one YAV-8B, 4 FSD AV-8B's and 2 production aircraft as required. Eleven Navy developmental test and evaluation periods were completed. DNSARC IIIA, July 1983, released funds for the limited production aircraft and approved long lead funding for 1984. Final technical evaluation (TECHEVAL) completed in October 1984. Operational evaluation (OPEVAL) Phase I (air-to-ground) completed 6 February 1985. Phase I quick look report was published on 11 March 1985 indicating the AV-8B OPEVAL "was the best OPEVAL conducted in nearly three years". OPEVAL Phase II (air-to-air) completed 30 March 1985. Milestone IIIB occurred in May 1985. Authorization for full production (AFP) was granted by the Secretary of the Navy on 9 September 1985. After the Milestone IIIB decision, DT-III final development phase began. DT for Maverick (AGM-65E) was completed September 1985 and confirmed readiness for FOT&E. DT for the F402-RR-406 engine was completed in December 1985 and provided an engine operating envelope clearance. DT for shore based VLA performance and aircraft compatibility was completed in December 1985 and warranted proceeding to shipboard evaluations. The FSD program for the [redacted]-8B and AV-8B development program continued with all milestones met or [redacted]eded.

[redacted]

7. Program Highlights (cont'd)

b. Significant Developments Since Last Report: DT-III and OT-III have continued throughout the year. Significant test programs successfully completed during the year were development and operational testing of OMNIBUS 6 OFP software to provide expanded weapons delivery capability. Ground/flight testing of an upgraded engine commenced in October 1989. 38 AV-8B aircraft (32 AV-8B and 6 TAV-8B) were delivered in CY-89. A total of 187 production aircraft (172 AV-8B and 15 TAV-8B) have been delivered through December 1989.

The AV-8B is expected to satisfy the mission requirement.

c. Changes Since "as of" Date: None.

8. Threshold Breaches: There are currently no breaches in the 31 December 1988 DAE Baseline.

9. Schedule:

a. Milestones

	Development Estimate	Approved Program	Current Estimate
[redacted]gram Initiated (DSARC I)	Mar 76	Mar 76	Mar 76
[redacted]st Flight YAV-8B Prototype	Dec 78	Nov 78	Nov 78
[redacted]RC II (FSD)	Jun 79	Jul 79	Jul 79
FSD Contract Award	Jun 79	Aug 79	Aug 79
Critical Design Review	Jul 80	Jul 80	Jul 80
First Flight AV-8B (FSD)	Oct 81	Nov 81	Nov 81
Award of Production Contract	Apr 82	Apr 82	Apr 82
TECHEVAL Avionics	Sep 83	Oct 84	Oct 84
TECHEVAL Performance	Sep 83	Oct 84	Oct 84
OPEVAL	Dec 83	Mar 85	Mar 85
Milestone IIIB	Apr 85	May 85	May 85
IOC (AV-8B)	Jun 85	Aug 85	Aug 85
IOC (TAV-8B)	N/A	N/A	Sep 88
IOC (Night Attack)	N/A	N/A	May 90

b. Previous Change Explanations - New Milestone. Delivery of 7th TAV8B September 1988. Delivery of 20th Night Attack airplane.

c. Current Change Explanations: None.

d. References:

Development Estimate: DCP 160 dtd 10 October 1986 and approved 16 January 1987.

Approved Program: DAE Baseline approved 31 December 1988.

10. (U) Technical/Operational Characteristics:

a. (U) Technical	Dev Est	Approved Program Goal/ Threshold	Demon-strated Perform	Current Estimate
(U) Weight (lbs.) Empty	12,750	13,126	12,835	13,126
(U) Speed Maximum (Mach No.)	0.91	0.91	0.905	.91
(U) Dimensions (ft.)				
Length	46.33	46.33	46.33	46.33
Height	11.65	11.65	11.65	11.65
Span	30.33	30.33	30.33	30.33
(U) Spotting Factor (A-7-1.0)	.95	.95	TBD	.95
b. (U) Operational				
(U) Maximum Vertical Gross Take-off (VTO) Weight (lbs.)	19,185	19,185	19,185	19,185
(U) Maximum Short Gross Take-Off (STO) (Weight) (lbs.) (1,000 ft. roll)	28,350	28,350	30,060	30,060
(U) Close Air Suppt Radius of Action (NM)				
VTO	50	50	TBD	50
STO (6MK 8LW/1 HgLo)	209	155	155	155
(U) Mean Flight Hours Between Failures (MFHBF), (Hrs.)	2.40	2.04	2.04	2.04
(U) Maintainability (DMMH/FH), (Hrs.)	16.9	16.5	14.5	14.5
(U) Standard Depot Level Maintenance Cycle (Airframe Hours				
1st Period	1,000	1,000	TBD	1,000
2nd Period	800	800	TBD	800
3rd Period	600	600	TBD	600
(U) VTO Close Air Support Payload (lbs.)	2,850	2,850	TBD	2,850
(U) STO Close Air Support Payload (lbs.) (600')				
20 kts WOD 87 deg. F Tropical Day)	7,980	7,980	TBD	7,980
(U)	(b)(1)			

10. ([redacted]) Technical/Operational Characteristics (cont'd)

c. ([redacted]) Previous Change Explanations -- Current estimate reflects known weight growth to accommodate LERX, 25mm gun provisioning, and deficiencies corrections. Close air support radius of action (NM) STO, current estimate and demonstrated performance changes to reflect specific mission profile from MS IIIA DNSARC and 5 August 1984 DCP. Maximum short gross take-off (STO) changed to reflect demonstrated performance with RR-406A engine. Maintainability (DMMH/FH) and weapon accuracies changed to reflect demonstrated performance.

d. ([redacted]) Current Change Explanations: Not Applicable.

e. ([redacted]) References --

Development Estimate: DCP dated 16 January 1987.

Approved Program: DAE Baseline approved 31 December 1988.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	$ 872.7	$ 1116.1	$ 1113.3
Procurement	$ 4862.4	3673.1	3687.7
Airframe	(2650.5)	(2104.7)	(2095.0)
Engine	(899.0)	(423.8)	(422.8)
Avionics	(258.9)	(195.0)	(191.5)
Other GFE	(145.5)	(40.0)	(37.9)
Total Flyaway	(3953.9)	(2763.5)	(2747.2)
Other Wpn Sys Cost	(439.3)	(551.8)	(561.3)
Initial Spares	(469.2)	(357.8)	(379.1)
Construction (MILCON)	5.5	5.5	5.5
Total FY 79 Base-Year$	$ 5740.6	$ 4794.7	4806.5
Escalation	3384.9	3527.8	3556.9
Development (RDT&E)	(185.3)	(323.7)	(322.8)
Procurement	(3196.8)	(3201.3)	(3231.3)
Construction (MILCON)	(2.8)	(2.8)	(2.8)
Total Then-Year$	$ 9125.5	$ 8322.5	$ 8363.4
b. Quantities --			
Development (RDT&E)	6	6	6
Procurement	336	276	276
Total	342	282	282

[redacted]

11. Program Acquisition Cost (cont'd)

c. Foreign Military Sales - - At present there is a Spanish FMS case for 12 aircraft. The planned recoupment was $10,408,476. A waiver of $5,204,232 was granted by DSAA. The revised recoupment is $5,204,244.

d. Nuclear Cost - - None.

e. References - -

Development Estimate: DCP dated 16 January 1987

Approved Program: DAE Baseline approved 31 December 1988.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then Year) Dollars in Millions)

		Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a.	Program Acquisition --	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
	(1) Cost	8363.4	8322.5	8363.4
	(2) Quantity	282	282	282
	(3) Unit Cost	29.7	29.5	29.7
b.	Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
	(1) Cost	557.8	557.8	534.8
	Less CY Adv Proc	-29.9	-29.9	0
	Plus PY Adv Proc	+59.2	+59.2	+68.9
	Net Total	587.1	587.1	603.7
	(2) Quantity	24	24	24
	(3) Unit Cost	24.5	24.5	25.2

[redacted]

13. Cost Variance Analysis:

a. Summary - - (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
DEVELOPMENT ESTIMATE	1058.0	8059.2	8.3	9125.5
PREVIOUS CHANGES				
ECONOMIC	+ 5.7	-786.5		-780.8
QUANTITY		-1473.7		-1473.7
SCHEDULE	+17.7	+1393.1		+1410.8
ENGINEERING	+181.1	+ 551.4		+ 732.5
ESTIMATING	+177.3	-1130.8		-953.5
OTHER				0.0
SUPPORT		+ 261.7		+261.7
SUBTOTAL	+381.8	-1184.8	0.0	-803.0
CURRENT CHANGES				
ECONOMIC	+ .9	+ 51.0		+ 51.9
QUANTITY				0.0
SCHEDULE				0.0
ENGINEERING				0.0
ESTIMATING	-4.6	- 76.4		-81.0
OTHER				0.0
SUPPORT		+ 70.0		+ 70.0
SUBTOTAL	-3.7	+ 44.6	0	+ 40.9
TOTAL CHANGES	+378.1	-1140.2	0	-762.1
CURRENT ESTIMATE	1436.1	6919.0	8.3	8363.4

b. (FY 1979 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
DEVELOPMENT ESTIMATE	872.7	4862.4	5.5	5740.6
PREVIOUS CHANGES				
QUANTITY		-580.5		-580.5
SCHEDULE	+10.8	+703.4		+714.2
ENGINEERING	+115.7	+230.5		+346.2
ESTIMATING	+116.9	-1639.0		-1522.1
OTHER				0.0
SUPPORT		+96.3		+96.3
SUBTOTAL	+243.4	-1189.3	0.0	-945.9
CURRENT CHANGES				
QUANTITY				0.0
SCHEDULE				0.0
ENGINEERING				0.0
ESTIMATING	- 2.8	- 16.2		- 19.0
OTHER				0.0
SUPPORT		+ 30.8		+ 30.8
SUBTOTAL	- 2.8	+ 14.6	0.0	+ 11.8
TOTAL CHANGES	+240.6	-1174.7	0.0	-934.1
CURRENT ESTIMATE	1113.3	3687.7	5.5	4806.5

[redacted]

13. Cost Variance Analysis (cont'd)

b. Previous Change Explanations:

RDT&E

Economic:	Revised escalation rates.
Schedule:	Extend flight test program 2 years for follow-on flight test program.
Engineering:	Addition of design/fabrication/integration/test of 25mm gun pak, development of the TAV-8B. Increase for night attack capability with United Kingdom FLIR system.
Estimating:	Decreased currency conversions rate for engine procurement, decrease offset for new economic indices, and refinement of estimate, base year adjustment and prior year reprogrammings, prior year increase due to foreign exchange adjustment, increase for TAV-8B, and increase due to additional FY-92 effort partially offset by reduced requirements in prior fiscal years, increase in Non Recurring costs due to -408 Engine Upgrade. Anticipated savings in TAV-8B and night attack and correction of error in computation of inflation indices. Non-Recurring recoupements are ongoing P3I efforts.

PROCUREMENT

Economic:	Correction of application of procurement outlay factors, revised escalation rates, and correction of previous error.
Quantity:	Decrease of 52 aircraft.
Schedule:	Revised procurement schedule for 336 aircraft accelerated procurement schedule, and 4 additional years added to program.
Engineering:	Reduction of 52 aircraft. Addition of ASPJ. Increase due to night attack capability, ASPJ and ECP's which provide recurring systems for aircraft procured in FY-88 and subsequent years, and increase due to schedule change.
Estimating:	Decreased currency conversion rate for engine procurement, offset for new economic decrease, correction of procurement outlay factor, and refinement of estimates, decreased dollar pound exchange rate, quantity adjustment, base year adjustment, reduction of 52 aircraft, and FY-82/FY-83 reprogramming. Prior year contracts negotiated lower than anticipated (32.2), exchange rate change (+536.6) and repricing based on negotiation of prior year airframe and engine contracts. Decrease due to overhead and labor rate decrease at MCAIR.
Support:	Increased spares and PSE due to redefinition and refinement of requirements, reduce spares required due to reduced aircraft buy. Outyear increases in GSE, pubs, ILS/ME and spares to accommodate night attack, ASPJ and other configuration ECP's. Decrease in pubs, ground support equipment, training due to refined pricing based on contract negotiated lower than anticipated. Decrease in spares due

13. Cost Variance Analysis (cont'd):

b. Previous Change Explanations: (cont'd)
Procurement (cont'd)

Support: to refined prices because of Airframe and engine contracts negotiated lower than anticipated. Support adjustment due to error in prior SARS in estimated variance category. Increase sustaining ILS management and production support requirements for new out years in program. Increased pubs update, spares and new modified support equipment for all operational and support sites required by redefinition and refinement of production aircraft. This includes updating of test cells, PGSE, ATE support (including required test program sets). Increase in ASPJ support requirements due to the adjustment of prior estimating errors. Prior year readjustments plus elimination of 3 years of support and spares due to the quantity change. Adjustment to procure required baseline FY-88 Night Attack Avionics F406-408 Engine and increased survivability improvement including stand-up of Yuma.

MILCON

Economic: Revised escalation rates.

Estimating: Base year adjustments. Increase due to hangar project at MCAS Cherry Point and hangar requirements at MCAS Yuma not previously reported for FY-85 and FY-86. Deletion of requirements for hangars at MCAS Yuma. MILCON estimate reduction end in FY-89.

c. Current Change Explanations

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Economic: Revised escalation rate.	N/A	+ .9
Estimating: Engine non-recurring recoupement.	- 2.8	-4.6
(2) Procurement		
Economic: Revised escalation rate.	N/A	+51.0
Estimating: Revised estimate reduction based on last contract negotiation.	-16.2	-76.4
Support: Increased spares and support due to redefinition and refinement of requirements.	+30.8	+70.0
(3) MILCON	-0-	-0-

14. Program Acquisition Unit Cost (PAUC) History:
(Millions of Then-Year Dollars)

a. Initial SAR Estimate to Current Baseline Estimate -
(1) Same as current baseline

b. Current Baseline Estimate to Current Estimate -

PAUC (Dev Est)	Change								PAUC (Current Est
	Econ	Qty	Sch	Eng	Est	Supt	Other	Total	
26.7	-2.6	+.5	+5.0	+2.6	-3.7	+1.2	0.0	+3.0	29.7

15. Contract Information: (Then Year Dollars in Millions)

Airframe	Initial Contract Price Target	Ceiling	Qty
McDonnell Douglas Corp. St. Louis, Mo. N00019-85-C-0477, FFP Award: July 2, 1986 Definitized: October 29, 1987	$430.0	$ N/A	42

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$430.0	$ N/A	42	$430.0	$430.0

Variance analysis does not apply to FFP contracts.

Engine	Initial Contract Price Target	Ceiling	Qty
Rolls Royce, Ltd. Bristol, England N00019-86-C-0004, FFP Award: July 2, 1986 Definitized: September 30, 1987	$146.8	$ N/A	42

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$146.8	$ N/A	42	$146.8	$146.8

Variance analysis does not apply to FFP contracts.

15. Contract Information: (Then Year Dllars in Millions) (cont'd)

Airframe	Initial Contract Price Target	Ceiling	Qty
McDonnell Douglas Corp., St. Louis, Mo.	$254.1	$ N/A	24

N00019-86-C-0302, FFP
Award: July 31, 1987
Definitized: May 31, 1988

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$254.1	$ N/A	24	$254.1	$254.1

Variance analysis does not apply to FFP contracts.

Engine	Initial Contract Price Target	Ceiling	Qty
Rolls Royce, Ltd. Bristol, England	$118.6	$ N/A	24

N00019-86-C-0281, FFP
rd: July 13, 1987
initized: May 26, 1988

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$118.6	$ N/A	24	$118.6	$118.6

Variance analysis does not apply to FFP contracts.

Airframe	Initial Contract Price Target	Ceiling	Qty
McDonnell Douglas Corp. St. Louis, Mo.	$ 25.0	$ N/A	24

N00019-88-C-0001, FFP
Award: March 14, 1988
Definitized: September 27, 1989 as a Multi-Year Contract for FY89,90 and 91 for 72 aircraft.

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$878.1	$ N/A	72	$878.1	$878.1

Variance analysis does not apply to FFP contracts.

15. Contract Information: (Then Year Dollars in Millions) (cont'd)

Engine	Initial Contract Price Target	Ceiling	Qty
Rolls Royce, Ltd. Bristol, England N00019-88-C-0065, FFP Award: May 26, 1988 Definitized: September 29, 1989	$ 36.7	$ N/A	24

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$110.9	$ N/A	24	$110.9	$110.9

Variance analysis does not apply to FFP contracts.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 88% (15 yrs/17 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 93% ($7753.3/$8363.4)
(Funds Appropriated to Date in Millions/Total Program in Millions)

b. Appropriation Summary -- (Then Year Dollars in Millions)

Appropriation	Prior Years (FY 76-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-95)	Total
RDT&E	1378.2	27.2	30.7	0	1436.1
PROCUREMENT	5781.8	557.8	534.8	44.6	6919.0
MILCON	8.3	0	0	0	8.3
TOTAL	7168.3	585.0	565.5	44.6	8363.4

16. Program Funding Summary (Current Estimate in Millions of Dollars) (cont'd)

c. Annual Summary

Fiscal Year	Qty	Flyaway FY 79 Dollars NonRec	Flyaway FY 79 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Ex-pended	Escal Rate (%)
Appropriation: RDT&E								
1976				5.2	4.3	4.3	4.3	6.6
197T				2.2	1.9	1.9	1.9	2.9
1977				37.6	33.6	33.6	33.6	2.6
1978				61.2	58.9	58.9	58.9	6.8
1979	2			158.8	168.7	168.7	168.7	8.4
1980				155.3	182.4	182.4	182.4	10.6
1981				186.6	239.1	238.6	235.6	10.6
1982	4			167.6	226.0	225.2	224.3	7.6
1983				83.2	117.3	116.1	112.1	4.9
1984				69.5	101.5	101.3	89.5	3.8
1985				40.8	61.4	61.4	60.3	3.4
1986				43.4	67.3	67.1	65.6	2.8
1987				26.5	42.3	42.0	38.1	2.7
88				22.1	36.5	40.5	37.8	3.0
89				21.6	37.0	37.0	30.3	4.2
90				15.2	27.2	20.7	0	4.0
1991				16.5	30.7	0	0	4.2
1992				0	0	0	0	4.0
1993				0	0	0	0	3.7
1994				0	0	0	0	3.4
SUBTOTAL	6			1113.3	1436.1	1399.7	1343.4	

16. Program Funding Summary (Current Estimate in Millions of Dollars) (cont'd)
c. Annual Summary

Fiscal Year	Qty	Flyaway FY79 Dollars Nonrec	Flyaway FY79 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Ex-pended	Escal Rate (%)
Appropriation: Procurement								
1981	0			59.0	86.6	86.6	83.2	11.6
1982	12	14.1	323.8	411.4	655.2	655.2	628.2	14.3
1983	21	3.7	286.1	481.8	816.2	816.2	777.7	9.0
1984	27	.9	270.4	449.8	792.7	792.6	748.8	8.0
1985	32	5.6	265.5	376.4	682.7	682.7	639.8	3.4
1986	46	.3	348.0	468.2	874.9	874.9	872.2	2.8
1987	42	17.8	299.7	358.3	693.1	693.1	623.9	2.7
1988	24	21.8	173.7	300.4	607.1	588.1	252.0	3.0
1989	24	4.2	201.2	272.6	573.3	565.4	80.5	4.2
1990	24	0.0	195.1	255.2	557.8	7.5	0.0	4.0
1991	24	0.0	186.8	235.7	534.8	0.0	0.0	4.2
1992	0	9.6	0.0	18.9	44.6	0.0	0.0	4.0
1993	0	0.0	0.0	0.0	0.0	0.0	0.0	3.7
1994	0	0.0	0.0	0.0	0.0	0.0	0.0	3.4
1995	0	0.0	0.0	0.0	0.0	0.0	0.0	3.1
SUBTOTAL	276	78.0	2550.3	3687.7	6919.0	5762.3	4706.3	
Appropriation: MILCON								
1983	0			3.2	4.6	4.6	4.6	4.9
1986	0			2.3	3.7	3.7	3.7	2.8
SUBTOTAL	0	0.0	0.0	5.5	8.3	8.3	8.3	
TOTAL	282	78.0	2550.3	4806.5	8363.4	7170.3	6058.0	

[redacted]

17. Production Rate Data:

a. Annual Production Rates - -

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1981	0	0	0	0
1982	12	12	12	12
1983	24	21	21	21
1984	54	27	27	27
1985	54	32	32	32
1986	54	46	46	46
1987	54	42	42	42
1988	54	42	24	31
1989	30	42	24	72
1990		42	24	
1991		22	24	
1992			0	

b. Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less (PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog. Acq. Cost (BY$)	5083.9	-277.4	4806.5	+55.5	4751.0
(TY$)	9104.8	-741.4	8363.4	+68.2	8295.2
PAUC (BY$)	15.2	+1.8	17.0	+.1	16.9
(TY$)	27.3	+2.4	29.7	+.2	29.5

c. Schedule Variance -

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	12-81	N/A	12-81	N/A	12-81
Duration (in Months	141	-3	138	+21	117
End Date (Mo/Yr)	9-93	N/A	6-93	N/A	9-91

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	6/6
Procurement	186/187

e. Approved Design to Cost Goal --

18. Operating and Support Costs:
    a. N/A
    b. N/A
    c. Contractor Support Costs --

(Then-Year Dollars in Millions)

	FY 1990 & Prior	FY 1991 Year	FY 1992 Year	Balance to Complete	Total
O&MN (A,N,AF)	12.5	5.2	0	0	17.7
Industrial Fund	3.4	3.3	0	0	6.7
Total	15.9	8.5	0	0	24.4

AF-5 B-1B (THIS PAGE IS [redacted]) ~~SECRET~~

(1)

SAR-89-068

SELECTED ACQUISITION REPORT (RCS: DD-COMP (QA) 823)

PROGRAM: B-1B AS OF: December 31, 1989

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CLEARED
FOR OPEN PUBLICATION
FEB 28 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

1. Designation and Nomenclature (Popular Name): B-1B

2. DoD Component: US Air Force

3. Responsible Office and Telephone Number:
B-1B System Program Office — Col John Madia
Aeronautical System Division — Assigned: 1 August 1988
Wright-Patterson AFB, OH 45433 — AV 785-3281 COMM (513) 255-3281

4. Program Elements/Procurement Line Items:
RDTE: PE 0604226F APPN: 3600 (Baseline Program Content Only)
PE 0604270F APPN: 3600 (RWR) (Shared Funding)
PROCUREMENT: PE 0101126F APPN: 3010 ICN# B001B0
PE 0708011F APPN: 3010 (Shared Funding)
MILCON: None

5. Related Programs:
B-1B Simulator, Common Strategic Rotary Launcher (CSRL), Conventional Weapons Release Systems (CWRS), Air Launched Cruise Missile (ALCM), Short Range Attack Missile (SRAM II), B-1B Monopulse Development, B-1B Electronic Countermeasures (ECM) Updates, Radar Warning Receiver (RWR), Miniature Receive Terminal (MRT), MILSTAR, and Global Positioning System Advanced Expendables.

6. Mission and Description:
The major purpose of the B-1B is to modernize the aircraft leg of the Strategic Triad. The B-1B has the capability to perform the missions of a conventional bomber, cruise missile launch platform and a nuclear weapon delivery system in both strategic and tactical roles. The long range and large payload of the B-1B makes it an ideal aircraft to support the United States deterrent posture across the full spectrum of conflict.

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6. Mission and Description (Cont'd)

The B-1B uses the B-1A aerodynamic shape and structure, as well as many of the B-1A systems. The B-1B has heavyweight landing gear and is powered by four F101-GE-102 afterburning turbofan engines which are a direct derivative of the F101-GE-100 engines used on the original B-1A. The avionics systems are updated to accommodate revised B-1B missions, counter new threats, and employ currently available equipment and technology. The communications and traffic control group remains essentially the same as B-1A, except current inventory replacements and AFSATCOM are used. The offensive systems group maximizes the use of B-52 Offensive Avionics System equipment as well as adding a new forward Looking Radar/Terrain Following Sensor and a new inertial system. The Defensive Systems Group incorporates the ALQ-161 as well as adding a Tail Warning Function. The B-1B weapon system is able to deliver conventional as well as nuclear ordnance. The B-1B aircraft will modernize the bomber leg of the Strategic Triad by partially replacing the 1950's designed B-52.

7. Program Highlights:

a. Significant Historical Developments --

The 1981 Defense Authorization Act directed the Department of Defense to vigorously pursue full scale engineering development of a strategic multirole bomber. As a result of the Joint OSD/Air Force Bomber Alternatives Study, the Administration directed in October 1981 that the B-1B be produced. The baseline configuration for the B-1B aircraft was established 4 November 1981 by the DepSecDef. Production and FSD contracts were awarded to Rockwell, General Electric, AIL, and Boeing in early 1982. B-1A A/C #2 started in the B-1B flight test program in March 1983 but was lost in a catastrophic crash in August 1984. Flight test continued with B-1A A/C #4. The rollout of the first B-1B occurred on 4 September 1984, several weeks ahead of schedule. First flight occurred 18 October 1984, five months ahead of schedule. The B-1B is currently performing flight test activities at Edwards AFB, CA.

A successful Functional Configuration Audit/Physical Configuration Audit FCA/PCA) for the B-1B Crew Egress Maintenance Trainer was held in January 1985 and a configuration baseline was established. B-1A mission 4-99 flown on 28 March 1985 was configured with operational offensive and defensive avionics systems. The first B-1B production aircraft going to the Strategic Air Command (SAC), B-1B A/C #2, arrived at SAC HQ on 27 June 1985. The Initial Operational Capability (IOC) milestone was met in September 1986.

The B-1B now holds 36 world records for speed, distance and payload. On 4 July 1987, B-1B #58 flew a 2,000 kilometer course with a payload of 30,000 kilograms at an average speed of 669.53 MPH. On 17 September 1987, B-1B #70 flew a 5,000 kilometer course with a payload of 30,000 kilograms at speeds in excess of 640 MPH.

B-1B #9 has successfully launched two live ALCMs from the CSRL on 24 November 1987 and 7 Apr 1989.

A major B-1B program milestone was achieved 22 September 1988 during flight tests at Edwards AFB when automatic terrain following runs were completed at the minimum set clearance of 200 feet hardride. Terrain following over all terrains, all ride settings and all altitudes have been released to SAC.

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7. Program Highlights (Cont'd)

A "stop work" order was issued to Eaton/AIL on 24 June 88 to stop efforts to correct the deficiencies with the AN/ALQ-161 electronic countermeasure (ECM) suite and was the result of problems found during flight testing in Apr-May 1988. The B-1B program office and the AF Electronic Combat Office recommended to SAF/AQ that the Air Force limit the corrections to the ALQ-161 to allow it to effectively receive and automatically jam the top 10 SAC threats and to complete the development and retrofit of the ALQ-161 central integrated test system (CITS) capability. It was also recommended to add the AirForce advanced radar warning receiver (ARWR) to the B-1B to provide the situational awareness for the threats lost by the limited capability of the ALQ-161. SAF/AQ concurred with these recommendations and issued direction in the form of the B-1B ECM roadmap.

The last production B-1B aircraft was delivered to SAC on 30 Apr 1988, two months ahead of schedule.

b. Significant Developments Since Last Report --

The Program Management Responsibility Transfer (PMRT) to OC-ALC for the B-1B weapon system occurred on 1 Jan 1989.

The Tail Warning Function (TWF) development was completed on 27 April 1989 and SAC aircraft retrofit began on 25 May 1989. All ALQ-161 equipped aircraft will be retrofit by mid 1990.

The Stall Inhibitor System 2/Stability Enhancement Function (SIS2/SEF) flight testing was completed on 31 May 1989. The SIS2/SEF flight control retrofit is progressing and is ahead of schedule at Rockwell's Palmdale CA facility. A total of 64 aircraft have received this modification. The entire fleet should be retrofitted by the end of FY92. These modifications significantly improve the B-1B's penetration range capability. The activation of SEF is planned to start in Sep 90 for aircraft 10-100 using support provided by retrofit but this is in jeopardy due to FY90 Appropriation Bill requirements to use the funds to test cruise missiles.

On 2 June 89, a successful flight test of defensive system software version PFS 4.01 was completed. The software was accepted on 10 August 89. This software provides significant performance improvement against the top threats. It also provides the first release of Central Integrated Test System (CITS) Maintenance Codes (CMCs). These CMCs will be used for Organizational level maintenance and mark the start of the defensive CITS maturation effort.

On 31 July 1989, the Air Force issued a contract modification which implemented the Core ALQ-161A recovery program. The Core program has the primary objective of completing development of the defensive system Central Integrated Test System (CITS). This will be accomplished by hardware retrofit and a new software release.

Full scale development for the integration of SRAM II onto the B-1B aircraft has been on contract since late 1987. A flight test aircraft was modified for SRAM II carriage between Mar and Sep 1989 and flew for the first time on 18 October 1989, two weeks ahead of schedule.

The Strategic Ststems Committee concurred with the Air Force plan to pursue risk reduction studies for integration of an "off-the-self" Radar Warning

7. Program Highlights (Cont'd)

Receiver (RWR) into the B-1B weapon system. The risk reduction studies were placed on contract with Boeing on 5 May 89 and Rockwell on 6 June 89. As a result of the FY90 Defense Appropriations Act language, the RWR risk reduction studies were stopped because no additional funds were alloved to be obligated in FY90 towards RWR activities.

Instrument landing system (ILS) testing continues through the end of the this fiscal year. Contract award for production is planned for 1 Oct 1990 with the retrofit to begin 1 Oct 1991 and end no later than 1 Oct 1993.

On 25 Apr 1989, a B-1B successfully released 84 MK-82s (500 pound inert bombs) from an altitude of 300 feet above ground level at a speed of .84 mach. On 17 May 1989, a successful flight test simultaneously jettisoned 84 MK-82s from an altitude of 2000 feet and a speed of .84 mach. The Conventional Weapons Release System (CWRS) received Safety Certification on 25 May 1989. On 21 Jul 1989, the B-1B was certified for conventional weapons delivery. This completed conventional weapons certification.

On 30 Sep 1989, the Air Launched Cruise Missile Nuclear Weapons Systems Safety Group (NWSSG) safety rules were approved. This completed ALCM activity (internal carriage only) for the B-1B.

Construction of the Air Force Anechoic Facility (AFAF) was completed in June 1989. AFAF "certification" started in Oct 1989 with an ALQ-161 equipped B-1B and is ongoing to validate the characteristics of the AFAF so it can be used to test the "core" ECM program in the summer of 1990.

As of 31 December 1989, 31 B-1B aircraft were on station at Dyess AFB, 30 at Ellsworth AFB, 17 at Grand Forks AFB, 17 at McConnell AFB, and 2 at Edwards AFB (test only).

Although the B-1B program meets thresholds for deliveries and expenditures -- thereby being eligible for SAR termination, this program will continue reporting until retrofit of "core" hardware is completed.

The B-1B is expected to meet all current mission requirements with completion of the "Core" ALQ-161A and Radar Warning Receiver (RWR) Programs. With the "Core" ALQ-161A and deferred support equipment, obligations are expected to reach the $20.5 billion (FY81$) Cap in FY92. With these programs, obligations will exceed the Cap by approximately $100 million. Congressional relief will be required to fully execute the planned program. The addition of the RWR program will bring the current estimate at completion to $20.88 billion (FY81$).

c. Changes Since "As of" Date -- None

8. Threshold Breaches:

There are DAE Baseline (31 Dec 88) milestone breaches for DT&E/IOT&E completed and ECM retrofit complete. A new APB Baseline was approved by the SAE on 10 Nov 89.

9. Schedule

a. Milestones --	Development Estimate	Approved Program		Current Estimate
R&D Contract Award	Jan 82	Jan 82		Jan 82*
Production Contract Award	Jan 82	Jan 82		Jan 82*
Engineering Review	Apr 82	Apr 82	**	Apr 82*
OSD Program Review	Sep 82	Feb 83		Feb 83*
Configuration Review	Jan 83	Jan 83		Jan 83*
DT&E/IOT&E Start	Apr 83	Mar 83		Mar 83*
First Flight B-1A/Aircraft #2	Apr 83	Mar 83		Mar 83*
First B-1B Flight	Mar 85	Oct 84		Oct 84*
FOT&E Phase I Start	Oct 85	Jul 85		Jul 85*
DT&E/IOT&E Complete	Jun 86	Sep 89		Oct 90(CH1)
IOC (15th Aircraft Delivery)	Sep 86	Sep 86		Sep 86*
FOT&E Phase I Complete	Oct 87	Mar 89		Jun 89(CH2)
Prod Complete(100 A/C Delivered)	Jun 88	Jun 88		Apr 88*
Prog Mgmt Resp Transfer(PMRT)	N/A	Jan 89		Jan 89*
ECM Development Complete	N/A	Sep 89		Feb 91
ECM Retrofit Complete	N/A	Mar 92		Jul 94(CH3)

* Actual dates

b. Previous Change Explanations --

OSD Program Review was changed to February 1983 by OSD direction. DT&E Start and First Flight of B-1A Aircraft #2 occurred in March 1983, one month ahead of schedule. Rollout of B-1B #1 was early, resulting in an early first flight. Delivery of B-1B Aircraft #2 to Dyess AFB was ahead of schedule and allowed early start of FOT&E Phase I. Extension of FOT&E Phase I reflects updated plans by APOTEC. DT&E/IOT&E completion date was extended due to flight test extension through Feb 89. Final reports are due 90 days after completion of flight test. DT&E and IOT&E flight test completion was extended due to the ECM program restructure. The delivery of aircraft #100 to SAC was completed 2 months ahead of schedule from Jun 88 to Apr 88. There were new milestones added by the DAE baseline dated 31 Dec 1988.

9. Schedule (Cont'd)

c. Current Change Explanations --

(CH1) DT&E and IOT&E flight test completion has been extended due to the ECM program restructure (from Jul 90 to Oct 90)

(CH2) Updated to reflect actual date of accomplishment

(CH3) ECM schedule change resulted from program restructure required by problems identified in Spring 88 flight tests. The ECM development is complete when the system level Program Event Review Board Directive (PERBD) is closed out. Current estimate for this activity is Feb 91. The retrofit is complete with the last aircraft retrofit in Jul 94. All support equipment deliveries are scheduled to be completed in Feb 94.

d. References --

Development Estimate: DCP dated 30 September 1983

Approved Program: DAE Baseline (31 Dec 88)

10. (U) Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold**	Demonstrated Perf	Current Estimate
a. (U) Technical --				
( ) Speed (MACH #):				
( ) Best cruise at altitude	0.72	0.73/0.70	0.72	0.72
( ) Penetration	0.85	0.87/0.83	0.85	0.85
( ) Altitude envelope (ft)	0-25K	0-25K/0-20K	0-25K	0-25K
( ) Weapon Carriage				
( ) AGM-69A (Internal)	24	24/24	16	24
( ) AGM-86B (Internal/ *** External)	8/14	8/12/8/12	8/ N/A	8/12
( ) B61/B83 (Internal)	24	24/24	24	24
( ) MK-82 AIR/ 36DST(AIR) (Internal)	84	84/84	84	84
( ) Takeoff Distance (feet)				
( ) 470,000 pound A/C	9,300	9,300/9,500	N/A	9,300
( ) 440,000 pound A/C	6,000	7,600/7,800	N/A	7,700
( ) Range (Nautical miles)*	6,000	6,400/5,600	5,880	5,874(CH1)
( ) Weight empty (pounds)	186,000	186K/186K	187,400(CH2)	187,400 (CH2)

*(U) Groundrules for range computation: (1) Assumes 24 SRAM - 53040 lbs (2) Operating Weight - 191956 lbs (3) Take Off Gross Wt- 432850 lbs (4) Single Enroute Refueling - 100000 lbs

** (U) Threshold at IOC.

*** External ALCM testing has been deferred in current PMD

The FY90 Defense Authorization Act directed continuation of cruise missile testing.

(UNCLASSIFIED)

10. Technical/Operational Characteristics (Cont'd)

	Dev Est	Approved Program Goal/Threshold**	Demon-strated Perf	Current Estimate
b. (U) Operational--				
(U) Base Escape (Minutes)	(b)(1)			
(U) Reliability Mission Complete Success Probability (MCSP)	0.92	0.92/0.83 (CH4)***	N/A	0.92
(U) Readiness/Supportability:	(b)(1)			
(U) Availability (B-1B Sys)				
(U) Maintainability (B-1B Sys)	37.6	37.6/80	28.1	14.0(CH5)
(U) Mean Time Between Unsched Maintenance Actions* (Maint. Manhr/Flt. Hrs.)	1.0	1.0/.22	0.65	1.21(CH6)

* Inherent maintenance actions and 03,04 special instructions

(U)*** This time has been amended by HQ SAC to 6.0 min ± 10%

(U)IIII The original DCP value has been amended (increased by Oct 89 SORD to .86)

c. (U) Previous Change Explanations --
Following USDR&E direction, the Air Force decided in Feb 86 to limit AGM-86B weapon carriages to ensure compliance with existing arms control policies.

(U) The flight test results have shown slightly higher drag which will decrease the mission range. Previous values were estimates based on wind tunnel drag data.

(U) Changes due to maturing of both B-1B systems and LRU components.

(U) Estimate reflects the most current flight test results.

(U) Reflects DAE Baseline updates dated Dec 1988

d. (U) Current Change Explanations --
(U) (CH-1) Range changed due to revision in aerodynamic model.

(U) (CH-2) The change reflects a higher confidence in actual weights of delivered aircraft as more aircraft have actually been weighed.

(U) (CH-3) The change reflects actual flight test results.

(U) (CH-4) Administrtive error in Baseline - baseline value should be 0.78.

(U) (CH-5) As the B-1B weapon system continues to accumulate flying hrs. towards it's maturity, the reliability continues to improve.

(U) (CH-6) Maintenance manhrs per flight adjusted to correspond with updated reliability.

(U) References --

Development Estimate: DCP dated 30 Sep 1983

Approved Program: DAE Baseline (31 Dec 88)

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	2538.9	3051.8	2975.5
Procurement	17961.1	17251.4	17307.5
Airframe	(10584.9)	(10437.1)	(10403.9)
Engine	(1859.3)	(1239.4)	(1241.7)
Avionics	(2684.7)	(3150.1)	(3186.4)
Total Flyaway	(15128.9)	(14826.6)	(14832.0)
Peculiar Support	(1768.0)	(1569.4)	(1636.9)
Initial Spares	(1064.2)	(855.4)	(838.6)
Construction (MILCON)*	0	0	0
TOTAL FY 81 Base-Year$	20500.0	20303.2	20283.0
Escalation	9037.6	7134.5	7161.7
Development (RDT&E)	(583.2)	(698.7)	(671.0)
Procurement	(8454.4)	(6435.8)	(6490.7)
Construction (MILCON)*	0	0	0
TOTAL Then-Year$	29537.6	27437.7	27444.7
b. Quantities --			
Development (RDT&E)	0	0	0
Procurement	100	100	100
TOTAL	100	100	100

c. Foreign Military Sales -- None

d. Nuclear Cost -- None

e. References --
Development Estimate: DCP dated 30 September 1983

Approved Program: DAF Baseline, 31 December 1988.

* The current estimate in Then-Year dollars of construction cost not included in the SAR is $365.8M.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition --	Dec 89 SAR	Dec 88 SAR	Dec 89 SAR
1) Cost	27444.7	27437.7	27444.7
2) Quantity	100	100	100
3) Unit Cost	274.447	274.377	274.447

b. Current Procurement -- None.

13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	Total
Development Estimate	+3122.1	+26415.5	+29537.6
Previous Changes:			
Economic	-111.1	-1689.5	-1800.6
Quantity			
Schedule			
Engineering	+202.4	+273.6	+476.0
Estimating	+537.1	-1063.4	-526.3
Other			
Support		-249.0	-249.0
SUBTOTAL	+628.4	-2728.3	-2099.9
Current Changes:			
Economic	+4.0	+38.8	+42.8
Quantity			
Schedule		-22.6	-22.6
Engineering			
Estimating	-108.0	+20.5	-87.5
Other			
Support		+74.3	+74.3
SUBTOTAL	-104.0	+111.0	+7.0
TOTAL CHANGES	+524.4	-2617.3	-2092.9
Current Estimate	+3646.5	+23798.2	+27444.7

(FY81 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	Total
Development Estimate	+2538.9	+17961.1	+20500.0
Previous Changes:			
Quantity			
Schedule			
Engineering	+132.9	+154.9	+287.8
Estimating	+380.0	-457.2	-77.2
Other			
Support	0	-407.4	-407.4
SUBTOTAL	+512.9	-709.7	-196.8
Current Changes:			
Quantity			
Schedule		-13.2	-13.2
Engineering			
Estimating	-76.3	+18.5	-57.8
Other			
Support		+50.8	+50.8
SUBTOTAL	-76.3	+56.1	-20.2
TOTAL CHANGES	+436.6	-653.6	-217.0
Current Estimate	+2975.5	+17307.5	+20283.0

13 b. Previous Change Explanations:

1) RDT&E

Economic: Revised economic escalation indices

Estimating: Congressional reduction during FY85 and FY86 enactment process; applied to reserves and other government costs

Reestimate based on impact of revised economic escalation rates on prior years

Transfer of ALCM and CSRL integration from procurement and increases in airframe and avionics for ALCM and CSRL integration

Correction of typographical error in Dec 82 SAR

Realignment of fiscal phasing for other government costs

Gramm-Rudman-Hollings reduction during FY86 budget enactment process and Small Business Innovation Research (SBIR) assessment

Extension of flight test program for flight controls, terrain following and ECM systems

Strategic Mission Data Planning System (SMDPS) and Balanced Technology Insertion reductions

Prior year definitization of authorized effort

Reduction in flight testing due to reprogramming action.

Engineering: New Requirement- Addition of Radar Warning Receiver (RWR) to B-1B

1122 Antennas Redesign

2) Procurement

Economic: Revised economic escalation indices

Estimating: Congressional reduction during FY85 and FY86 enactment process; applied to reserves and weapons equipment

Reestimate based on impact of revised economic escalation rates on prior years

One-time change resulting from a correction to the methodology for computing inflation on programs with advance procurement funding

13 b. Previous Change Explanations (Cont'd)

Transfer of ALCM and CSRL integration from procurement to RDT&E

Congressionally directed reprogramming to Peacekeeper (FY85 enactment process); applied to reserves

Reestimate of engine requirements

Gramm-Rudman-Hollings reduction of reserves during FY86 budget enactment process

Undistributed Budget Cuts taken from engineering change orders

Adjustments to refine the mix of previous support and estimating category changes primarily related to the impact of escalation changes in current and prior years

Unobligated contingent liability reductions

Prior year definitization of authorized effort

Annual estimate revisions to realign ECP requirements

New requirement - Addition of RWR production costs

Rockwell over-target - Funded with expired year funds

Boeing contract underrun - de-obligated.

Support: Reestimate of inital spares requirement- reduced based on actual obligations

Adjustment to refine the mix of previous support and estimating category changes primarily related to the impact of escalation changes in current and prior years

Gramm-Rudman-Hollings reductions resulted in limiting of initial spares and peculiar support equipment

Revised initial spares estimate

Unobligated contingent liability reductions

Prior year definitization of authorized effort/support equipment requirements

Annual estimate revisions to realign support requirements

Addition of deferred ECM support equipment - FY 90-93

13 c. Current Change Explanations --

	(Dollars in Millions) Base-Year $	Then-Year $
1) RDT&E		
Revised Jan 90 economic escalation indices (Economic)	N/A	+4.0
Boeing underrun deobligation (Est.)	-12.3	-14.5
EPA adjustment (Estimating)	-14.0	-17.4
Revisions to annual estimate (Est)	-1.2	-2.1
Reduction of RWR funding based on FY91 Amended President's Budget (Est.)	-46.4	-70.0
Adjustment of current and prior year escalation (Estimating)	+0.4	+0.5
Reduced estimate to absorb increases resulting from Jan 90 economic escalation indices.	-2.8	-4.5

	(Dollars in Millions) Base-Year $	Then-Year $
2) Procurement		
Revised Jan 90 economic escalation indices (Economic)	N/A	+38.8
AIL ECP 80 (CORE proposal) Funded with expired year funds (Est)	+76.6	+107.2
Definitization of previously Undefinitized Contractual Actions (UCAs) (Estimating)	-36.7	-51.5
EPA adjustment (Estimating)	-10.1	-12.8
Reduced spares estimate based on actual obligations (Support)	-18.2	-25.7
Adjustment to peculiar support equipment based on FY90 Amended President's Budget (Support)	-1.0	-1.8
Inclusion of Core initial spares (Support)	+1.5	+2.0
Rephasing of PSE per FY91 Amended President's Budget (PB) (Support)	+14.5	+26.3
Definitization of UCAs (Support)	+63.2	+89.9
FY91 Amended PB rephasing of RWR(Schedule)	-13.2	-22.6
Adjustment for current & prior year escalation (Estimating)	+0.4	+0.6
Reduced estimate to absorb increases resulting from Jan 90 economic escalation indicies (Estimating)	-11.7	-23.0
Adjustment for current & prior year escalation (Support)	-0.2	-0.3
Reduced estimate to absorb increases resulting from Jan 90 economic escalation indicies (Support)	-9.0	-16.1

14. Program Acquisition Unit Cost (PAUC) History:

(Then-Year dollars in Millions)

Development Estimate to Current Estimate

PAUC (Init SAR/ Dev Est)	Changes								PAUC (Current Estimate)
	ECON	QTY	SCH	ENG	EST	SP	OTH	Total	
295.376	-17.578		-.226	+4.76	-6.138	-1.747		-20.929	274.447

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E --

Airframe	Initial Contract Price Target	Ceiling	Qty
North American Rockwell	$1317.0	$1554.4	0

P33657-81-C-0208, FPIF
Award: 20 Jan 82
Definitized: 20 Jan 82

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$1867.2	$2176.1	0	$1884.5	$1884.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$8.4	-$3.9
Cumulative Variance to Date (27 Oct 89)	$3.9	-$3.8
NET CHANGE	-$4.5	$0.1
Cumulative Variance Change Percent	-53.6%	+2.6%

Explanation of change: The decrease in favorable cost variance is the result of lagging actuals for the Flight Test spares, Flight Test Support and on Test Program sets (CCP 149). The decrease in unfavorable schedule variance is a result of catching up to original schedules in qualification testing and shipping of Engineering Test and Evaluation Techniques 1122 antennas. No program impact.

15. Contract Information (Cont'd)

Avionics	Initial Contract Price Target	Ceiling	Qty
Boeing Military Airplanes	$435.0	$512.5	1
F33657-81-C-0212, FPIF			
Award: 8 Jun 82			
Definitized: 8 Jun 82			

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$743.1	$861.3	1	$735.9	$735.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$9.2	-$2.1
Cumulative Variances to Date (26 Oct 89)	11.2	-$1.1
NET CHANGE	+2.0	+1.0
Cumulative Variance Change Percent	21.7%	+47.6%

Explanation of change: The favorable cost variance results primarily from using a lower-than-planned skill mix in Test and Deployment functional area. The change in schedule variance is caused by the restructure of ALCM Interdepartmental Work Authorized (IDWA) effort to go based on external ALCM flight test decisions. No program impact.

b. Procurement --

Airframe	Initial Contract Price Target	Ceiling	Qty
North American Rockwell	$886.0	$1051.2	1
F33657-81-C-0210, FPIF			
Award: 20 Jan 82			
Definitized: 20 Jan 82			

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$14590.5	$17112.2	100	$15132.4	$15119.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-$471.8	-$48.3
Cumulative Variances to Date (27 Oct 89)	-$554.1	-$40.8
NET CHANGE	-$82.3	$7.5
Cumulative Variance Change Percent	-17.4%	+15.5%

Explanation of Change: The increase in unfavorable cost variance is due to labor volume and rate impacts, contract closeout activities and payment of lagging actuals. The decrease in unfavorable schedule variance is due to numerous schedules catching up to original planning, primarily Lot V Pylons. No program impact.

15. Contract Information (Cont'd)

Avionics
Boeing Military Airplanes
F33657-81-C-0213, FPIF
Award: 11 Jun 82
Definitized: 11 Jun 82

Initial Contract Price		
Target	Ceiling	Qty
$172.0	$183.1	9

Current Contract Price		
Target	Ceiling	Qty
$2110.5	$2351.8	100

Estimated Price At Completion	
Contractor	Program Manager
$2056.5	$2056.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$25.2	$-7.6
Cumulative Variances to Date (26 Oct 89)	$25.1	$-7.8
NET CHANGE	-0.1	-0.2
Cumulative Variance Change Percent	-0.4%	-2.6%

Explanation of Change: The unfavorable contract cost performance is due to several insiginificant events of small dollar value. The unfavorable schedule variance is due to delays in delivery of GFP ACC units to BMA for receipt of the IBM modification. No program impact.

AIL Division of Eaton
F33657-81-C-0215, FPIF
Award: 22 May 82
Definitized: 22 May 82

Initial Contract Price		
Target	Ceiling	Qty
$143.2	$171.1	1

Current Contract Price		
Target	Ceiling	Qty
$3144.1	$3561.9	100

Estimated Price At Completion	
Contractor	Program Manager
$3231.2	$3215.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$41.5	-$53.4
Cumulative Variances to Date (23 Oct 87)	-$70.6	-$40.6
NET CHANGE	-$112.1	$12.8
Cumulative Variance Change Percent	-270.1%	+24%

Explanation of Change: The unfavorable change in cost variance was primarily due to a major cleanup of the actuals within the Cost Reporting Systems at AIL. Earned value has been taken but no actuals were posted against the earned value. The favorable schedule variance change is due to the completion of the work in Lot 1, 2, and 4 of the basic contract effort. No program impact.

15. Contract Information (Cont'd)

Engine	Initial Contract Price Target	Ceiling	Qty
General Electric Co. (Lot III,IV,V) F33657-81-C-2047 FFP* Award: 20 Jul 84 Definitized: 20 Jul 84	$1387.6	N/A	368

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$1456.5	N/A	368	$1456.5	$1456.5

*No CPR FFP Contract

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

1) *Percent Program Completed: 66.67% (10yrs/15yrs)

2) Percent Program Cost Appropriated: 97.65% ($26800.7/$27444.7)

* Program extended 6 years due to addition of RWR requirement, FY 90-95.

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY81-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-95)	Total
RDT&E	$3517.5	$0.0	$46.0	$83.0	$3646.5
Procurement	$23273.2	$10.0	$20.8	$494.2	$23798.2
MILCON	0	0	0	0	0
TOTAL	$26790.7	$10.0	$66.8	$577.2	$27444.7

16. Program Funding Summary (Cont'd)(Current Estimate in Millions of Dollars).

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY 81 Dollars Nonrec	Rec	Total Base Year$	Total Then-Year Dollars Program	*Obli-gated	*Ex-pended	Escl Rate %
				Appropriation: RDT&E				
1981				208.1	217.3	217.3	217.3	11.9
1982				419.1	467.7	467.7	467.7	9.2
1983				636.8	743.8	743.8	732.1	4.9
1984				596.2	723.2	723.2	708.6	3.8
1985				347.8	435.1	435.1	422.9	3.4
1986				185.6	238.5	238.5	224.4	2.8
1987				89.0	117.9	117.9	111.8	2.7
1988				260.5	357.4	357.4	237.7	3.1
1989				151.4	216.6	106.5	29.0	4.2
1990				0.0	0.0	0.0	0.0	4.0
1991				29.7	46.0	0.0	0.0	4.2
1992				42.9	69.0	0.0	0.0	4.0
1993				8.4	14.0	0.0	0.0	3.7
SUBTOTAL				2975.5	3646.5	3407.4	3151.5	
				Appropriation: Procurement				
1982	1	552.1	549.7	1311.1	1610.0	1610.0	1592.5	9.6
1983	7	786.7	1477.9	3022.2	3934.9	3934.9	3719.3	9.0
1984	10	819.6	1626.0	4372.7	5938.1	5938.1	5703.5	8.0
1985**	34	760.7	3548.2	5074.6	7109.6	7109.6	6590.7	3.4
1986	48	375.0	4206.4	3248.1	4680.6	4680.6	4398.4	2.8
1990***			0.0	5.9	10.0	0.0	0.0	4.0
1991***			0.0	11.8	20.8	0.0	0.0	4.2
1992***			5.5	92.0	168.3	0.0	0.0	4.0
1993***			47.1	92.0	173.9	0.0	0.0	3.7
1994***			47.2	47.2	92.0	0.0	0.0	3.4
1995***			29.9	29.9	60.0	0.0	0.0	3.1
SUBTOTAL	100	3294.1	11537.9	17307.5	23798.2	23273.2	22004.4	
TOTAL	100	3294.1	11537.9	20283.0	27444.7	26680.6	25155.9	

* Reflects Program Office records as of 31 Dec 1989.
** FY85 includes $52M for B-1B anechoic chamber (PE 78011F).
***RWR retrofit program and support equipment.

17. Production Rate Data:

a. Annualized Production Rates --

Production Rates (Quantity/Year)

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1982	1.0	1.0	1.0	1.0
1983	7.0	7.0	7.0	7.0
1984	24.0	24.0	24.0	24.0
1985	40.8	40.8	40.8	40.8
1986	44.3	44.3	44.3	44.3

The annual production rates differ from annual funded quantities because the funded delivery period is 5 months for FY84, 10 months for FY85, and 13 months for FY86.

b. Cost Variance -- Dollars in Millions

		Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max)	Maximum
Prog Acq Cost	(BY$)	20500.0	-217.0	20283.0	-	20283.0
	(TY$)	29537.6	-2092.9	27444.7	-	27444.7
PAUC	(BY$)	205.000	-2.170	202.830	-	202.830
	(TY$)	295.376	-20.929	274.447	-	274.447

c. Schedule Variance --

		Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max)	Maximum
Start Date (Mo/Yr)	*	1/82	N/A	1/82	N/A	1/82
Duration (in Months)		78	-2 mo	76	-2 mo	78
End Date (Mo/Yr)	**	6/88	N/A	4/88	N/A	6/88

* Date of contract award.
** Date of A/C #100 delivery

d. Deliveries (Plan/Actual) --

	To Date:
RDT&E	N/A
Procurement	100/100

18. Operating and Support Cost: Sections a and b and c are not available.

N-32 PHOENIX

SAR-89-037

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A) 823)
PROGRAM: PHOENIX (AIM-54C)

AS OF DATE: December 31, 1989

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AS AMENDED
RELEASED FOR OPEN PUBLICATION
MAR 22 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

1. Designation/Nomenclature (Popular Name): PHOENIX (AIM-54C)

2. DOD COMPONENT: U.S. Navy

3. Responsible Office and Telephone Number:

Naval Air Systems Command
PMA-259
Washington, D.C. 20361-1259

PM: CAPT J.J. Stewart
Assigned: July 24,1985
(202) 692-0915
AUTOVON: 222-0915

Program Elements:

RDT&E:	PE 0604364N	
PROCUREMENT:	PE 24162N	ICN: 2212 APPN: 1507
MILCON:	PE 72031N	

5. Related Programs: F-14A/D

CLASSIFIED BY: OPNAVINST 5513.2A-87
Declassify On: OADR

This Page Unclassified

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90-C-0667
No Security Objection to Open Publication
(AS AMENDED)
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Director, Navy Staff for Naval Operations
Dept. of the Navy

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6. [redacted] Mission and Description: The Phoenix Missile System is comprised of a long-range airborne weapons control system (AWCS) with multiple target handling capabilities and long-range missiles utilizing semi-active midcourse guidance and active terminal guidance. The mission is to kill multiple air targets with conventional warheads. Six such missiles can be carried aboard the F-14A/D. Near simultaneous launch is possible against six targets in all weather, heavy jamming environments. The improved Phoenix, the AIM-54C, provides improved lethality, stream raid discrimination, ECCM performance, high and low altitude performance, and improved reliability and maintainability. As a result of these improvements, the missile has greater capability to counter the projected tactical aircraft and cruise missile threats. The Phoenix does not replace any other missile.

7. [redacted] Program Highlights:

a. [redacted] Significant Historical Developments: The Phoenix AIM-54C is a major improvement over the AIM-54A which ended production in 1979. A major upgrade was required to meet a more sophisticated threat. Initial Operational Capability was reached in December 1986. Hughes Aircraft (HAC) has corrected quality problems that resulted in a Phoenix production line shutdown from July 1984 through January 1985. HAC is currently producing at a monthly rate in the mid-30's. In June 1986, Raytheon was selected as a winner of competition to second-source the Phoenix missile, producing 10 validation units in FY 1986, and production quantities of 56 and 180 missiles in FY 1987 and FY 1988 respectively. In April 1990 the Revised President's Budget changed the procurement strategy from a three year multi-year acquisition to terminating the program in FY 1990.

b. [redacted] Significant Developments Since Last Report: Micronics International, the only producer of the FSU-10/A safe and arming device, filed Chapter 11 bankruptcy in September 1989. However, FSU-10s will be available through a second source beginning in June 1991. Reprocurement of FSU-10s, undelivered by Micronics will be pursued through a competitve contract in FY90. In the interim, to ensure AIM-54C missile deliveries to the fleet, a workaround plan has been implemented. This plan consists of reconfiguring AIM-54C missiles with [redacted] fuzing and propulsion section components. Two hundred thirty-five missiles have been configured and delivered in this manner.

(U) The AIM-54C Phoenix Missile System satisfies the mission requirement.

c. [redacted] Changes since "as of" Date: A contract for FY 1990 was awarded to Hughes 26 January 1990 for a quantity of 420 missiles.

8. [redacted] Threashold Breaches: There was a breach to the DAE baseline dated 30 June 89 (Milestone IIIB).

9. Schedule:

	Development Estimate	Approved Program	Current Estimate
Full Development Go-Ahead	Oct 76	N/A	Oct 76
Development Contract Award	Sep 77	Sep 77	Sep 77
Complete Section Integration Test	Dec 78	N/A	Mar 79
Pilot Prod Contract	Jul 79	N/A	Sep 79
First Low Rate Prod Contract	Dec 79	Dec 79	Dec 79
Delivery of EDM Msls	Dec 80	N/A	May 81
Complete Contractor Devel	Apr 81	N/A	May 82
Pilot Production Missile Deliveries	Oct 81	N/A	Oct 81
Begin Navy TECHEVAL	Oct 81	N/A	May 82
Complete Navy TECHEVAL	Jun 82	N/A	Nov 82
Begin Navy OPEVAL	Jan 83	N/A	Mar 83
Complete Navy OPEVAL	Mar 84	N/A	Jun 84
Approval for Full Production (IIIB)	Mar 83	May 88	Jan 89
Begin Full Rate Prod	Oct 83	N/A	Oct 90
Establish Second Source	N/A	Jun 86	Aug 86
IOC	Oct 83	Dec 86	Dec 86

b. Previous Change Explanations --

AIM-54C Section Integration Test slippage due to delay in component build-up caused by unanticipated design complexity. Award of Pilot Production Contract slippage caused by administrative delays. Navy Technical Evaluation slippage (start & complete) and Navy Operational Evaluation slippage (start & complete) due to delays in delivery of pilot production missiles and delay in completion of contractor development testing. Approval for Full Production delayed to August 1987 in order to evaluate ECCM engineering change (ECP-87) which was introduced with the 1984 production missiles. Full Rate Production delayed until first year of competition between Hughes and Raytheon (1989). IOC was delayed from March 1986 to December 1986 due to a requirement to rework igniter safety mechanisms.The NPDM IIIB delayed from May 1988 to January 1989 due to delay in DT-IIIB testing.

c. Current Change Explanations -- None

d. References --

Development Estimate: Approved Program: DAE Approved Baseline dated 30 June 1989.

10. (U) Technical/Operational Characteristics:

		Dev. Est.	Approved Program Goal/Thra.	Demon-strated Perf.	Prod. Current Est.
a.	( ) Technical		(b)(1)		
	( ) MTBF (Captive)				
	( ) Range (NM) Max (launch)				
	( ) Target Altitude				
	( ) Guidance Success (%)				
	( ) Kill Probability				
b.	( ) Operational				
	Launch wt (lbs)	1020	1020/1014	1018	1014
	Length (inches)	156	156/156	156	156
	Diameter (inches)	15	15/15	15	15
	Guidance:	Radar,Pulse Dopoler,Semi-active/Active,HOJ Modes			
	Propulsion:	Solid Boost			

c. ( ) Previous Change Explanations: None.

d. ( ) Current Change Explanations: None.

e. ( ) References --

Development Estimate: DCP, dated November 21, 1980, subject "AIM-54 Improvement Program".
Approved Program: DAE baseline approved 30 June 1989.

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	73.8	123.1	123.1
Procurement	296.7	1382.0	1350.3
Total Flyaway	231.6	1207.9	1177.6
Other WPN Sys Costs	56.9	149.5	148.0
Initial Spares	8.2	24.8	24.7
Construction	1.5	2.4	2.4
Total FY77 Base-Year $	372.0	1507.5	1475.8
Escalation	92.3	1639.9	1607.7
Development (RDT&E)	11.4	48.7	48.7
Procurement	80.7	1589.5	1557.3
Construction	0.2	1.7	1.7
Total Then-year $	464.3	3147.4	3083.5

11. [redacted] Program Acquisition Cost (Continued)

b. Quantities

Development (RDT&E)	30	45	45
Procurement	705	2483	2483
Total	735	2528	2528

c. Foreign Military Sales: None.

d. Nuclear Costs: None

e. References --

Development Estimate: DCP, dated November 21, 1980, subject "AIM-54 Improvement Program".

Approved Program: DAE approved baseline 30 June 1989.

12. [redacted] Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Est	UCR Baseline	UCR Baseline
a. Program Acquisition	(Dec 89 SAR)	(Jun 89 SAR)	(Dec 89 SAR)
(1) Cost	3083.5	3147.4	3083.5
(2) Quantity	2528	2528	2528
(3) Unit Cost	1.220	1.245	1.220

	Current Year		Budget Year
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	325.6	325.6	-
Less CY Adv Proc	0.0	0.0	-
Plus PY Adv Proc	0.0	0.0	-
Net Total	325.6	325.6	-
(2) Quantity	420	420	-
(3) Unit Cost	.775	.775	-



3. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	85.2	377.4	1.7	464.3
Previous Changes:				
Economic	11.7	-596.6	0.1	-584.8
Quantity		4169.3		4169.3
Schedule	10.1	507.4		517.5
Engineering	23.6	322.8		346.4
Estimating	41.2	-2128.5	-0.2	-2087.5
Support		319.7	2.5	322.2
Other				
Subtotal	86.6	2594.1	2.4	2683.1
Current Changes:				
Economic		32.1		32.1
Quantity				
Schedule				
Engineering				
Estimating		-88.0		-88.0
Support		-8.0		-8.0
Other				
Subtotal		-63.9		-63.9
Total Changes	86.6	2530.2	2.4	2619.2
Current Estimate	171.8	2907.6	4.1	3083.5

(Current (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	73.8	296.7	1.5	372.0
Previous Changes:				
Quantity		1313.6		1313.6
Schedule	3.0	91.1		94.1
Engineering	16.0	141.8		157.8
Estimating	30.3	-564.8	-0.2	-534.7
Support		103.6	1.1	104.7
Other				
Subtotal	49.3	1085.3	0.9	1135.5
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating		-29.1		-29.1
Support		-2.6		-2.6
Other				
Subtotal		-31.7		-31.7
Total Changes	49.3	1053.6	0.9	1103.8
Current Estimate	123.1	1350.3	2.4	1475.8

13. Cost Variance Summary (Continued)

b. Previous Change Explanations:

RDT&E
Economic: revised escalation indices
Schedule: slippage due to technical problems in development
Engineering: guidance, control and thermal conditioning changes
Estimating: higher prototype and R&D effort costs

Procurement
Economic: revised escalation indices
Quantity: revision of inventory objective, reducing the FY89 quantity (450 vs 403) and cancelling FY91/92
Schedule: quantity shifts during the budget process
Engineering: guidance, control and thermal conditioning changes
Estimating: reduction due to introduction of contract actuals into model. Increase due to change in strategy from multiyear to one year.
Support: increased requirements for establishment of support NARF; additional support costs associated with additional quantity of missiles and multi-year/one-year strategy. Reassessment of spares and support equipment requirements and cancelling FY91/92.

MILCON
Economic: revised escalation indices
Estimating: based on contract actual costs
Support: additional effort for storage bunkers

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) Procurement		
Revised Jan 90 economic escalation rates (Economic)	N/A	+32.1
Revised estimate to Congressional decrease in FY90 and prior year actuals (Estimating)	-29.1	-88.0
Reduction resulting from prior year actuals (Support)	-2.6	-8.0

14. Program Acquisition Unit Cost (PAUC) History: (Millions of then-year dollars)

a. Initial SAR Estimate to Current Baseline Estimate --

PAUC (Dev Est)	Changes							PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
0.632	-0.218	1.201		0.137		0.124	0.000	0.588	1.220

0.205 -0.861

15. [redacted] Contract Information: (Then-Year Dollars in Millions)

a. RDT&E -- None

b. Procurement -- Initial Contract Price

		Target	Ceiling	Qty
Guidance Control & Airframe	FY87	49.5	49.5	56
Raytheon Company, Lowell, Ma.	FY88	135.5	135.9	180

N00019-86-C-0216, FPI
Award: May 15, 1986
Definitized: May 15, 1986

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
169.0	185.4	236	185.4	185.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	+0.2	- 4.0
Cumulative Variances to Date (11/30/89)	$-1.5	$-13.9
Net Change	$-1.7	$- 9.9

Explanation of Change: Increased material cost and FAIT overrun (various parts not included in the original material bit and the cost of rescreening components was underestimated). The rework of 20 modules caused higher FAIT costs. Higher than expected payments for industrial construction (additional safety requirements at Letterkenny facility). More time and effort required to review investigation [redacted] requests associated with the test station as well as additional [redacted] on the telemetry analysis.

		Target	Ceiling	Qty
Guidance [redacted] Airframe	FY87	118.3	N/A	149
Hughes Aircraft Co. Tucson	FY88	131.0	N/A	180

N00019-87-C-0283, FFP
Award: August 20, 1987
Definitized: August 20, 1987

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
249.4	N/A	329	249.4	249.4

Explanation of Change: Cost Performance not required on FFP.

15. Contract Information (Continued)

	Target	Ceiling	Qty
All-Up-Round	131.9	N/A	195

Hughes Aircraft Co. Tuscon
N00019-89-C-0079, FFP
Award: January 19, 1989
Definitized: January 19, 1989

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
131.9	N/A	195	131.9	131.9

Explanation of Change: Cost Performance not required on FFP.

	Target	Ceiling	Qty
All-Up-Round	140.3	N/A	208

Raytheon Company, Lowell, Ma.
N00019-89-C-0112, FFP
Award: January 19, 1989
Definitized: January 19, 1989

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
140.3	N/A	208	140.3	140.3

Explanation of Change: Cost Performance not required on FFP.

16. [redacted] Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status:

(1) Percent Program Completed: 93.3% (14/15 years)

(2) Percent Program Cost Appropriated: 99.9% ($3,081.0/$3,083.5)

b. Appropriation Summary --

		(Then-Year Dollars in Millions)			
Appropriation	[redacted]9)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-95)	Total
RDT&E	171.8				171.8
Procurement	2,582.0	325.6	-	-	2,907.6
MILCON	1.6			2.5	4.1
Total	2,755.4	325.6	-	2.5	3,083.5

16. [redacted] Program Funding Summary (Continued): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY77 Dollars Nonrec	Flyaway FY77 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escalation Rate (%)
			Appropriation: RDT&E					
1977				9.2	9.5	9.5	9.5	2.58
1978				6.4	7.1	7.1	7.1	6.80
1979	15			19.1	23.5	23.5	23.5	8.40
1980	30			27.9	38.0	38.0	38.0	10.59
1981				23.9	35.4	35.4	35.4	10.61
1982				21.1	32.9	32.9	32.9	7.60
1983				14.0	22.8	22.8	22.8	4.90
1984				1.5	2.6	2.6	2.6	3.80
Sub-total	45			123.1	171.8	171.8	171.8	
			Appropriation: Procurement					
1979				7.7	10.7	10.7	10.7	8.72
1980	60	13.4	53.7	69.1	107.3	107.3	107.3	11.80
1981	60	10.5	59.7	77.0	132.9	132.9	132.9	11.60
1982	72	7.1	53.4	84.0	157.1	157.1	157.1	14.30
1983	108	20.4	72.6	113.0	223.7	223.7	223.7	9.00
1984	265	.9	127.8	144.5	297.0	297.0	294.0	8.00
1985	265	28.0	105.9	165.8	350.3	350.3	319.7	3.40
1986	265	23.9	98.7	133.4	291.7	291.7	254.3	2.80
1987	205	13.2	81.7	120.8	273.5	267.2	220.9	2.70
1988	360	7.9	140.5	145.4	342.6	336.5	217.2	3.00
1989	403	13.3	136.7	161.6	395.2	380.1	95.5	4.20
1990	420	3.0	105.3	128.0	325.6	12.0	1.2	4.00
Sub-total	2483	[redacted]		1350.3	2907.6	2566.5	2034.5	
			Appropriation: MILCON					
1978				1.3	1.6	1.6	1.6	7.68
1993				1.1	2.5			3.70
Sub-total				2.4	4.1			
Total	2528	141.6	1036.0	1475.8	3083.5	2739.9	2207.9	

17. [redacted] Production Rate Data:

a. Annualized Production Rates --

Fiscal Year Buy	Production Rates (Quantity/Year) Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1980	60	60	60	60
1981	60	60	60	60
1982	72	72	72	72
1983	220	108	108	108
1984	307	265	265	265
1985	307	265	265	265
1986	307	265	265	265
1987	97	205	205	205
1988		430	360	360
1989		560	403	403
1990		560	420	420
1991		560		
1992		560		
1993		560		
1994		560		
1995		560		
1996		560		
1997		560		
1998		434		

b. Cost Variance -- Dollars in Millions

Item		Production Estimate	Variance CE - PdE	Current Est.	Variance CE - Max	Maximum Economic
Prog Acq Cost	(BY$)	1709.4	-233.6	1475.8	-	1475.8
	(TY$)	3671.1	-587.6	3083.5	-	3083.5
PAUC	(BY$)	0.503	+0.080	0.583	-	0.583
	(TY$)	1.079	+0.140	1.219	-	1.219

c. Schedule Variance --

Item	[redacted]duction Estimate	Variance CE vs PdE	Current Est.	Variance CE vs Max	Maximum Economic
Start Da[redacted]	12/79	N/A	12/79	N/A	12/79
Duration [redacted]	177	-24	153	-	153
End Date [redacted]	9/94	N/A	9/92	N/A	9/92

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	45/45
Procurement	1426/1378

e. Approved Design to Cost Goals: None

18. [redacted] Operating and Support Costs:

a. Assumptions and Ground Rules -- N/A

b. Costs -- N/A

c. Contractor Support Costs --

	Prior Years (FY77-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-95)	Total
O&M (Navy)	1.0	0.1	0.1	0.0	1.2
Industrial Fund	0.7	0.5	0.5	0.0	1.7
Total	1.7	0.6	0.6	0.0	2.9

[redacted]

[redacted]

AF-17 JTIDS

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SAR-89-060 SAF/PAS

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08

SELECTED ACQUISITION REPORT (RCS:DD-COMP(06A)823)
PROGRAM: JTIDS Class 2 TDMA TERMINAL (RDT&E only SAR)

AS OF DATE: December 31, 1989

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1. Designation and Nomenclature (Popular Name): Joint Tactical Information Distribution System Class 2 Time Division Multiple Access Terminal (JTIDS Class 2 TDMA Terminal)

2. DoD Component: U.S. Air Force (Lead Service), U.S. Army, U.S. Navy, and U.S. Marine Corps.

3. Responsible Office and Telephone Number:

JTIDS Joint Program Office (JPO)
Electronic Systems Division
Hanscom AFB, MA 01731-5000

Col Bruce D. Mills
Assigned: Aug 31, 1989
AV: 478-5980 MITRE x3532
Commercial: (617) 271-3532

4. Program Element/Procurement Line Items:

RDT&E: 0604754F (Shared Funding)
0604771D (Shared Funding)
0604702A
0604232N (Shared Funding)
0205604N

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DEPARTMENT OF DEFENSE

5. Related Programs: E-3 (AWACS); NATO Airborne Early Warning and Control System; JSTARS; E-2C HAWKEYE Carrier-Based Airborne Early Warning Aircraft; Adaptable Surface Interface Terminal (ASIT); Tactical Air Operations Center (TAOC); Modular Control Element (MCE); JTIDS Class 1 TDMA terminal; F-15 Eagle; F-14D TOMCAT Carrier-Based Maritime Air Superiority Fighter; Joint Interoperability of Tactical Command and Control Systems (JINTACCS); Aircraft

CLASSIFIED BY: JTIDS SECURITY CLASSIFICATION GUIDE, 30 JANUARY 1989 (THIS PAGE IS UNCLASSIFIED)

Declassify on: OADR

5. Related Programs (Cont'd):
Carrier (CV); Guided Missile Cruiser (CG); Guided Missile Destroyer (DDG); Army Data Distribution System (ADDS); Advance Combat Direction System (ACDS); C^2 Processor.

6. Mission and Description:
The Joint Tactical Information Distribution System (JTIDS) Class 2 family of terminals will provide improved combat capability in fighter aircraft, command and control weapon systems, and surface air defense units by providing near real-time, netted, jam-resistant, position determination, and identification to subscribing elements. Real-time, high capacity data transfer between weapons platforms and C3 systems is required for more effective management as the density of the air combat environment increases. The JTIDS Class 2 terminal development is a Joint Service Program with the Air Force as lead service. The family of JTIDS Class 2 terminals consists of the Class 2 (for AF and Navy tactical fighters), the Class 2H (high powered amplifier group (HPAG) for AF Command and Control platforms, Navy sea and air platforms, and AF and USMC ground shelters), and the Class 2M (miniaturized, data only Class 2 terminal for mobile Army platforms). The United Kingdom (UK) is also planning to buy the basic Class 2 terminal for their air defense fighters and both the UK and France are buying the Class 2 HPAG terminals as part of their E-3 acquisition. These terminals will enable sensor information from many sources to be displayed to Army, Navy, and Air Force units in a real-time coherent fashion. The family of Class 2 terminals includes the capability to operate in the Interim JTIDS Message Specification (IJMS) in order to be compatible with Class 1 TDMA JTIDS terminals (currently installed in US and NATO AWACS and ground systems). The Class 2 terminal community uses a newer message standard, TADIL-J, among themselves. The size of the Class 2 TDMA terminal is 1.6 cubic feet, and the weight is 125 pounds. The Class 2 TDMA terminal does not replace any existing DoD system.

7. Program Highlights:
a. Significant Historical Developments -- Following the DSARC IIA decision on 13 January 1981, the Under Secretary of Defense authorized FSED of the JTIDS Class 2 TDMA terminal and development of a comprehensive fighter integration program to identify cost effective integration options. An FSED contract was awarded 14 January 1981 to Singer-Kearfott Division for Class 2 TDMA terminals for Air Force and Army test and evaluation.

A DSARC IIB in January 1982 approved FSD for the DTDMA terminal, and the Navy awarded a contract to the team of Hughes and ITT.

On 16 October 1985, the Secretary of the Navy directed the Chief of Naval Operations to drop all plans to procure Navy DTDMA JTIDS terminals and to procure the Air Force developed TDMA family of modules through the JTIDS JPO for incorporation into the E-2C, F-14D, CG, CV, and DDG. In February 1986, the Navy's Space and Naval Warfare Systems Command (SPAWARSYSCOM) funded Singer for a seven month study to assess the feasibility of integrating Class 2 TDMA terminals into Navy platforms. The results of that study formed the basis for a JPO request for proposal (RFP) to Singer for adapting of Class 2 terminals for the E-2C, F-14D, and ships.

On 31 December 1985, Singer was awarded a contract for Class 2M development terminals for the Army, and Class 2H development terminals for the Air Force (the Class 2H will go into the AWACS and MCE). During FY 87, the Army made a decision not to buy Class 2 terminals. Instead, they will produce and field

7. Program Highlights (Cont'd):

a. Significant Historical Developments (Continued) -- only Class 2M terminals. Army delivery, testing, and full production milestones for the Class 2M have been added. Also, the Army program was rebaselined to meet the needs of the FAADC2I program.

AF IOT&E and multi-service Initial Operational Assessment (IOA) was completed in April 87 on JTIDS Class 2 Terminals. Although JTIDS terminal reliability was unsatisfactory, the system demonstrated overall marginal functional performance. The JPO has initiated an aggressive reliability growth program. The MIDS Concept Validation Contract was awarded to Singer on 18 Sep 1987. Two Class 2 terminals (borrowed F-15) were delivered for F-14D laboratory integration and testing in July - August 1987. A JPO team conducted a Preliminary Design Review (PDR) and initiated a Critical Design Review (CDR) for the Navy Class 2 terminals. Contract modifications were awarded to Singer Kearfott to begin building Navy FSD Class 2 TDMA terminal long lead parts, interface units, and shipboard cabinets for integration.

On 2 March 1988, the JPO awarded a contract modification to Singer to develop Class 2 terminals for the E-2C, F-14D, and Ships. This modification also included acquisition of Class 2 (F-15) and Class 2H (E-3) terminals for Design Certification Testing (DCT), and Class 2 terminals (F-15) for JSTARS integration. On 28 April 1988, the JPO awarded Singer a contract for additional Class 2M terminals needed to meet expanded testing requirements. On 8 July 1988, the JPO awarded a contract modification to Singer to develop a Class 2 terminal for the MCE. An FY 88 congressional RDT&E budget reduction required that the Navy program be restructured to meet budget constraints. A Navy Program Decision Meeting (NPDM) was conducted in June 1988 to gain approval to proceed with the restructured program that resulted from FY 88 funding reductions. On 1 August 1988, the Under Secretary of the Navy granted approval to proceed with the restructured program subject to OSD funding availability for Follow-on acquisition of E-2C, F-14D, and ship Class 2 development terminals. In August 1988, RVT #2 was successfully completed and demonstrated an instantaneous Mean Time Between Failure (MTBF) of 316.5 hours in the laboratory. In September 1988, Plessey Electronic Systems Corporation purchased Singer; henceforth, Singer will be known as Plessey Electronics Systems Corporation (PESC). Program Budget Decision (PBD) 252C (signed 2 December 1988) fully funded our OSD program.

b. Significant Developments Since Last Report - Early this year the Air Force conducted further DT/OA, which demonstrated the Class 2 terminal's increased functional maturity. DT/OA test results provided the necessary support for a positive Defense Acquisition Board (DAB) Milestone IIIA decision. This DAB review of the JTIDS program for initial production approval was conducted 7 September 1989. On 11 October 1989, the Under Secretary of Defense approved Low-Rate Initial Production (LRIP) of the Class 2 and 2H terminals. This LRIP represents 25% of the expected (Milestone/DAB IIIB, FY 93) program. The first contracts will procure USAF F-15 operational terminals and Navy Block II FSD terminals. The first FSD Class 2 TDMA terminals were delivered to the Navy in November 1989. Based on current direction, the JTIDS Joint Program Office (JPO) will no longer report Multifunctional Information Distribution System (MIDS) in JTIDS Class 2 TDMA Terminal SAR.

The JTIDS Class 2 TDMA Terminal is expected to satisfy the mission requirements.

c. Changes since "As Of" Date -- None

8. Threshold Breaches: There are currently no DAE baseline (dated 11 October 1989) breaches.

9. Schedule	Development Estimate	Approved Program	Current Estimate	
a. Milestones--				
Program Initiation	Mar 76	N/A	Mar 76	
Class 2 TDMA ADM Delivery	Aug 78	N/A	Aug 78	
Milestone II	Jan 81	N/A	Jan 81	
TDMA Development Contract Award	Jan 81	N/A	Jan 81	
Pod Preliminary OT&E	Jan 81	N/A	Jan 82	
Delivery of 1st FSD Terminal				
Army (Class 2)	Apr 83	N/A	Mar 84	
Air Force (F-15)	Jul 83	Jun 84	Jun 84	
Navy	N/A	Sep 89	Nov 89	Ch-1
Army (Class 2M)	N/A	Mar 88	Mar 88	Ch-2
IOT&E/IOA Complete				
Army (Class 2)	Mar 87	N/A	Apr 87	
Air Force (F-15)	Jan 86	Apr 87	Apr 87	
Army (Class 2M)	N/A	Jun 91	Jun 91	
Milestone IIIA				
Air Force (F-15)	Jun 86	Aug 89	Sep 89	Ch-3
Production Contract Award (AF)	Jun 86	Oct 89	Feb 90	Ch-4
Full Production (Army Class 2M)	N/A	Oct 92	Oct 92	Ch-5
Milestone IIIA (NPDM)				
LRIP (Navy)	N/A	N/A	Feb 91	
Begin Navy TECHEVAL	N/A	N/A	Aug 92	
Begin Navy OPEVAL	N/A	N/A	Feb 93	
Milestone IIIB (NPDM)				
Full Production (Navy)	N/A	N/A	Sep 93	
Delivery of 1st Production Unit				
Air Force (F-15)	Jun 88	Jan 92	Apr 92	Ch-6
Army (Class 2M)	N/A	Oct 93	Oct 93	
Navy	N/A	Feb 93	Feb 93	
IOC				
Army (Class 2M)	Oct 89	Oct 93	Oct 93	Ch-7 A/
Air Force (F-15)	Sep 88	TBD	N/A	
Navy	N/A	Sep 93	Sep 93	

A/ Army will use refurbished Class 2M development terminals to meet the FAADC2I IOC First Unit Equipped (FUE) CONUS.

b. Previous Change Explanations --

The first production terminal for Army (Class 2M) was delivered in March 1988. The revised September 1986 Required Operational Capability (ROC) established two data distribution systems (EPLRS and JTIDS) in lieu of one data distribution system known as PLRS/JTIDS Hybrid. As a result, JTIDS and EPLRS now have separate Army fielding dates. The Army Class 2M milestones were rescheduled to coincide with the FAADC2I program schedule. The Class 2M is a primary subsystem of the FAADC2I. The schedule also slipped due to delay in obtaining test assets for the pre-DAB testing at Eglin AFB FL. Milestones occurred earlier than anticipated due to major program restructuring. The first F-15 production terminal is to be delivered 27 months after contract award, therefore, an April 1992 date is anticipated. Only 20 F-15s will be equipped with JTIDS. Air Force IOC is not relevant.

c. Current Change Explanations:

Ch-1: Actual delivery of the first FSD terminal for the Navy occurred November 89 vice anticipated September 89.

Ch-2: Actual delivery of first FSD terminal for Army (Class 2M) occurred Mar 88 vice anticipated Feb 88.

Ch-3: Delay of one month in schedule by DAB committee.

Ch-4: Due to delay in proposal preparation and funding constraints the anticipated date for contract award (AF) is now February 1990.

Ch-5: Full production for the Army Class 2M has been delayed until Oct 92 due to program restructuring and Army funding constraints.

Ch-6: Due to a delay in contract award, the delivery of the first production unit for the Air Force (F-15) is slipped to April 1992 (27 months after contract award).

Ch-7: The Army will use refurbished Class 2M development terminals to meet the FAADC2I IOC First Unit Equipped (FUE) CONUS.

d. References --

Development Estimate: Secretary of Defense Decision Memorandum (SDDM), dated 16 January 1981, subject "JTIDS Milestone II Approval (Class 2 Terminal FSED)"; Decision Coordinating Paper (DCP), dated 31 March 1981.

Approved Program: DAE baseline approved 11 October 1989.

10. (U) Technical/Operational Characteristics:

a. (U) Technical	Dev Est	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
(U) Coded/Uncoded Data Rate (double pulse Tx or Rx)(Kbps) A/	28.8	28.8/28.8	57.6/119.0	57.6/119.0
(U) Number of Nets	4	4/2	5	128
(U) Jam Resistance	(b)(1)			
(U) Relay Range	1200	1200/1200	1200 B	1200 Ch-1
(U) Rel Nav Accuracy at 150 nm (ft)	(b)(1)			C/
(U) Communication Range (nm)	300	300/200	310/495 D/	300/500
(U) Voice Channels	3	3/1	2	2 E/
(U) Coded Message Error Probability	.01	.01/.02	.01	.01
b. (U) Operational				
(U) MTBF (hr) (Field)	120	120/102	28 F/	120
(U) MTBF (hr) (Lab)	500	500/400	316.5	500
(U) Mean Corrective Maintenance Time (min)	30	30/60	38	30

A/ A new message packing structure accounts for increase in the data rate. The data rate for single pulse is 238 Kbps.

B/ 1200 NM was demonstrated due to improved software operations.

C/ Average accuracy at 50 NM with triangulation of 52°. System accuracy is a function of triangulation (depending on geometry of participants), source timing, and synchronization. (Similar to Loran). Rel Nav Accuracy at exactly 150 NM was not tested during DT/OT.

D/ 310 NM was demonstrated in the normal range mode; 495 NM was demonstrated in the extended range mode.

E/ JTIDS equipment specifications and TADIL J standards require only 2 voice channels. Multiple Requirements Operational Capability (MROC) requires that the system shall have a sufficient data rate to support 2 voice channels per net.

F/ Apr 1987 OT results.

10. Technical/Operational Characteristics: (Continued)

c. ( ) Previous Change Explanation: RVT#2 Demonstrated a new lab MTBF point estimate.

d. ( ) Explanation of Changes: Ch-1 - 1200 NM demonstated new relay range.

e. ( ) References --

Development Estimate: Secretary of Defense Decision Memorandum (SDDM), dated 16 January 1981, subject "JTIDS Milestone II Approval (Class 2 Terminal FSED)"; Decision Coordinating Paper (DCP), dated 31 March 1981.

Approved Program: DAE baseline approved 11 October 1989.

11. PROGRAM ACQUISITION COST: (Current Estimate in Millions of Dollars)

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	$309.0	$1318.2	$1296.0
Procurement	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total FY 81 Base-Year $	309.0	1318.2	1296.0
Escalation	73.5	530.6	521.2
Development (RDT&E)	(73.5)	(530.6)	(521.2)
Procurement	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total Then-Year $	$382.5	$1848.8	$1817.2
b. Quantities --			
Development (RDT&E)	55	168	168 A/
Procurement	N/A	N/A	N/A
Total	55	168	168

A/ Quantity increased since Dec 88 SAR from 158 to 168 as follows: 10 additional terminals for testing. Not included in this SAR are 16 additional terminals (and associated funding) for MCE, JINTACCS, E-3, JSTARS, TAOM and Ships.

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Development Estimate: Secretary of Defense Decision Memorandum (SDDM), dated 16 January 1981, subject "JTIDS Milestone II Approval (Class 2 Terminal FSED)"; Decision Coordinating Paper (DCP), dated 31 March 1981.

Approved Program: DAE baseline approved 11 October 1989.

12. PROGRAM ACQUISITION/CURRENT PROGRAM UNIT COST SUMMARY:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition --	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	1817.2	1886.4	1817.2
(2) Quantity	168	158	168
(3) Unit Cost	10.8	11.9	10.8
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost			
Less CY Adv Proc	N/A	N/A	N/A
Plus PY Adv Proc	N/A	N/A	N/A
Net Total	N/A	N/A	N/A
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

13. Cost Variance Analysis

a. Summary -- (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
DEVELOPMENT ESTIMATE	382.5	-	-	382.5
PREVIOUS CHANGES				
ECONOMIC	-48.1	-	-	-48.1
QUANTITY	+730.9	-	-	+730.9
SCHEDULE	+22.8	-	-	+22.8
ENGINEERING	+352.7	-	-	+352.7
ESTIMATING	+389.5	-	-	+389.5
OTHER	-	-	-	-
SUPPORT	+56.1	-	-	+56.1
SUBTOTAL	+1503.9	-	-	+1503.9
CURRENT CHANGES				
ECONOMIC	+22.5	-	-	+22.5
QUANTITY	+10.0	-	-	+10.0
SCHEDULE	-	-	-	-
ENGINEERING	-	-	-	-
ESTIMATING	-101.7	-	-	-101.7
OTHER		-	-	
SUPPORT	-	-	-	-
SUBTOTAL	-69.2	-	-	-69.2
TOTAL CHANGES	+1434.7	-	-	+1434.7
CURRENT ESTIMATE	+1817.2	-	-	+1817.2

(FY 1981 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
DEVELOPMENT ESTIMATE	309.0	-	-	309.0
PREVIOUS CHANGES				
QUANTITY	+502.4	-	-	+502.4
SCHEDULE	-1.5	-	-	-1.5
ENGINEERING	+243.8	-	-	+243.8
ESTIMATING	+266.4	-	-	+266.4
OTHER	-	-	-	-
SUPPORT	+38.6	-	-	+38.6
SUBTOTAL	+1049.7	-	-	+1049.7
CURRENT CHANGES				
QUANTITY	+6.7	-	-	+6.7
SCHEDULE	-	-	-	-
ENGINEERING	-	-	-	-
ESTIMATING	-69.4	-	-	-69.4
OTHER		-	-	
SUPPORT	-	-	-	-
SUBTOTAL	-62.7	-	-	-62.7
TOTAL CHANGES	+987.0	-	-	+987.0
CURRENT ESTIMATE	+1296.0	-	-	+1296.0

b. Previous Change Explanation --

RDT&E

Economic: Revised escalation indices.

Quantity: Revised for Air Force's initial quantity increase from 15 to 19 development terminals, and subsequent Air Force quantity increase from 19 to 37 to accommodate TADIL J efforts; revised for Army's quantity increase from 6 to 33 development terminals. Increase quantity of 29 additional terminals.

Schedule: Increase due to 6 month schedule slip of DT&E; deletion of Army FY 85 test support funds.

Engineering: Increased scope of Software Support Facility, Contractor Software support, F-15 Avionics Intermediate Shop, Sustaining F-16 planning effort, F-15 IOT&E, Class 2 Logistics, F-15 Group A; decrease in scope of F-16 and Bilingual Interface; added development of Class 2 terminal High Power Amplifier and interfaces for upgrade in E-3 and MCE platforms to TADIL J capability; F-15 PSE added to program; addition of Army budget for DT/OT IIA testing. MIDS PSD added to program.

Estimating: Original Cost Estimate included all future terminals, impact of revised indices for prior year dollars, Class 1 work removal, Undistributed Budget cuts; adjustments to correct errors in 31 Dec 83 and 31 Dec 84 SARs; correction of Administrative errors on 31 Dec 85 SAR; Gramm-Rudman budget cuts; out year inflation changes; reinstatement of Army funds managed at OSD; FY 87 undistributed budget cut. Adjustment for current and prior. Adjustment for FY 90 and beyond. Prior year OSD funding not previously reported. FY 89 undistributed cuts to OSD funds. FY 90-94 increase to fund, Follow-on developments, testing, logistics, and program support in line. Program restructure reduced Navy effort. However, prior estimates did not include platform integration costs associated with the terminals. FY 93-94 increase to fund USAF testing, integration, MIDS development, and support.

Support: Develop, demonstrate, and evaluate direct link between E-3A and HIMAD elements using Class 2 terminals.

c. Current Change Explanations --

	(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E		
Revised escalation indices (Economic)	N/A	+22.5
Adjustment for Current and Prior Year Escalation (Estimating)	-5.4	-3.9
Reduced Estimate to Absorb Increase Resulting From Jan 90 Economic Escalation Indices (Estimating)	-1.1	-0.7

c. Current Change Explanations (Cont'd) --

	(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E (Cont'd)		
Change in Cost Categories for previously added cost for 10 development terminals already included in Cost Estimate	0	0
Cost due to Quantity increase of 10 additional terminals (QUANTITY)	(+6.7)	(+10.0)
Decrease since funding for additional terminals had been included in previous estimate (ESTIMATING)	(-6.7)	(-10.0)
Reduction/deferral of various R&D tasks due to FY 90-94 OSD funding cuts (ESTIMATING)	-29.2	-46.7
Reduction/deferral of various R&D tasks due to FY 90-94 AF funding cuts (ESTIMATING)	-29.6	-48.5
FY 95 AF funding not previously included (ESTIMATING)	+11.3	+20.1
FY 95 Navy funding not previously included (ESTIMATING)	+1.3	+2.3
FY 89 MIDS funding (PE 65130D) deleted from JTIDS Program (ESTIMATING)	-10.0	-14.3

14. Program Acquisition Unit Cost (PAUC) History: N/A

15. Contract Information: (Then Year Dollars in Millions)

a. RDT&E--

		Initial Contract Price		
		Target	Ceiling	Qty
(1)	Follow-on Development Plessey Electronics Systems Corp (PESC), Wayne NJ. F19628-86-C-0035, FPP Award: December 31, 1985 Definitization: December 31, 1985	$23.6	$23.6	6

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$269.8M (Ch-1)	$269.8M (Ch-1)	93	$269.8M (Ch-1)	$269.8M (Ch-1)

Ch-1 - This is a joint Air Force/Army/Navy/Marine Corps contract with the Air Force being the lead service. Changes since last report: a) Various mods ($2.5M).

Explanation of Changes: FPP contract, Cost Performance Report is not on contract.

		Initial Contract Price		
		Target	Ceiling	Qty
(2)	F-14D/JTIDS Integration Grumman Aerospace Co., Aircraft Systems Bethpage, L.I., NY N00019-84-C-0015, FPP Award: July 31, 1984 Definitization: December 18, 1986	$86.1 A/	N/A	1

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$111.6M	N/A	1	$111.6	$111.6

Explanation of Changes: FPP contract, Cost Performance Report is not on contract.

		Initial Contract Price		
		Target	Ceiling	Qty
(3)	E-2C JTIDS Integration Grumman Aerospace Co. Bethpage, L.I., NY N00019-83-C-0037, CPIF Award: July 1, 1983 Definitization: September 28, 1984	$227.1 A/	N/A	4

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$244.0M (Ch-1)	N/A	4	$244.0M (Ch-1)	$244.0M (Ch-1)

Explanation of Changes: Negotiated, 3 Mar 89, NTE contract price of $244.0M for same scope of effort ($5.9M).

15. Contract Information (Cont'd): (Then Year Dollars in Millions)

A/ Initial contract price was for integration of Navy's JTIDS DTDMA program prior to Secretary of the Navy direction in October 1985 to transition to TDMA integration efforts.

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ -8.6
Cumulative Variances to Date (12/31/89)	$+0.6	$-11.7
Net Change	$+0.6	$ -3.1
Cumulative Variance		
Change Percent	0.0%	36%

Explanation of Change: The schedule variance is based on an out dated baseline. The contractor is currently working to establish a new baseline which will reflect the schedule approved in the June 1988 NPDM. Definitization is anticipated in March 1990.

b. Procurement -- None

c. Milcon -- None

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 75.0% (15 yrs/20 yrs)

(2) Percent Program Cost Appropriated: 69.5% ($1262.9/$1817.2)

b. Appropriation on Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY 76-89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance To Complete (FY92-95)	Total
RDT&E	$1083.8	$179.1	$178.9	$375.4	$1817.2

c. Annual Summary --

PROGRAM: JTIDS CLASS 2 TDMA TOTAL PROGRAM A/ B/

Fiscal Year	Qty	Flyaway FY 81 Dollars		Total Base Year$	Total Then-Year $			Escl Rate %
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
1976				0.1	0.1	0.1	0.1	6.9
1977				1.4	1.0	1.0	1.0	2.9
1978				1.0	0.8	0.8	0.8	2.7
1979				7.5	6.4	6.4	6.4	6.8
1980				10.4	9.8	9.8	9.8	9.4
1981				20.1	21.0	21.0	21.0	11.9
1982				42.9	47.9	47.9	47.9	9.2
1983				37.5	43.8	43.8	43.3	4.9
1984				36.4	44.1	44.1	43.0	3.8
1985				64.8	81.1	81.1	70.1	3.4
1986				165.1	212.2	212.2	209.8	2.8
1987				139.0	184.2	184.2	182.1	2.7
1988				152.4	209.0	209.0	136.3	3.1
1989				155.4	222.4	183.2	77.0	4.2
1990				120.2	179.1	20.6	0.4	4.0
1991				115.4	178.9			4.2
1992				102.8	165.4			4.0
1993				61.7	102.8			3.7
1994				49.3	84.8			3.4
1995				12.6	22.4			3.1
Total	168			1296.0	1817.2	1065.2	849.0	

A/ FY 91 amended PB submitted 29 January 1990. In FY 86, OSD incorporated all JTIDS funds (both terminal development and integration) into an OSD development line. Beginning in FY 88, all terminal development funds remain in the OSD line while all platform integration development RDT&E money is controlled by each Service.

B/ Program Office records as of 15 December 1989.

c. Annual Summary (Cont'd) --

PROGRAM: JTIDS Class 2 TDMA OSD (PE: 0604771D) A/ B/

Fiscal Year	Qty	Flyaway FY 81 Dollars		Total Base Year$	Total Then-Year $			Escl Rate %
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
			Appropriation:	RDT&E	(PE: 0604771D)			
1986				154.3	198.3	198.3	198.3	2.8
1987				110.9	147.0	147.0	147.0	2.7
1988				57.3	78.6	78.6	24.2	3.1
1989				41.9	60.0	28.1	8.4	4.2
1990				46.8	69.8	5.1		4.0
1991				41.7	64.6			4.2
1992				52.4	84.3			4.0
1993				31.8	52.9			3.7
1994				24.8	42.7			3.4
Total	125			561.9	798.2	457.1	377.9	

PROGRAM: JTIDS Class 2 TDMA AIR FORCE PROGRAM (PE: 0604754F) A/ B/

Fiscal Year	Qty	Flyaway FY 81 Dollars		Total Base Year$	Total Then-Year $			Escl Rate %
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
			Appropriation:	RDT&E	(PE: 0604754F)			
1980				5.8	5.5	5.5	5.5	9.4
1981				17.3	18.1	18.1	18.1	11.9
1982				32.0	35.7	35.7	35.7	9.2
1983				20.5	23.9	23.9	23.9	4.9
1984				18.8	22.8	22.8	22.8	3.8
1985				46.7	58.4	58.4	49.8	3.4
1986				0.0	0.0	0.0	0.0	2.8
1987				0.0	0.0	0.0	0.0	2.7
1988				15.2	20.8	20.8	13.4	3.1
1989				34.0	48.7	41.5	15.5	4.2
1990				11.9	17.7	1.0		4.0
1991				24.7	38.3			4.2
1992				10.4	16.8			4.0
1993				11.1	18.5			3.7
1994				12.1	20.8			3.4
1995				11.3	20.1			3.1
Total	19			271.8	366.1	227.7	184.7	

A/ FY 91 amended PB submitted in 29 January 1990.
B/ Program Office records as of 15 December 1989.

c. Annual Summary (Cont'd) --

PROGRAM: JTIDS CLASS 2 TDMA ARMY PROGRAM (PE: 0604702A) A/

Fiscal Year	Qty	Flyaway FY 81 Dollars		Total Base Year$	Total Then-Year $			Escl Rate %
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
			Appropriation:	RDT&E	(PE: 0604702A)			
1976				0.1	0.1	0.1	0.1	6.6
1977				1.4	1.0	1.0	1.0	2.9
1978				1.0	0.8	0.8	0.8	2.6
1979				7.5	6.4	6.4	6.4	6.8
1980				4.6	4.3	4.3	4.3	9.4
1981				2.8	2.9	2.9	2.9	11.9
1982				10.9	12.2	12.2	12.2	9.2
1983				17.0	19.9	19.9	19.4	4.9
1984				17.6	21.3	21.3	20.2	3.8
1985				18.1	22.7	22.7	20.3	3.4
1986				10.8	13.9	13.9	11.5	2.8
1987				0.0	0.0	0.0	0.0	2.7
1988				3.1	4.2	4.2	3.4	3.1
TOTAL	24			94.9	109.7	109.7	102.5	

PROGRAM: JTIDS CLASS 2 TDMA NAVY PROGRAM (PE: 0205604N) A/

Fiscal Year	Qty	Flyaway FY 81 Dollars		Total Base Year$	Total Then-Year $			Escl Rate %
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
			Appropriation:	RDT&E	(PE: 0205604N)			
1987				28.1	37.2	37.2	35.1	2.7
1988				76.8	105.4	105.4	95.3	3.1
1989				79.5	113.7	113.6	53.1	4.2
1990				61.5	91.6	14.5	0.4	4.0
1991				49.0	76.0			4.2
1992				40.0	64.0			4.0
1993				18.8	31.1			3.7
1994				12.4	20.9			3.4
1995				1.3	3.3			3.1
Total	0			367.4	543.2	270.7	183.9	

A/ FY 91 Amended PB submitted January 1990.

17. Production Rate Data:

a. Annualized Production Rates -- N/A

b. Cost Variance -- N/A

c. Schedule Variance -- N/A

d. Deliveries (Plan/Actual) --

	RDT&E	To Date 83/78

e. Approved Design-to-Cost Goal -- N/A

18. Operating and Support Costs:

a. Assumptions and Ground Rules -- N/A

b. Costs -- N/A

c. Contractor Support Costs -- N/A

A-21 OH-58D

SAR-89-112

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: ARMY HELICOPTER IMPROVEMENT PROGRAM (AHIP)
(KIOWA WARRIOR)

AS OF DATE: December 31, 1989

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Concur in Classification as marked
21 MAR 1990
SECURITY REVIEW, DOCUMENT, DODA

1. (U) Designation and Nomenclature (Popular Name): OH-58D Scout Helicopter (AHIP); OH-58D Kiowa Warrior (Armed AHIP).

2. (U) DOD Component: Department of the Army.

3. (U) Responsible Office and Telephone Number:

Army Helicopter Improvement Program
Project Manager's Office
4300 Goodfellow Boulevard

Colonel James T. Huey
Assigned: April 1, 1988
AV: 693-1360; Comm: (314) 263-1360

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DEPARTMENT OF DEFENSE

4. (U) Program Elements/Procurement Line Items:

RDTE: PE 64220 Projects D518, D519
PROCUREMENT: APPN 2031, SSN AZ2200/AA0961
MILCON: None

5. (U) Related Programs: None

6. (U) Mission and Description: The Army Helicopter Improvement Program (AHIP) aeroscout helicopter is a major modification of the existing OH-58A helicopter to incorporate improved hot-day and nap-of-the-earth (NOE) performance. The AHIP has a low-light television, thermal imaging system, and laser rangefinder/designator incorporated into a Mast Mounted Sight (MMS). It is designed to operate autonomously at stand-off ranges providing command and

CLASSIFIED BY: Mast Mounted Sight SCG
DECLASSIFY ON: 31 Dec 94

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OASD(PA) DFOISR 90 -T- 0283

6. (U) Mission and Description (Cont'd):

control, target acquisition, and target designation under day/night, limited visibility, hot and adverse weather conditions. The communications suite includes a digital data burst airborne target handover system (ATHS), inertial and doppler navigation, and an audio distribution unit which gives the status of frequencies for five on-board radios and allows management of the communications system. AHIP can designate for DOD precision-guided munitions, and using the ATHS, the aircraft is capable of providing adjustment of conventional artillery as well as handing off targets for precision-guided munitions. The primary mission for the OH-58D will be reconnaissance, intelligence, surveillance, and target acquisition for air cavalry units. Normal operations will require the scout to operate as a member of the combined arms team. The AHIP is currently fielded in field artillery units and fielding to air cavalry units is tentatively scheduled to begin 2QFY90. The fully armed configuration is a modification of the OH-58D aircraft and includes Air-to-Air-STINGER (ATAS) and Air-to-Ground (ATG) weapons. The ATAS has been a program requirement from the initiation of AHIP, to provide a self-defense capability against airborne threats. The ATG weapons capability will provide defense against ground threats and the ability to service urgent/high priority targets. The fully armed OH-58D will provide forward deployed air cavalry reconnaissance units and certain rapid deployment units with the ability to see, fight, and survive at night.

7. (U) Program Highlights:

a. (U) Significant Historical Developments — On 30 November 1979, a Special Army Systems Acquisition Review Council (ASARC) reaffirmed the need for an Advanced Scout Helicopter (ASH) to incorporate day/night target acquisition/designation capabilities; improved NOE and tactical communication and navigation and an aircraft performance improvement which would permit operation with the AH-64 APACHE in the hot-day, high altitude environment. A Required Operational Capability (ROC) document was approved on 9 January 1981, and on 21 September 1981, a Full Scale Engineering Development (FSED) contract was awarded to Bell Helicopter Textron, Incorporated (BHTI), for development and qualification of an improved scout helicopter to be identified as the OH-58D aircraft which entered formal Government Development Testing (DT) in July 1984. An ASARC was held on 23 July 1985 for the purpose of type classifying the OH-58D as Standard A and to proceed into full scale production. A Secretary of Defense Decision Memorandum (SDDM), signed 7 October 1985, approved the OH-58D for the field artillery aerial observer role.

b. (U) Significant Developments Since Last Report — OH-58D Armed Pre-ASARC, 8 August 1989, recommended approval for arming OH-58D aircraft with ATG weapons. Congress restored the FY 90 program and provided $192.3M for an additional 36 OH-58D helicopters for a total procurement of 243 aircraft. Although the FY 90 Joint Authorization language terminates the OH-58D procurement program after the FY 90 buy, it contains a proviso for future procurement. A Secretary of the Army memorandum, dated 8 January 1990, approved the armed retrofit program to fully arm all 243 OH-58Ds. Included in that memorandum was the approval to modify 81 of the 243 Armed AHIPs in the Multi-purpose Light Helicopter (MPLH) configuration. Fielding of 30 OH-58D aircraft to the V and VII Corps in US Army Europe (USAREUR) was completed in September 1989.

7. (U) Program Highlights (Cont'd):

(U) The OH-58D helicopter and the OH-58D Armed are expected to satisfy mission requirements.

c. (U) Changes Since "As of" Date — None

8. (U) Threshold Breaches: There are currently no AAE approved baseline (26 February 1990) breaches.

9. (U) Schedule:

a. (U) Milestones —	Development Estimate	Approved Program	Current Estimate
FSD Contract Award	Sep 81	Sep 81	Sep 81
Development Test II (DT II)	N/A	Aug 84	Aug 84
First Production Contract Award (16) (FY83/84)	Oct 84	Sep 84	Sep 84
DT II/OT II Complete	Jan 85	Feb 85	Feb 85
Milestone III (DSARC III)	N/A	Oct 85	Oct 85
Second Production Contract Award (44) (FY85)	Jun 85	Oct 85	Oct 85
First Production Delivery Start	N/A	Dec 85	Dec 85
Second Production Delivery Start	N/A	Jun 86	Jun 86
Third Production Contract Award (39) (FY86)	N/A	Aug 86	Aug 86
Production Verification Test	N/A	Oct 86	Oct 86
First Unit Equipped (CONUS)	N/A	Mar 87	Mar 87
Start Follow-on Evaluation (FOE) ((Army Aerial Scout Test (AAST))	N/A	May 87	Mar 87
Initial Operational Capability (IOC)	Jun 86	May 87	May 87
First Unit Equipped (USAREUR)	N/A	Jun 87	Jun 87
Production Reliability Scoring Conference	N/A	Jun 87	Jun 87
Third Lot Production Delivery Start	N/A	Jun 87	Jun 87
Fourth Production Contract Award (36) (FY87)	N/A	Sep 87	Sep 87
Production (RAMLOG) Scoring Conference	N/A	Feb 88	Feb 88
First Unit Equipped (EUSA)	N/A	Apr 88	Apr 88
Fourth Production Delivery Start	N/A	Jul 88	Jul 88
Production (RAMLOG) Scoring Conference	N/A	Aug 88	Aug 88
Production (RAMLOG) Scoring Conference	N/A	Oct 88	Oct 88

9. (U) Schedule (Cont'd):

a. (U) Milestones —

	Development Estimate	Approved Program	Current Estimate	
Fifth Production Contract Award (36) (FY88)	N/A	Dec 88	Dec 88	
RAM Assessment	N/A	Jan 89	Jan 89	
Sixth Production Contract Award (36) (FY89)	N/A	Jun 89	Jun 89	
Fifth Production Delivery Start	N/A	Jul 89	Jul 89	
Seventh Production Contract Award (36) (FY90)	N/A	Jun 90	Jun 90	(Ch-1)
Sixth Production Delivery Start	N/A	Jul 90	Jul 90	
Seventh Production Delivery Start	N/A	Jul 91	Jul 91	(Ch-1)
Final AHIP Production Delivery	N/A	Jun 92	Jun 92	(Ch-2)
Last Unit Equipped (AHIP)	N/A	Jul 92	Jul 92	(Ch-2)

b. (U) Previous Change Explanations —

Long lead materiels contract award slipped one month because of late arrival of contractor proposal and more extensive negotiations. The first year production option was signed on 25 September 1984. Because of weather delays and the requirement for additional tests, OT II was extended two weeks. Full Production Award was delayed due to the ASARC/DSARC process. The original IOC was scheduled for June 1986, but a Vice Chief of Staff of the Army (VCSA) decision was made to field AHIP on the basis of an entire AAH Battalion rather than a Company as originally planned, thus slipping IOC six months. A delay of an additional six months to June 1987 was due to the SDDM decision to field initially to the Field Artillery Aerial Observer (FAAO) role, thereby requiring a FOE to qualify the AHIP for the Attack and Air Cavalry roles. The IOC will be a divisional General Support Aviation Company (GSAC) with six AHIPs in the FAAO role. The delayed IOC is not a result of any known or perceived problems with hardware/software production. FY 90 is last year of AHIP procurement.

c. (U) Current Change Explanations —

(Ch-1) Current estimate changed from N/A to Jun 90 for 7th Production Contract Award and from N/A to Jul 91 for 7th Production Delivery Start due to Congress restoring FY 90 procurement funding for 36 CH-58D's.

(Ch-2) Corrects dates to agree with 243 AHIP procurement quantity. Final Production Delivery changed from Jun 91 to Jun 92 and Last Unit Equipped changed from Jul 91 to Jul 92.

9. (U) Schedule (Cont'd):

d. (U) References —

Development Estimate: SDDMs, 31 August 1982 and 7 October 1985, subject: "Army Helicopter Improvement Program (AHIP) for the Scout Helicopter."

Approved Program: AAE approved Baseline (26 February 1990); the Armed AHIP Program Baseline is being definitized.

10. (U) Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
a. (U) Technical — AHIP:				
(1) (U) Aircraft				
Vertical Rate of Climb (FT/MIN)				
2000 ft and 70 F	650	650/450	650	650
4000 ft and 95 F	500	500/HOGE	500	500
Forward Flight Speed (KTAS)	112	112/100	118	118
Endurance (Hrs)	2.4	2.4/1.9	2.4	2.4
(2) (S) Mast Mounted Sight (MMS) Performance				
Detection Range (Km) 95 F	(b)(1)			
Day				
Night				
Recognition Range (Km) 95 F				
Day				
Night				
Designation Range (Km) 95 F				
Day				
Night				
Target Location Accuracy (M) 90% Probability				
b. (U) Operational —				
(U) Aircraft				
(U) Mean Time Between Mission Affecting Failure (HR) (4 hour mission)	4.4	4.4/4.4	8.7	8.7
(U) Sortie Rate (Flight hours for month)				
Peacetime	20	20/20	20	20
Wartime: Initial Surge	112	112/112	112	112
Sustained	65	65/65	65	65
(U) Maintenance Ratio (Manhour/ Flight Hr) (AVUM)	3.0	1.8/3.0	1.8	1.8

10. Technical/Operational Characteristics (Cont'd):

b. Operational —	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
Mean Time to Repair (HRS) (AVIM)	2.0	2.0/2.0	2.0	2.0
Mean Time Between Failure (Specification)	N/A	6.98/6.98	7.2	7.2

c. Previous Change Explanation —

November 1984 ROC revision defined reliability based on mean time between mission affecting failures in place of Operational Mission Reliability. Maintenance reliability no longer used. Demonstrated Performance and Current Estimate updated to reflect results of OT and production verification tests.

d. Current Change Explanation — None

e. References —

Development Estimate: SDDMs, 31 August 1982 and 7 October 1985, subject: "Army Helicopter Improvement Program (AHIP) for the Scout Helicopter."

Approved Program: AAE approved Baseline (26 February 1990).

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. Cost —	Development Estimate	Approved 1/ Program	Current Estimate
Development	$ 213.5	$ 210.3	$ 241.6
Procurement	1454.4	1073.3	1432.1
Airframe	(329.7)	(279.5)	(338.8)
Engine	(67.6)	(31.6)	(32.4)
MMS/CDS	(559.1)	(432.1)	(439.0)
Other Avionics	(148.9)	(57.6)	(62.6)
Armament	N/A	(62.1)	(239.5)
Non Rec	(47.6)	(19.7)	(30.8)
Total Flyaway	(1152.9)	(882.6)	(1143.1)
Other Wpn Sys Cost	(220.9)	(79.9)	(171.8)
Initial Spares	(80.6)	(110.8)	(117.2)
Construction (MILCON)	0	0	0
Total FY 82 Base Year $	$1667.9	$1283.6	$1673.7

1/ On 8 January 1990, the Army approved the Armed AHIP configuration with a total program quantity of 248. A baseline is being developed for the Armed AHIP Program. The following Armed AHIP costs are included in the Current Estimate column of the SAR: RDTE; $45.2M/Procurement; $610.0M

11. (U) Program Acquisition Cost (Cont'd): (Current Estimate in Millions of Dollars)

Escalation	863.7	397.8	662.9
Development (RDT&E)	(14.6)	(13.0)	(26.9)
Procurement	(849.1)	(384.8)	(636.0)
Construction (MILCON)	0	0	0
Total Then-Year $	$2531.6	$1681.4	$2336.6

b. (U) Quantities —

Development	5	5	5
Procurement	578	243	243
Total	583	248	248

c. (U) Foreign Military Sales — None

d. (U) Nuclear Costs — None

e. (U) References —

Development Estimate: SDDMs, 31 August 1982 and 7 October 1985, subject: "Army Helicopter Improvement Program (AHIP) for the Scout Helicopter."

Approved Program: AAE approved baseline (26 February 1990).

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions)

		Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. (U)	Program Acquisition	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) (U)	Cost	2336.6	3171.1	2336.6
(2) (U)	Quantity	243	375	243
(3) (U)	Unit Cost	9.616	8.456 1/	9.616

1/ This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purpose of this calculation.

b. (U)	Current Procurement —	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) (U)	Cost	192.3	192.3	48.0
	Less CY Adv Proc	0.0	0.0	0
	Plus PY Adv Proc	33.6	33.6	0
	Net Total	225.9	225.9	48.0
(2) (U)	Quantity	36	36	0
(3) (U)	Unit Cost	6.275	6.275	N/A

13. (U) Cost Variance Analysis:

a. (U) Summary--(Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	228.1	2303.5	0	2531.6
Previous Changes:				
Economic	-3.4	-302.0		-305.4
Quantity	-	-1063.5		-1063.5
Schedule	-	+177.0		+177.0
Engineering	+13.4	+109.8		+123.2
Estimating	-14.8	+348.7		+333.9
Support	-	-325.2		-325.2
Subtotal	-4.8	-1055.2	0	-1060.0
Current Changes:				
Economic	-	+4.8		+4.8
Quantity	-	+104.2		+104.2
Schedule	-	-		-
Engineering	+45.2	+495.2		+540.4
Estimating	-	+24.6		+24.6
Support	-	+191.0		+191.0
Subtotal	+45.2	+819.8	0	+865.0
Total Changes	+40.4	-235.4	0	-195.0
Current Estimate	+268.5	+2068.1	0	+2336.6

(FY 1982 Constant (Base Years) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	213.5	1454.4	0	1667.9
Previous Changes:				
Quantity	-	-721.6		-721.6
Schedule	-	+73.0		+73.0
Engineering	+11.1	+72.9		+84.0
Estimating	-14.3	+309.5		+295.2
Support	-	-248.6		-248.6
Subtotal	-3.2	-514.8	0	-518.0
Current Changes:				
Quantity	-	+68.1		+68.1
Schedule	-	-		-
Engineering	+31.3	+294.3		+325.6
Estimating	-	+15.5		+15.5
Support	-	+114.6		+114.6
Subtotal	+31.3	+492.5	0	+523.8
Total Changes	+28.1	-22.3	0	+5.8
Current Estimate	+241.6	+1432.1	0	+1673.7

13. (U) Cost Variance Analysis (Cont'd):

b. (U) Previous Change Explanations —

(U) RDTE

Economic:	Due to the application of December 1988 and prior DA/OSD inflation guidance.
Engineering:	Inclusion of the Optical Improvement Program (OIP).
Estimating:	Congressionally directed reduction in Total Risk Assessing Cost Estimate (TRACE).
	Revised computational method for FY 82 base year 82$.
	Turn-in of contract contingency funds and Gramm-Rudman-Hollings cuts.
	Correction of rounding error from 31 Dec 87 SAR

(U) Procurement

Economic:	Due to the application of December 1988 and prior DA/OSD inflation guidance.
Quantity:	Reduction of aircraft from 578 to 135. Increase of aircraft from 135 to 195. Increase of aircraft from 195 to 375. Decrease of aircraft from 375 to 207.
Schedule:	Program stretched in the FY 86-90 POM by Army. Program stretchout into FY 92 due to POM restructuring and SDDM guidance.
Engineering:	HQDA directed program changes (Single Channel Ground and Airborne System (SINCGARS), Global Positioning Satellite System (GPS)). Inclusion of Optical Improvement Program (OIP), ATAS and memory upgrade for the MMS and Control Display System (CDS). Reduction in ATAS, Armed AHIP, and configuration changes to the Airframe, MMS, and CDS due to reduction in quantity.
Estimating:	Congressional cuts (IR&D), revised System Program Management (SPM) and Engineering Change Orders (ECO) and adjustments from learning curve differences. Changes applicable to decrease from 375 to 207 aircraft.
Support:	Inclusion of warranty risk requirement. Increased initial spares estimate based on refined configuration data, changing Logistics Support Analysis (LSA) results. Reduction and additions in initial spares based on changes in program quantities. Additions and reductions in retrofit of fielded aircraft to production baseline due to changes in program quantities.

(U) MILCON: None.

13. (U) Cost Variance Analysis (Cont'd):

c. (U) Current Change Explanations —

	(Dollars in Millions) Base-Year	Then-Year
(1) (U) RDT&E		
Revised Dec 89 escalation rate (Economic)	N/A	+ 0.0
Engineering changes associated with Armed OH-58D and Multi-purpose Light Helicopter (MPLH)	+ 31.3	+ 45.2
o Development of Armed OH-58D (Engineering)	(+ 22.9)	(+ 32.7)
o Development of MPLH (Engineering)	(+ 8.4)	(+ 12.5)
(2) (U) Procurement		
Revised Dec 89 escalation rate (Economic)	N/A	+ 4.8
Increase in production program by 36 aircraft from 207 to 243	+ 89.7	+138.0
o Increase of 36 aircraft (Quantity)	(+ 68.1)	(+104.2)
o Estimating changes applicable to increase of 36 aircraft (Estimating)	(+ 14.6)	(+ 23.1)
o Support changes applicable to increase of 36 aircraft (Support)	(+ 7.0)	(+ 10.7)
Inclusion of Armed OH-58D retrofit program	+374.9	+630.9
o Engineering changes to the aircraft for Armed OH-58D (Engineering)	(+284.6)	(+479.2)
o Support changes for Armed OH-58D (Support)	(+ 80.6)	(+135.7)
Inclusion of MPLH program		
o Engineering changes for MPLH (Engineering)	(+ 9.7)	(+ 16.0)
Adjustments from learning curve differences (Estimating)	+ .9	+ 1.5
Depot facilitization due to termination (Support)	+ 27.0	+ 44.6
(3) (U) MILCON		
None		

14. (U) Program Acquisition Unit Cost (PAUC) History: (Millions of then-year dollars). 1/

(U) Current Baseline Estimate to Current Estimate —

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Sup	Total	
4.38	-1.24	+2.15	+.73	+2.73	+1.48	—	-.55	+5.24	9.62

1/ This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purpose of this calculation.

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E - None

b. (U) Procurement -

Lot III (FY86) Production - Air Vehicle
Bell Helicopter Textron, Inc., Hurst, TX
DAAJ09-86-C-0500, FFP
Award: August 22, 1986
Definitized: August 22, 1986

Initial Contract Price		
Target	Ceiling	Qty
$185.3	N/A	39

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$181.8	N/A	39	$181.8	$181.8

NOTE: For FFP contracts, cost and schedule variance information is not required.

Lot IV (FY87) Production - Airframe
Bell Helicopter Textron, Inc., Hurst, TX
DAAJ09-87-C-0379, FFP
Award: September 30, 1987
Definitized: September 30, 1987

Initial Contract Price		
Target	Ceiling	Qty
$ 44.4	N/A	36

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 47.7	N/A	36	$ 47.7	$ 47.7

NOTE: For FFP contracts, cost and schedule variance information is not required.

Lot IV (FY87) Production - Mast Mounted Sight
McDonnell Douglas Astr Co., Huntington Beach, CA
DAAJ09-86-C-A312, FFP
Award: September 30, 1987
Definitized: September 30, 1987

Initial Contract Price		
Target	Ceiling	Qty
$ 77.2	N/A	39

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 81.6	N/A	39	$ 81.6	$ 81.6

NOTE: For FFP contracts, cost and schedule variance information is not required.

OH-58D, December 31, 1989

15. (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

Lot V & VI (FY88&89) Production-Mast Mounted Sight
McDonnell Douglas Electronic Systems Company
DAAJ09-88-C-A107, FFP
Award: September 23, 1988
Definitized: September 23, 1988

Initial Contract Price		
Target	Ceiling	Qty
$147.1	N/A	72 1/

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$165.2	N/A	72	$165.2	$165.2 1/

NOTE: For FFP contracts, cost and schedule variance information is not required.

Lot V & VI (FY88&89) Production-Airframe
Bell Helicopter Textron, Inc., Hurst, TX
DAAJ09-88-C-A097, FFP
Award: January 27, 1989
Definitized: January 27, 1989

Initial Contract Price		
Target	Ceiling	Qty
$120.3	N/A	72 1/

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$127.4	N/A	72	$127.4	$127.4 1/

NOTE: For FFP contracts, cost and schedule variance information is not required.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status —

(1) (U) Percent Program Completed: 68.8% (11/yrs/16 yrs).

(2) (U) Percent Program Cost Appropriated: 72.0% ($1681.4/$2336.6).

b. (U) Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-95)	Total
RDT&E	223.3	-	25.8	19.4	268.5
Procurement	1265.8	192.3	48.0	562.0	2068.1
MILCON	0	0	0	0	0
TOTAL	1489.1	192.3	73.8	581.4	2336.6

1/ Lot VI Option exercised for 36 aircraft (FY 89 contract).

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary — Program funding and quantities reflect the FY 1991 Budget Estimate.

Fiscal Year	Qty	Flyaway FY82 Dollars Nonrec	Flyaway FY82 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: RDTE								
1980				8.5	7.4	7.4	7.4	9.4
1981		-	21.9	26.5	25.6	25.6	25.6	11.9
1982		2.1	33.5	37.4	38.5	38.5	38.5	7.6
1983		4.6	55.1	68.8	73.9	73.9	73.9	4.9
1984		13.8	14.0	45.2	50.4	50.4	50.4	3.8
1985		1.8	3.9	17.7	20.3	20.3	20.3	3.4
1986		-	-	6.1	7.2	7.2	7.2	2.8
1987		-	-	-	-	-	-	-
1988		-	-	-	-	-	-	-
1989		-	-	-	-	-	-	-
1990		-	-	-	-	-	-	-
1991		-	-	18.2	25.8	-	-	4.2
1992		-	-	13.2	19.4	-	-	4.0
Subtotal	5	22.3	128.4	241.6	268.5	223.3	223.3	
Appropriation: Procurement								
1983		2.4	24.6	30.1	36.3	36.3	36.3	9.0
1984	16	17.3	112.2	158.6	196.5	196.5	196.5	8.0
1985	44	-	141.3	181.4	231.7	231.7	231.7	3.4
1986	39	-	122.2	174.7	230.7	230.7	230.7	2.8
1987	36	-	102.5	132.8	179.3	179.3	179.3	2.7
1988	36	-	106.5	113.6	160.4	152.9	82.0	3.0
1989	36	-	135.0	156.4	230.9	207.9	74.0	4.2
1990	36	-	118.7	125.7	192.3	.1	-	4.0
1991	-	6.2	15.9	30.2	48.0	-	-	4.2
1992	-	4.9	67.2	119.9	197.2	-	-	4.0
1993	-	-	61.8	75.6	128.5	-	-	3.7
1994	-	-	57.9	75.1	131.6	-	-	3.4
1995	-	-	46.6	58.0	104.7	-	-	3.1
Subtotal	243	30.8	1112.4	1432.1	2068.1	1235.4	1030.5	
Appropriation: MILCON								
Subtotal		0	0	0	0	0	0	0
Total	248	53.1	1240.8	1673.7	2336.6	1458.7	1253.8	

17. (U) Production Rate Data:

a. (U) Annual Production Rates — (Note: The annual production rates shown differ from the annual funded quantities because the funded delivery period is nine months for FY 84 and 11 months for FY 85.)

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1984	21	21	21	21
1985	48	48	48	48
1986	56	39	39	56
1987	92	48	36	92
1988	120	32	36	120
1989	130	81	36	-
1990	120	116	36	-
1991	-	120	-	-
1992	-	82	-	-

b. (U) Cost Variance — Dollars in Millions — (NOTE: Subject to the limitations on production rates above).

Item		Production Estimate	Variance (CE Less PdE	Current Estimate	Variance (CE Less Max)	Maximum Economic
Prog Acq Cost	(82 $)	2094.4	-420.7	1673.7	+430.2	1243.5
	(ESC $)	2943.4	-606.8	2336.6	+755.5	1581.1
PAUC	(82 $)	3.6	+3.3	6.9	+1.8	5.1
	(ESC $)	5.0	+4.6	9.6	+3.1	6.5

c. (U) Schedule Variance - (NOTE: Subject to the limitations on on production rates above).

Item	Production Estimate	Variance (CE Less PdE	Current Estimate	Variance (CE Less Max)	Maximum Economic
Start Date (Mo/Yr)	12/85	0	12/85	0	12/85
Duration (in Months)	83	-5	+78	+27	+51
End Date (Mo/Yr)	11/92	-5	06/92	+27	03/90

d. (U) Deliveries (Plan/Actual) —

	To Date
RDT&E	5/5
Procurement	153/156

17. (U) Production Rate Data (Cont'd):

e. (U) Approved Design to Cost Goal —

(Average Unit Flyaway Cost)

	Development Estimate	Current Estimate	Latest Approved Threshold
@ Qty:	578	243	
@ Peak Rate:	10/mo	4/mo	
@ FY 82 Base-Year $	1.99	4.70	4.60
Then-Year $	3.19	6.79	5.52
@ Qty:	116	99	
@ Peak Rate:	10/mo	4/mo	
FY 82 Base-Year $	2.80	4.24	5.29
Then-Year $	3.82	5.40	6.10

18. (U) Operating & Support Costs:

a. (U) Assumptions and Ground Rules —

Sustainment costs are based on 243 Armed OH-58D operating at a tempo of 240 peacetime flying hours per year with each aircraft operating for 20 years. Replenishment costs includes aircraft spares and repair parts. Depot maintenance includes the cost of labor, material, and transportation for maintenance performed at the depot level. Military personnel includes costs for the aircraft flight crews, Aviation Unit Maintenance (AVUM) personnel, Aviation Intermediate Maintenance (AVIM) personnel and AVUM and AVIM indirect support personnel. Sustainment costs are based on the Armed AHIP Baseline Cost Estimate (BCE) of May 1989.

b. (U) Costs —

(FY 82 Constant (Base-Year) in Dollars)

Cost Element	Cost Per Flying Hour
Replenishment	$ 135
Petroleum, Oil and Lubricants (POL)	24
Ammunition	204
Depot Maintenance	100
Transportation	1
System Specific Replacement Training	106
Military Personnel	1123
System/Project Management (Civilian)	26
Life Cycle Software Support	3
Total	$1722

c. (U) Contractor Support Costs —

(Then-Year Dollars in Millions)

	FY1989 & Prior 1/	FY1990 Year	FY1991 Year	Balance to Complete	Total
O&M	43.9	25.7	18.9	—	88.5

1/ Includes FY 1988 and FY 1989.

N-43 . TRIDENT II SUB

SAR-89-052

~~CONFIDENTIAL~~

SELECTED ACQUISITION REPORT (RCS: DD COMP(Q&A)823)

PROGRAM: OHIO CLASS D-5 CAPABLE SUBMARINE

AS OF DATE: DECEMBER 31, 1989

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AS AMENDED

MAR 22 1990

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1. Designation/Nomenclature (Popular Name): OHIO Class Submarine.

2. DOD Component: U.S. Navy

3. Responsible Office and Telephone Number:

Strategic Systems Programs
Department of the Navy
Washington, D.C. 20376-5002

PM: RADM K. Malley
Assigned: June 21, 1985
Telephone: 695-2064 --
Autovon: 225-2098

98-00674

No Security Objection to Open Publication (AS AMENDED) MAR 22 1990
Office of the Chief of Naval Operations
Dept. of the Navy

4. Program Elements:

RDT&E: [redacted] 0604363N (J1546 only) (Shared)
PROCUREMENT: 0101228N, APPN 1611 ICN 1040

5. Related Programs:

TRIDENT I Backfit and TRIDENT II (D-5) Missile, and TRIDENT I Systems

Classified by:
OPNAVINST [redacted] Enclosure (27)
Declassify on: OADR

(This page is [redacted])

~~CONFIDENTIAL~~

6. Mission and Description: To provide an undersea strategic missile system to ensure that the U.S. continues to maintain a credible, survivable deterrent independent of foreseeable threats. The nuclear-powered OHIO Class D-5 capable submarine has 24 missile tubes. Incorporation of state-of-the-art technologies in submarine quietness, mobility, and self-defense make the submarine highly survivable. The submarine can patrol, transit, or evade enemy search forces at higher speeds than previous SSBNs. It has an integrated command and control system, including an integrated radio room designed to enhance the survivability of communication links in a hostile electromagnetic environment, and carries the latest submarine defense systems.

7. Program Highlights:

a. Significant Historical Developments -- The Deputy Secretary of Defense's Program Decision Memorandum (PDM) of 2 October 1981 directed the Navy to fund development of the TRIDENT II (D-5) missile with a December 1989 IOC. The design characteristics of the TRIDENT II (D-5) missile require modifications to the OHIO Class submarine. Efforts in FY 1982 included identification of the necessary subsystem changes to incorporate the TRIDENT II (D-5) missile in the OHIO Class submarine baseline. Required weapon support system and component developments were initiated.

On 29 April 1982, SECNAV maintained the December 1989 IOC for TRIDENT II (D-5), while rephasing the introduction of the weapons system into the fleet. A decision was made to incorporate the D-5 Strategic Weapon System (SWS) starting with the ninth submarine (SSBN 734). The D-5 capability would be accomplished during initial construction of the ship, consequently the ninth ship delivery would be extended one year. The schedules of the tenth (SSBN 735) and the eleventh (SSBN 736) have also been extended. The twelfth (SSBN 737) and subsequent ship construction periods will not be affected by the change to TRIDENT II (D-5). On 1 June 1982 the SECDEF advised Congress of the decision to accelerate the rate of introduction of D-5 while maintaining the 1989 IOC.

In November 1982, the Navy executed modifications to the Electric Boat contract which incorporated the D-5 SWS into the ninth and tenth ships and revised their delivery dates to December 1988 and August 1989 respectively. On 21 November 1983 an option to acquire the eleventh ship (SSBN 736) was exercised. A contemporaneous modification to incorporate D-5 and extend delivery to April 1990 was also executed. The contract for the SSBN 737 (the twelfth ship) was awarded in August 1985. In March 1986 an option for the SSBN 738 (the thirteenth ship) was awarded. In May 1987 the SSBN 739 (fourteenth ship) was awarded to Electric Boat. In January 1988 the SSBN 740 (fifteenth ship) was competitively awarded to Electric Boat. In October 1988 an option for the SSBN 741 (sixteenth ship) was awarded. In November 1988 the first D-5 capable submarine (SSBN 734) was delivered.

b. Significant Development Since Last Report -- In August 1989 the second D-5 Capable Submarine (SSBN 735) was delivered. In October 1989 an option for the SSBN 742 (seventeenth ship) was awarded.

The OHIO Class D-5 Capable Submarine is expected to satisfy mission requirements.

c. Change Since "As Of" Date -- The IOC for the SSBN 734 is on schedule for March 1990.

8. Threshold Breaches:

a. There are currently no DAE Baseline of December 31, 1988 threshold breaches.

9. Schedule:

a. Milestones --

	Production Estimate Approved Program	Current Estimate
Complete Baseline Design	Mar 72/Mar 72	Mar 72
Characteristics Approved	Jan 73/Jan 73	Jan 73
Complete Ship Contract Design	Aug 84/Aug 84	Aug 84
Production Contract Award	Jan 82/Jan 82	Jan 82
Construction Started:		
(1) First Ship	Jan 82/Jan 82	Jan 82
(2) Last Ship	Jan 88/Jun 92	Dec 93
Launch:		
(1) First Ship	Nov 86	Dec 86
(2) Last Ship	Jul 92	Apr 99
Acceptance Trials:		
(1) First Ship	Dec 88	Nov 88
(2) Last Ship	Dec 93	Dec 99
Delivery:		
(1) First Ship	Dec 88/Dec 88	Nov 88
(2) Last Ship	Dec 93/Apr 98	Dec 99
System IOC	Dec 89/Dec 89	Mar 90 (CH-1)

b. Previous Change Explanations -- The Current Estimate is based on a total program of 13 submarines vice the 7 included in the Production Estimate.

The start of construction, launch, acceptance trials, and delivery for the last ship was revised to reflect an increased number of submarines for the total program.

The acceptance trials and delivery of the first ship was revised to reflect the completion of those milestones.

c. Current Change Explanations --

(CH-1) The system IOC was revised to reflect delays in the TRIDENT II (D-5) Missile.

d. References --

Production Estimate: USD (R&E) Memo of July 22, 1981, subject OHIO Class Submarine program.

Approved Program: DAE Baseline of December 31, 1988.

10. Technical/Operational Characteristics: The following characteristics are based on those of the currently deployed OHIO Class C-4 Configured Submarine.

a. Technical --

	Prod Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
(U) Length Overall (Feet)	558	560/558	560	560
(U) Beam Max. (hull diameter in feet)	42	42/42	42	42
(U) Draft Navigation (feet)	35.5	35.5/36.5	36.5	36.5
(U) Submerged Displacement (tons)	18,500	18,500/18,700	18,700	18,700
(U) Operating Depth (feet)	[redacted]			
(U) Propulsion				
(1) (U) Type	Nuclear	Nuclear/Nuclear	Nuclear	Nuclear
(2) (U) Shaft Horsepower	[redacted]			
(U) Accommodations, Crew	155	164/155	164	164

b. Operational --

(U) Max Speed (knots submerged)	[redacted]			
(U) Endurance				
(1) Range	Unlimited	Unlimited	Unlimited	Unlimited
(2) Stores (days)	90	90/90	90	90
(U) Armament				
(1) Missile Tubes	24	24/24	24	24
(2) Torpedo Tubes	4	4/4	4	4

c. Previous Change Explanations -- None.

d. Current Change Explanation -- None.

e. References --

Production Estimate: OPNAVINST C-9010.296, dated April 12, 1981, subject approved characteristics of the OHIO Class Submarine.

Approved Program: DAE Baseline of December 31, 1988.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Production Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E,N)	49.3	62.1	61.2
Procurement (SCN)	9,980.0	14,471.5	14,413.4
Construction (MCON)	519.6	424.6	435.4
Total FY 1983 Base-Yr $	10,548.9	14,958.2	14,910.0
Escalation	3,536.3	2,925.1	3,320.6
Development (RDT&E,N)	3.6	4.6	4.5
Procurement (SCN)	3,416.8	2,845.9	3,234.5
Construction (MCON)	115.9	74.6	81.6
Total Then-Yr $	14,085.2	17,883.3	18,230.6
b. Quantities --			
Development (RDT&E,N)	0	0	0
Procurement (SCN)	7	13	13
Total	7	13	13

c. Foreign Military Sales -- None.

d. Nuclear Costs -- Department of Energy cost: $129.9M (then-year $)

e. References --
Production Estimate:
USD(R&E) Memo of July 22, 1981, subject OHIO Class Submarine Program.

Approved Program: DAE Baseline (31 Dec 88)

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Yr) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition --	(DEC-89 SAR)	(DEC 88 SAR)	(DEC-89 SAR)
(1) Cost	18,230.6	17,883.3	18,230.6
(2) Quantity	13	13	13
(3) Unit Cost	1,402.4	1,375.6	1,402.4
	Current Year		Budget Year
b. Current Procurement --	(FY 1990)	(FY 1990) APPN	(FY 1991)
(1) Cost	1,224.0	1,224.0	1,415.2
Less CY Adv Proc	(99.3)	(99.3)	(143.0)
Plus PY Adv Proc	137.1	137.1	137.4
Less Outfit/PDel	(9.3)	(9.3)	(27.6)
Net Total	1,252.5	1,252.5	1,382.0
(2) Quantity	1	1	1
(3) Unit Cost	1,252.5	1,252.5	1,382.0

13. Cost Variance Analysis

a. Summary --

	RDT&E,N	SCN	WCON	TOTAL
(Current (Then-Year) Dollars in Millions)				
Production Estimate	52.9	13,396.8	635.5	14,085.2
Previous Changes:				
Economic	(2.9)	(3,016.5)	(33.5)	(3,052.9)
Quantity	0.0	10,061.9	0.0	10,061.9
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	16.7	(3,124.8)	(102.8)	(3,210.9)
Other	0.0	0.0	(0.0)	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	13.8	3,920.6	(136.3)	3,798.1
Current Changes:				
Economic	0.0	390.5	1.2	391.7
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	(1.0)	(60.0)	16.6	(44.4)
Other	0.0	0.0	0.0	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	(1.0)	330.5	17.8	347.3
Total Changes	12.8	4,251.1	(118.5)	4,145.4
Current Estimate	65.7	17,647.9	517.0	18,230.6
(FY 1983 Constant (Base-Year) Dollars in Millions)				
Production Estimate	49.3	9,980.0	519.6	10,548.9
Previous Changes:				
Quantity	0.0	6,949.3	0.0	6,949.3
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	12.8	(2,457.8)	(95.0)	(2,540.0)
Other	0.0	0.0	0.0	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	12.8	4,491.5	(95.0)	4,409.3
Current Changes:				
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	(0.9)	(58.1)	10.8	(48.2)
Other	0.0	0.0	0.0	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	(0.9)	(58.1)	10.8	(48.2)
Total Changes	11.9	4,433.4	(84.2)	4,361.1
Current Estimate	61.2	14,413.4	435.4	14,910.0

13. Cost Variance Analysis (cont'd):

b. Previous Change Explanations --

RDT&E

Economic: revised escalation indices.
Estimating: transfer of certain efforts properly identified with D-5 capable SSBNs from the TRIDENT I program, reallocation of funds to TRIDENT II (D-5) Missile and revised estimates.

Procurement

Economic: revised escalation indices.
Quantity: six additional submarines.
Estimating: revised estimates for shipbuilding and GFE costs.

MILCON

Economic: revised escalation indices.
Estimating: recategorization of construction projects as unique to the General Support Program and revised estimates.

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised economic escalation rates. (Economic)	N/A	0.0
Reallocated to TRIDENT II (D-5) Missile and revised estimates. (Estimating)	-.9	-1.0
(2) Procurement		
Revised economic escalation rates. (Economic)	N/A	390.5
Decrease due to revised estimates for shipbuilding and GFE costs. (Estimating)	-194.1	-242.1
Correction of misapplication of indices reflected in previous procurement estimate. (Estimating)	136.0	182.1

13. Cost Variance Analysis (cont'd):

(3) MILCON

Revised economic escalation rates. (Economic)	N/A	1.2
Revised construction estimates for Kings Bay. (Estimating)	10.8	16.6

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-year dollars)

a. Initial SAR Estimate to Current Baseline Estimate (PdE) -- For the OHIO Class D5 Capable Submarine Program, the initial SAR estimate is the Current Baseline Estimate.

b. Current Baseline Estimate (PdE) to Current Estimate --

PAUC (Prod Est)	Changes							PAUC (Current Est)
	Econ	Qty	Sched	Eng	Est	Other	Spt	Total	
2012.171	-204.708	-154.762	0.000	0.000	-250.408	0.000	0.000	-609.818	1402.354

15. Contract Information: (THEN-YEAR DOLLARS IN MILLIONS)

a. Procurement (SCN) --

Submarine:
General Dynamics Corp.,
Electric Boat Division
Groton, Ct.
N00024-81-C-2134/FPIF
Award Date: January 7, 1982
(Group IV Construction, FY81, 83 and 84 Ships)

INITIAL CONTRACT PRICE		
Target	Ceiling	Qty
1,590.7	1,801.8	3

CURRENT CONTRACT PRICE			ESTIMATED PRICE AT COMPLETION	
Target	Ceiling	Qty	Contractor	Program Manager
1,703.4	1,930.1	3	1,625.3	1,638.5

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE VARIANCES	29.6	(6.1)
CUMULATIVE VARIANCES as of Sept 89	77.0	(23.9)
NET CHANGE	47.4	(17.8)

Explanation of Change: The favorable net change in cost variance is a result of continued better than planned manpower expenditure. The negative net change in schedule variance is due to technical corrections in the management systems data. The contractor is establishing a plan to correct this system. Program Manager's estimate at completion remains within approved budget.

Submarine:
General Dynamics Corp.,
Electric Boat Division
Groton, Ct.
N00024-85-C-2062/FPIF
Award Date: August 13, 1985
(Group V Construction, FY85 and 86 Ships)

INITIAL CONTRACT PRICE		
Target	Ceiling	Qty
1,203.4	1,412.5	2

CURRENT CONTRACT PRICE			ESTIMATED PRICE AT COMPLETION	
Target	Ceiling	Qty	Contractor	Program Manager
1,218.5	1,430.5	2	1,242.2	1,253.5

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE VARIANCES	(24.9)	(21.8)
CUMULATIVE VARIANCES as of Sept 89	(16.0)	(18.1)
NET CHANGE	8.9	3.7

15. Contract Information (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

Explanation of Change: The net positive cost variance is due to favorable results from the contractors overhead reduction program. The favorable schedule variance is due to the contractor's rephasing of budgets immediately after the Metal Trades Council strike. Program Managers estimate at completion remains within approved budget.

Submarine
General Dynamics Corp.,
Electric Boat Division
Groton, CT
N00024-87-C-2023/FPIF
Award Date: May 26, 1987
(Group VI Construction, FY87 ship)

INITIAL CONTRACT PRICE		
Target	Ceiling	Qty
611.9	693.9	1

CURRENT CONTRACT PRICE		
TARGET	CEILING	QTY
616.4	698.3	1

ESTIMATED PRICE AT COMPLETION	
Contractor	Program Manager
638.4	616.4

	Cost Variance	Schedule Variance
PREVIOUS CUMULATIVE VARIANCES	(5.7)	11.7
CUMULATIVE VARIANCES as of Sept 89	(8.5)	13.9
NET CHANGE	(2.7)	2.2

Explanation of Change: The net cost and schedule variances are not significant in relation to the current contract target price. Program Managers estimate at completion remains within approved budget.

Submarine
General Dynamics Corp.,
Electric Boat Division
Groton, CT
N00024-88-C-2000/FPIF
Award Date: January 5, 1988
(Group VII Construction, FY88/89/90 ships)

INITIAL CONTRACT PRICE		
Target	Ceiling	Qty
1,837.9	2,077.6	3

CURRENT CONTRACT PRICE		
TARGET	CEILING	QTY
1,841.3	2,081.5	3

ESTIMATED PRICE AT COMPLETION	
Contractor	Program Manager
1,873.5	1,841.3

	Cost Variance	Schedule Variance
[redacted] CUMULATIVE VARIANCES	(3.3)	(.7)
[redacted] VARIANCES as of Sept 89	(4.2)	25.9
NET [redacted]	(.9)	26.6

Explanation of Change: This procurement is too new to draw meaningful cost or schedule trend conclusions at this time. The FY 90 option was awarded in October 1989 and is included. The net positive schedule variances is due to early placement of orders for major contractor furnished equipment components.

[redacted] OHIO CLASS D-5 CAPABLE SUBMARINE, DECEMBER 31, 1989

15. Contract Information (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

Nuclear:
Department of Energy
Germantown, MD
N00024-67-F-5110/EAO
Award Date: July 1, 1977

INITIAL CONTRACT PRICE	
Target	Qty
442.7	N/A

CURRENT CONTRACT		PM'S EST. PRICE
Target	Qty	AT COMPLETION
588.2	N/A	588.2

Explanation of Change: Under Naval Nuclear Propulsion Program prime contracts about 90 percent of the contract value is subcontracted in fixed price type subcontracts. In these circumstances, control of prime contract cost and measurement of planned vs. actual cost is exercised through detailed Government and prime contractor surveillance of subcontract obligations rather than through a cost-base "earned value" system such as that defined in DOD Instruction 7000.2. The Navy has waived the requirements of DOD Instruction 7000.2 for Naval Nuclear Propulsion Program procurements. If funds are determined to be available, they are returned to the program for further use. Program Manager's estimate at completion remains within approved budget.

Contract	% Complete
N00024-67-F-5110	62%
N00024-85-C-4011	63%

Nuclear:
General Electric Company
Schnactady, NY
N00024-85-C-4011/CPFF
Award Date: December 3, 1984

INITIAL CONTRACT PRICE	
Target	Qty
197.5	N/A

CURRENT CONTRACT		PM'S EST. PRICE
Target	Qty	AT COMPLETION
187.5	N/A	187.5

Explanation of Change: See above.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 50.0% (10 yrs/20 yrs)

(2) Percent Program Cost Appropriated: 69.5% ($12663.1/$18230.8)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY 81-89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance to Complete (FY 92-00)	Total
RDT&E,N	64.9	0.8		(0.0)	65.7
SCN	10,874.2	1,224.0	1,415.2	4,134.5	17,647.9
MCON	474.3	24.9		17.8	517.0
Total	11,413.4	1,249.7	1,415.2	4,152.3	18,230.8

c. Annual Summary --

Fiscal Year	Qty	SAILAWAY (FY 1988 Dollars) Nearac	SAILAWAY (FY 1988 Dollars) Rec	Total Base Yr (FY 1988) Dollars	Total Then-Year Dollars Program	Total Then-Year Dollars Obligated	Total Then-Year Dollars Expended	Rec Rate (%)
Appropriation: RDT&E,N								
1982				24.6	24.6	24.6	24.6	7.6%
1983								4.0%
1984				8.0	8.5	8.5	8.5	3.8%
1985				8.6	8.4	8.4	8.7	3.4%
1986				7.8	8.8	8.8	8.5	2.8%
1987				5.0	5.8	5.8	6.4	2.7%
1988				5.0	8.0	8.0	5.1	3.0%
1989				8.8	8.8	8.8	8.7	4.2%
1990				8.8	8.8			4.0%
Subtotal	0	8.8	8.8	81.2	85.7	84.9	81.5	

c. Annual Summary --

Fiscal Year	Qty	SAILAWAY (FY 1983 Dollars) Nonrec	SAILAWAY (FY 1983 Dollars) Rec	Total Base Yr (FY 1983) Dollars	Total Then-Year Dollars Program	Obligated	Expended	Escl Rate (%)
Appropriation: SCN								
1981	1		1,381.7	1,436.2	1,463.6	1,430.0	1,375.3	9.6%
1982				314.4	329.9	329.9	329.9	7.5%
1983	1		1,354.5	1,162.9	1,236.8	1,215.4	1,129.3	3.8%
1984	1		1,228.8	1,457.7	1,583.7	1,488.2	1,259.9	3.6%
1985	1		1,179.7	1,160.5	1,289.1	1,209.7	857.5	2.1%
1986	1		1,126.0	1,041.5	1,188.8	1,026.9	538.3	1.0%
1987	1		1,112.1	1,088.0	1,284.6	1,064.8	506.3	1.5%
1988	1		1,021.1	1,020.0	1,259.0	1,076.8	342.5	2.5%
1989	1		957.2	965.6	1,236.9	871.3	81.8	2.8%
1990	1		942.8	921.3	1,224.0	1.0		4.0%
1991	1		1,005.0	1,029.1	1,415.2			4.2%
1992	1		968.9	987.0	1,402.4			4.0%
1993	1		980.4	902.4	1,323.1			3.7%
1994	1		943.5	885.4	1,308.4			3.4%
1995				11.4	17.7			3.1%
1996				11.9	18.4			3.1%
1997				12.6	20.6			3.1%
1998				12.2	20.8			3.1%
1999				7.4	13.0			3.1%
2000				5.4	9.8			3.1%
Subtotal	13	0.0	14,181.7	14,413.4	17,647.9	9,714.8	6,421.6	

c. Annual Summary --

Fiscal Year	Qty	SAILAWAY (FY 1985 Dollars) Nonrec	SAILAWAY (FY 1985 Dollars) Rec	Total Base Yr (FY 1985) Dollars	Total Then-Year Dollars Program	Obli-gated	Expended	Escl Rate (%)
Appropriation: MCON								
1982				12.8	13.0	13.0	13.0	7.6%
1983				14.0	14.8	14.8	14.8	4.9%
1984				15.6	17.0	17.0	17.0	3.8%
1985				85.6	96.1	96.1	96.1	3.4%
1986				79.4	91.8	91.8	91.8	2.8%
1987				108.7	131.1	131.1	131.1	2.7%
1988				59.6	73.8	73.8	61.5	3.0%
1989				28.5	36.7	31.7	14.1	4.2%
1990				18.6	24.9			4.0%
1991								4.2%
1992								4.0%
1993				2.5	3.8			3.7%
1994				9.1	14.0			3.4%
Subtotal		0.0	0.0	435.4	517.0	469.3	438.4	
Total	13	0.0	14,181.7	14,910.0	18,230.8	10,248.0	6,922.5	

17. Production Rate Data: Not applicable. Programs that produce at a rate less than six per year are not required to complete Section 17.

18. Operating and Support Cost: Not applicable since OHIO Class D5 Capable Submarine is not a new SAR.

a. Assumptions and Ground Rules - N/A
b. Cost - N/A
c. Contractor Support Cost - N/A

SAR-89-050

~~SECRET FORMERLY RESTRICTED DATA~~

N-42 TRIDENT II MSL

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)

PROGRAM: TRIDENT II (D-5) MISSILE

AS OF DATE: DECEMBER 31, 1989

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1. Designation and Nomenclature (Popular Name): Sea Launched Ballistic Missile-UGM 133A TRIDENT II (D-5) Missile.

2. DOD Component: U.S. Navy.

3. Responsible Office and Telephone Number:

Strategic Systems Programs
Department of the Navy
Washington, D.C. 20376-5002

PM: RADM K. Malley
Assigned: June 21, 1985
Telephone: (202) 695-2064
Autovon: 225-2098

4. Program Elements:

RDT&E: PE 0603371N, PE 0604363N Project J0951 (Shared funding)

PROCUREMENT: PE 0101228N, APPN 1507 ICN 1150

5. Related Programs: TRIDENT Submarine System, TRIDENT I (C-4) Missile Systems, Fleet Ballistic Missile System, and Department of Energy re-entry vehicle development.

90-C-0668

AS AMENDED

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~~OPNAVINST 5513[illegible] Enclosure (27)~~

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Dept of the Navy

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OASD(PA) DFOISR 90-T-0691/7

c. Changes Since "As of" Date -- The seventh and eighth PEM flight tests were launched on 15 and 16 January 1990; both were fully successful. Prior approval reprogramming action (DD-1415) is in process for additional development costs for missile fixes.

The PEM flight test program completed on 12 February 1990 with the launch of the ninth PEM and the first Demonstration and Shakedown Operations (DASO) missiles from the SSBN 734. Both flight tests were fully successful. The SSBN 734 will complete strategic loadout of D-5 missiles in March 1990. The USS PENNSYLVANIA (SSBN 735) launched a DASO missile on 11 March 1990. The flight test was fully successful.

8. Threshold Breaches: There are currently no DAE Baseline of June 30, 1989 threshold breaches.

9. Schedule:

a. Milestones --

	Prod Est	Approved Program	Current Estimate
Initiated Concept Definition	10/77	10/77	10/77
Commenced Advanced Development Phase	10/80	10/80	10/80
Commenced Full Scale Engineering Development (Milestone II)	10/83	10/83	10/83
First Development Flight Test	1/87	1/87	1/87
Commitment to Full Scale Missile Production (Milestone III A)	4/87	4/87	4/87
First Demonstration and Shakedown (DASO) Missile Test Flight	8/89	N/A	2/90
Initial Operating Capability (IOC)	12/89	12/89	3/90

b. Previous Change Explanations -- The initial missile production contract was awarded April 8, 1987 (Milestone III A).

The first DASO and the IOC were delayed due to scheduled corrective action for the PEM failures and as a result of destruction of the Hercules Propellant Mix Building #2, used for casting second-stage missile motors.

c. Current Change Explanations -- None.

d. References --

Production Estimate:

UNSECDEF Memorandum for SECNAV of June 4, 1987, subject TRIDENT II (D-5) Missile Program.

UNSECNAV Memorandum for DIRSSP of December 1, 1987, subject TRIDENT D-5 Navy Program Review.

Approved Program: DAE Baseline of June 30, 1989.

6. Mission and Description: The TRIDENT II (D-5) Strategic Weapons System program develops an improved Sea Launched Ballistic Missile (SLBM) with greater accuracy and payload capability at equivalent ranges as compared to the current TRIDENT I (C-4) system. TRIDENT II will enhance U.S. strategic deterrence by providing a survivable sea-based system capable of engaging the full spectrum of potential targets. It will enhance the U.S. position in strategic arms negotiation by providing a weapons system with performance and payload flexibility that will accommodate various treaty initiatives. TRIDENT II's increased payload allows the deterrent mission to be achieved with fewer submarines.

7. Program Highlights:

a. Significant Historical Developments -- In March 1980 the Secretary of Defense described to Congress a Sea Launched Ballistic Missile Modernization Advanced Development Program which would lead to an end of FY 1983 Defense System Acquisition Review Council Milestone II decision to select a weapon system option which would achieve specific performance objectives with an IOC of CY 1989. The Secretary of Defense reaffirmed the need for an improved Sea Launched Ballistic Missile in his Decision Memorandum of 2 February 1981. The Deputy Secretary of Defense in his Program Decision Memorandum of 2 October 1981, directed the Navy to fund the development of the D-5 missile with a December 1989 IOC and in his Program Budget Decision of 29 December 1982 he approved funds for the development of a new higher yield Re-Entry Body for the TRIDENT II (D-5) Missile. The Deputy Secretary of Defense in his memorandum of 28 October 1983, authorized the Navy to proceed to full scale Engineering Development of the TRIDENT II (D-5) SWS and initial production, as necessary, to meet a December 1989 IOC. All major D-5 weapon system subsystem completion development contracts were awarded as of March 1984. The flight testing from the flat pad at Cape Canaveral was completed in January 1989. Fifteen flight tests were fully successful, one flight (the seventh) was a partial success, two flights (the ninth and the thirteenth) failed to meet test objectives, and one flight (the fifteenth) was terminated by the range safety officer and is a "no test." The first TRIDENT II (D-5) Performance Evaluation Missile (PEM) was launched from the SSBN 734 (USS Tennessee) on 21 March 1989. The missile experienced loss of control just after first stage (F/S) ignition and was subsequently auto-destructed by the onboard flight termination system (FTS).

b. Significant Developments Since Last Report -- Analysis of the telemetry data and recovered missile hardware from the first PEM determined that the mechanical linkage to the F/S nozzle exit cone failed. Corrective actions were taken. The second PEM on 2 August 1989 was fully successful. The third PEM was launched on [redacted] August 1989 and experienced a control loss early in first stage flight, though all hardware that had been modified as a result of the first failure performed satisfactorily. Several additional modifications to the PEM design to increase the design margin were incorporated along with an aggressive ground test program to validate these modifications prior to flight test. PEM flight tests resumed in December 1989; three flight tests were conducted and all three were fully successful.

The TRIDENT II (D-5) Missile is expected to satisfy mission requirements.

10. Performance Characteristics:

a. Characteristics --

	Prod Est	Approved Program Goal/Threshold	Demon-Strated Perf	Current Estimate
(1) Max Range Full Payload (NM		(b)(1)		
(2) System CEP (FEET)				
(3) System Reliability				
~~(4)~~ Max Payload and Yield				

b. Previous Change Explanations --

Latest estimate of military characteristics for the warhead for the TRIDENT II (D-5) MK-5 Reentry Body as cited by the joint DOD/DOE Military Liaison Committee in letter dated July 23, 1984.

Latest estimate of system reliability as provided in TRIDENT II (D-5) Decision Coordinating Paper (DCP) Update of February 24, 1987.

Maximum Range Full Payload and System CEP estimates are based on the latest engineering estimate provided by the Navy to the Joint Chief of Staffs.

c. Current Change Explanations -- None

d. References --

Production Estimate:

UNSECDEF Memorandum for SECNAV of June 4, 1987, subject TRIDENT II (D-5) Missile Program.
UNSECNAV Memorandum for DIRSSP of December 1, 1987, subject TRIDENT D-5 Navy Program Review

Approved Program: DAE Baseline of June 30, 1989.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Production Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E,N)	8,434.9	8,401.2	8,392.7
Procurement (WPN)	17,588.5	17,395.7	17,202.6
Total Flyaway	(14,471.2)	(14,088.2)	(14,054.4)
Peculiar Support	0.0	0.0	0.0
Other Wpn Sys Cost	(3,082.9)	(3,274.5)	(3,115.7)
Initial Spares	(34.4)	(33.0)	(32.5)
Construction (MCON)	532.9	513.4	503.7
Total FY 1983 Base-Yr $	26,556.3	26,310.3	26,099.0
Escalation	8,962.2	9,162.7	11,191.1
Development (RDT&E,N)	1,018.3	986.8	986.1
Procurement (WPN)	7,808.4	8,049.7	10,067.5
Construction (MCON)	135.5	126.2	135.5
Total Then-Yr $	35,518.5	35,473.0	37,290.1
b. Quantities --			
Development (RDT&E,N)	28	28	28
Procurement (WPN)	815	871	871
Total	843	899	899

c. Foreign Military Sales -- This item is not applicable to TRIDENT II (D-5) Missile. U.S. support of the U.K. Trident II program is being accomplished under terms of the Polaris Sales Agreement of 1963 as extended and modified by exchanges of diplomatic notes in September 1980 and October 1982.

d. Nuclear Costs -- Department of Energy cost (b)(1) [redacted] (then-year $)

e. Excludes the RDT&E costs for Ballistic Missile Defense Penetration System, SLBM Effectiveness Enhancement and SLBM Retargeting System development. These costs are included in Program Element 0604363N (Project J0951) but are not included in the TRIDENT II (D-5) Missile Development or Production baseline. (FY 1984 - FY 1994 $312.0 M then-year $)

f. Excludes RDT&E FY 1991 and FY 1992 costs associated with TRIDENT II acquisition but budgeted subsequent to IOC. These costs are included in Program Element 0604363N (Project J0951) but are not included in the TRIDENT II (D-5) Missile Development or Production baseline. (FY 1991 - FY 1992 $66.3 M then-year $)

g. References --
Production Estimate:
USECDEF Memorandum for SECNAV of June 4, 1987, subject TRIDENT II (D-5) Missile Program.
USECNAV Memorandum for DIRSSP of December 1, 1987, subject TRIDENT D-5 Navy Program Review.

Approved Program: DAE Baseline dated June 30, 1989,

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Yr) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition --	(DEC-89 SAR)	(DEC 88 SAR)	(DEC-89 SAR)
(1) Cost	37,290.1	35,486.6	37,290.1
(2) Quantity	899	899	899
(3) Unit Cost	41.5	39.5	41.5
	Current Year		Budget Year
b. Current Procurement --	(FY 1990)	(FY 1990) APPN	(FY 1991)
(1) Cost	1,440.6	1,441.1	1,537.9
Less CY Adv Proc	(216.1)	(216.1)	(192.6)
Plus PY Adv Proc	167.1	167.1	151.5
Net Total	1,391.6	1,392.1	1,496.8
(2) Quantity	42	42	52
(3) Unit Cost	33.1	33.1	28.8

13. Cost Variance Analysis

a. Summary --

	RDT&E,N	WPN	MCON	TOTAL
	(Current (Then-Year) Dollars in Millions)			
Production Estimate	9,453.2	25,396.9	668.4	35,518.5
Previous Changes:				
Economic	(24.4)	(163.3)	(2.4)	(190.1)
Quantity	(48.0)	1,305.0	0.0	1,257.0
Schedule	0.0	278.8	0.0	278.8
Engineering	0.0	0.0	0.0	0.0
Estimating	7.2	(1,375.0)	(26.4)	(1,394.2)
Other	0.0	0.0	0.0	0.0
Support	0.0	3.0	0.0	3.0
Subtotal	(65.2)	48.5	(28.8)	(45.5)
Current Changes:				
Economic	2.8	1,962.7	16.0	1,981.5
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	192.4	0.0	192.4
Engineering	0.0	0.0	0.0	0.0
Estimating	(10.0)	(83.1)	(16.4)	(109.5)
Other	0.0	0.0	0.0	0.0
Support	0.0	(247.3)	0.0	(247.3)
Subtotal	(7.2)	1,824.7	(0.4)	1,817.1
Total Changes	(72.4)	1,873.2	(29.2)	1,771.6
Current Estimate	9,380.8	27,270.1	639.2	37,290.1
	(FY 1983 Constant (Base-Year) Dollars in Millions)			
Production Estimate	8,434.9	17,588.5	532.9	26,556.3
Previous Changes:				
Quantity	(40.0)	771.0	0.0	731.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	6.3	(965.0)	(19.5)	(978.2)
Other	0.0	0.0	0.0	0.0
Support	0.0	1.2	0.0	1.2
Subtotal	(33.7)	(192.8)	(19.5)	(246.0)
Current Changes:				
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	(8.5)	(34.0)	(9.7)	(52.2)
Other	0.0	0.0	0.0	0.0
Support	0.0	(159.1)	0.0	(159.1)
Subtotal	(8.5)	(193.1)	(9.7)	(211.3)
Total Changes	(42.2)	(385.9)	(29.2)	(457.3)
Current Estimate	8,392.7	17,202.6	503.7	26,099.0

13. Cost Variance Analysis (cont'd):

b. Previous Change Explanations --

RDT&E
Economic: Revised escalation indices.
Quantity: Deleted 2 development flight test missiles.
Estimating: Transfer of funds to Small Business Innovative Research, revised estimates, reallocation of funds from SLBM Effectiveness Enhancement, Ballistic Missile Defense Penetration System and TRIDENT II Submarine, and inflation offset for current and prior years.

Procurement
Economic: Revised escalation indices.
Quantity: Additional missiles required for two additional submarines.
Schedule: Rephasing of missile procurements to reflect delays in submarine backfits.
Estimating: Congressional reduction, reduced guidance system requirements, latest repricing estimates, expected savings from United Kingdom participation, and inflation offset for current and prior years.
Support: Revised estimates for initial spares.

MILCON
Economic: Revised escalation indices.
Estimating: Revised construction estimates and inflation offset for current and prior years.

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised economic escalation rates. (Economic)	N/A	2.8
Reclassification of costs as escalation for current and prior years. (Estimating)	-2.2	-2.8
Navy reprogramming as a partial asset for prior approval reprogramming action (DD-1415) for additional costs associated with PEM test failure corrections. (Estimating)	11.0	14.2
Adjustment to prior years and reallocation of funds from TRIDENT II Submarine. (Estimating)	-4.7	-5.1

13. Cost Variance Analysis (cont'd):

	(Dollars in Millions) Base-Year	Then-Year
Congressional Reductions (Estimating)	-12.6	-16.3
(2) Procurement		
Revised economic escalation rates. (Economic)	N/A	1,962.7
Deferral of 21 missiles and 20 guidance systems from FY 1990 to FY 2000 through FY 2002. (Schedule)	-	192.4
Reclassification of costs as escalation for current and prior years and revised estimates. (Estimating)	-34.0	-83.1
Reclassification of costs as escalation for current and prior years and revised estimates on support items (Support)	-159.1	-247.3
(3) MILCON		
Revised economic escalation rates. (Economic)	N/A	16.0
Reclassification of costs as escalation for current and prior years. (Estimating)	-.2	-.3
Revised construction estimates. (Estimating)	-9.5	-16.1



14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-year dollars)

a. Initial SAR Estimate to Current Baseline Estimate (PdE) --

PAUC (Initial SAR Est)	Changes								PAUC (Prod Est)
	Econ	Qty	Sched	Eng	Est	Other	Spt	Total	
50.934	-8.100	-2.000	0.400	0.000	0.800	0.000	0.000	-8.900	42.034

b. Current Baseline Estimate (PdE) to Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sched	Eng	Est	Other	Spt	Total	
42.034	1.993	-1.127	0.524	0.000	-1.873	0.000	-0.272	-0.954	41.480

15. CONTRACT INFORMATION: (THEN-YEAR DOLLARS IN MILLIONS)

a. RDT&E --

Launcher
Westinghouse Electric Corporation
Sunnyvale, CA
N00030-84-C-0105, CPIF
Award Date: October 14, 1983
Definitized Date: March 12, 1984

INITIAL Target	CONTRACT Ceiling	PRICE Qty
320.2	N/A	1

CURRENT CONTRACT PRICE Target	Ceiling	Qty	ESTIMATED PRICE AT COMPLETION Contractor	Program Manager
338.9	N/A	1	349.9	349.9

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(29.3)	(4.2)
CUMULATIVE VARIANCES TO DATE (09/30/89)	(25.3)	(2.3)
NET CHANGE	4.0	1.9

Explanation of Change: The unfavorable cost variance is due to design changes in earlier extensive tooling, both mechanical and electrical; and increased efforts to meet delivery schedules. The slight improvement in the schedule variance is the result of completion of the majority of development activities. No impact to the major TRIDENT II program milestones is anticipated as a result of the current schedule problems. The Government anticipates a price overrun at completion of ($11.0M). This will be the final report for this contract.

Fire Control
General Electric Ordnance Systems
Pittsfield, MA
N00030-84-C-0022, CPIF
Award Date: October 14, 1983
Definitized Date: March 12, 1984

INITIAL Target	CONTRACT Ceiling	PRICE Qty
437.1	N/A	4

CURRENT CONTRACT PRICE Target	Ceiling	Qty	ESTIMATED PRICE AT COMPLETION Contractor	Program Manager
[redacted]	N/A	4	445.1	444.7

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(3.1)	(1.4)
CUMULATIVE VARIANCES TO DATE (07/02/89)	(.9)	(.7)
NET CHANGE	2.2	.7

15. CONTRACT INFORMATION (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

Explanation of Change: The improvement in both the cost and schedule variance is due to GEOS' continued efforts to make contract deliveries on or ahead of schedule. No cost overrun at completion is anticipated. Since contract is 95% complete, and all contract deliveries have been met, this will be the final report.

Navigation:
Unisys Corporation
Shipboard and Ground Systems Group
Great Neck, NY
N00024-84-C-4003, CPIF
Award Date: December 21, 1983

INITIAL Target	CONTRACT Ceiling	PRICE Qty
644.6	N/A	1

CURRENT CONTRACT PRICE Target	Ceiling	Qty	ESTIMATED PRICE AT COMPLETION Contractor	Program Manager
729.4	N/A	2	753.6	753.6

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(26.7)	(7.5)
CUMULATIVE VARIANCES TO DATE (09/30/89)	(14.4)	(4.6)
NET CHANGE	12.3	2.9

Explanation of Change: The improvement in the cost variance is the result of credit being taken for work as it nears completion and realization of the management action taken some years ago to constrain cost growth. The schedule variance has almost disappeared. No items were delivered late enough to impact the TRIDENT II program. The reduction in the anticipated price overrun, from $36.9M forecast at completion in the previous SAR to only $24.2M, is a result of the improvements in both cost and schedule performance, as well as the elimination of the Gravity Sensor Subsystem from the TRIDENT II Navigation System.

Test Instrumentation
Interstate Electronics Corporation
Anaheim, CA
N00030-84-C-0090, CPIF
Award Date: October 21, 1983
Definitized Date: March 13, 1984

INITIAL Target	CONTRACT Ceiling	PRICE Qty
237.5	N/A	16

CURRENT CONTRACT PRICE Target	Ceiling	Qty	ESTIMATED PRICE AT COMPLETION Contractor	Program Manager
247.2	N/A	16	259.4	259.4

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	1.0	(.6)
CUMULATIVE VARIANCES TO DATE (09/30/89)	1.5	(.2)
NET CHANGE	.5	.4

15. CONTRACT INFORMATION (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

Explanation of Change: The continued cost improvement has been due to transfers of excess material from the RDT&E effort to production and also to improved efficiency. Schedule is improving as the contract nears completion. With effort 98.6% done, only 2 items out of the multi-item systems included in this contract are behind schedule, and the brief delay in the delivery of these 2 items will have no adverse impact. The government and the contractor anticipate a price overrun at completion of ($12.2M).

Missile:
Lockheed Missiles and Space Company, Inc.
Sunnyvale, CA
N00030-84-C-0100, CPIF
Award Date: October 21, 1983
Definitized Date: March 12, 1984

INITIAL Target	CONTRACT Ceiling	PRICE Qty
4,224.5	N/A	30

CURRENT CONTRACT PRICE Target	Ceiling	Qty	ESTIMATED PRICE AT COMPLETION Contractor	Program Manager
4,222.6	N/A	28	4,279.0	4,279.0

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(336.0)	(23.7)
CUMULATIVE VARIANCES TO DATE (09/24/89)	(358.2)	(15.6)
NET CHANGE	(22.2)	8.1

Explanation of Change: The unfavorable cost variance is the result of unplanned costs to recover schedule, investigate flight anomalies and failures seen in both the X and PEM development phases, and design changes which were incorporated as corrective actions. Since those corrective actions have not been fully evaluated and since much development testing remains, it is uncertain what the final impacts will be. The March 1990 IOC will be met, but the price at completion will increase, although not by a significant amount. Due to Congressional action on the TRIDENT II RDT&EN budget, the quantity was reduced from 30 to 28.

b. Procurement (WPN) --

Missile:
Lockheed Missiles and Space Company, Inc.
Sunnyvale, CA
N00030-84-C-0100, CPIF
Award Date: October 21, 1983
Definitized Date: March 21, 1984

INITIAL Target	CONTRACT Ceiling	PRICE Qty
1,473.0	N/A	52

15. CONTRACT INFORMATION (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

CURRENT CONTRACT PRICE			ESTIMATED PRICE AT COMPLETION	
Target	Ceiling	Qty	Contractor	Program Manager
1,539.4	N/A	54	1,532.0	1,532.0

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(44.9)	(45.1)
CUMULATIVE VARIANCES TO DATE (09/24/89)	(91.5)	(54.0)
NET CHANGE	(46.6)	(8.9)

Explanation of Change: Most of the unfavorable cost variance to date is due to greater than planned subcontracted materials such as reentry measurement instrumentation, several electronics commodities such as configurable gate arrays and various multilayer electronic sub-assemblies. No impacts expected since adequate contractor reserves exist. Almost all of the schedule variance is due to delays in subcontracted propulsion effort driven by late tool delivery and process sequence changes. Quantity is increased to 54 from 52 due to a Congressional reduction to the TRIDENT II RDT&EN budget and its resulting impact in the production/development missile mix in this contract. The missile quantity contained in the FY 1989 follow on missile production contract was correspondingly reduced by two (2) missiles.

Missile:
Lockheed Missiles and Space Company, Inc.
Sunnyvale, CA
N00030-88-C-0088, CPIF
Award Date: December 9, 1987
Definitized Date: October 18, 1988

INITIAL CONTRACT PRICE		
Target	Ceiling	Qty
596.3	N/A	35

CURRENT CONTRACT PRICE			ESTIMATED PRICE AT COMPLETION	
Target	Ceiling	Qty	Contractor	Program Manager
596.3	N/A	35	596.3	596.3

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(3.4)	(7.8)
CUMULATIVE VARIANCES TO DATE (09/24/89)	(1.5)	(28.4)
NET CHANGE	1.9	(20.6)

Explanation of Change: The total cost variance continues to be driven by greater than planned cost of materials at the rocket motor subcontractor. The schedule variance is due to late subcontractor deliveries of electronic

15. CONTRACT INFORMATION (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

components for rocket motors. In the case of electronic components, the delays are caused by manufacturing difficulties of integrated circuits at Raytheon, Conic and Quantic. In the case of rocket motors, the delays are due to a strike at the nozzle manufacturer, Kaiser, and problems in manufacturing F/S compliance rings to a new specification which resulted from the failure of PEM 1.

Missile:
Lockheed Missiles and Space Company, Inc.
Sunnyvale, CA
N00030-89-C-0089, CPIF
Award Date: March 13, 1989

INITIAL CONTRACT PRICE		
Target	Ceiling	Qty
875.5	N/A	64

CURRENT CONTRACT PRICE			ESTIMATED PRICE AT COMPLETION	
Target	Ceiling	Qty	Contractor	Program Manager
875.5	N/A	64	875.5	875.5

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	N/A	N/A
CUMULATIVE VARIANCES TO DATE (09/24/89)	(1.4)	(6.4)
NET CHANGE	N/A	N/A

Explanation of Change: The cost variance is the result of greater than planned subcontracted material costs, especially Reentry Test Instrumentation. The schedule variance is due to manufacturing of missile body segments and rocket motors occurring later than planned.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --
(1) Percent Program Completed: 52.0% (13 yrs/25 yrs)

(2) Percent Program Cost Appropriated: 45.9% ($17098.8/$37290.1)

b. Appropriation Summary --
(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY 78-89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance to Complete (FY 92-02)	Total
RDT&E,N	9,193.3	187.5		0.0	9,380.8
WPN	5,927.3	1,440.6	1,537.9	18,364.3	27,270.1
MCON	342.5	7.6	115.9	173.2	639.2
Total	15,463.1	1,635.7	1,653.8	18,537.5	37,290.1

c. Annual Summary --

Fiscal Year	Qty	Flyaway (FY 1983 Dollars) Nonrec	Flyaway (FY 1983 Dollars) Rec	Total Base Yr (FY 1983) Dollars	Total Then-Year Dollars Program	Total Then-Year Dollars Obligated	Total Then-Year Dollars Expended	Escl Rate (%)
Appropriation: RDT&E,N								
1978				5.0	5.0	5.0	5.0	6.8%
1979				5.0	5.0	5.0	5.0	8.4%
1980				25.6	25.6	25.5	25.0	10.6%
1981				96.7	96.7	96.4	93.6	10.6%
1982				198.4	198.4	197.8	193.6	7.6%
1983				343.9	351.0	346.8	341.2	4.9%
1984				1,368.5	1,447.3	1,447.3	1,337.2	3.8%
1985				1,818.1	1,982.6	1,982.6	1,972.5	3.4%
1986				1,731.3	1,942.3	1,941.6	1,931.2	2.8%
1987				1,354.4	1,564.5	1,564.4	1,536.8	2.7%
1988				860.8	1,027.8	1,016.2	937.1	3.0%
1989				446.1	547.1	542.3	425.4	4.2%
1990	28			144.9	187.5	47.7	9.8	4.0%
Subtotal	28	0.0	0.0	8,382.7	9,360.8	9,218.2	8,813.4	

c. Annual Summary --

Fiscal Year	Qty	Flyaway (FY 1983 Dollars) Nonrec	Flyaway (FY 1983 Dollars) Rec	Total Base Yr (FY 1983) Dollars	Total Then-Year Dollars Program	Total Then-Year Dollars Obligated	Total Then-Year Dollars Expended	Escl Rate (%)
Appropriation: WPN								
1985			9.7	137.7	160.8	160.3	160.3	3.4%
1986			42.3	420.6	508.4	508.0	493.9	2.8%
1987	21		787.9	1,075.6	1,346.8	1,344.7	1,282.6	2.7%
1988	66		1,313.0	1,568.6	2,042.8	1,995.0	1,050.5	3.0%
1989	66		1,170.7	1,376.6	1,868.5	1,822.5	234.1	4.2%
1990	42		819.8	1,022.2	1,440.6	108.4	4.5	4.0%
1991	52		873.5	1,051.5	1,537.9			4.2%
1992	50		849.0	1,042.7	1,578.8			4.0%
1993	44		784.3	948.4	1,482.9			3.7%
1994	68		976.0	1,131.0	1,823.6			3.4%
1995	64		997.9	1,176.6	1,956.0			3.1%
1996	64		998.8	1,158.0	1,984.7			3.1%
1997	64		999.6	1,131.1	1,996.7			3.1%
1998	64		1,001.3	1,127.0	2,053.2			3.1%
1999	64		983.9	1,098.7	2,063.7			3.1%
2000	64		755.8	909.9	1,761.9			3.1%
2001	64		571.6	585.7	1,169.3			3.1%
2002	16		119.3	238.8	491.5			3.1%
Subtotal	871	0.0	14,054.4	17,202.6	27,270.1	5,738.9	3,225.9	

c. Annual Summary --

Fiscal Year	Qty	Flyaway (FY 1983 Dollars) Nonrec	Flyaway (FY 1983 Dollars) Rec	Total Base Yr (FY 1983) Dollars	Total Then-Year Dollars Program	Total Then-Year Dollars Obligated	Total Then-Year Dollars Expended	Escl Rate (%)
Appropriation: MCON								
1984				72.8	79.3	44.8	44.8	3.8%
1985				73.4	82.4	76.2	75.8	3.4%
1986				109.3	126.3	125.7	123.7	2.8%
1987				17.6	21.0	21.0	21.0	2.7%
1988				14.6	18.1	17.2	17.0	3.0%
1989				11.9	15.4	12.9	0.3	4.2%
1990				5.7	7.6			4.0%
1991				83.2	115.9			4.2%
1992				52.9	76.4			4.0%
1993				26.4	38.4			3.7%
1994				13.4	20.6			3.4%
1995				6.8	10.7			3.1%
1996				7.3	12.0			3.1%
1997				8.4	14.1			3.1%
Subtotal		0.0	0.0	503.7	639.2	297.8	282.6	
Total	899	0.0	14,054.4	26,099.0	37,290.1	15,256.9	12,321.9	

17.

a. Annual Production Rates -- The production rates shown are annualized rates which differ from the funded quantities because the 27 missiles in the Planning Estimate and Maximum Economic for FY87 funding were planned for delivery over a 5 month period. The 21 missiles in the Production Estimate and Current Estimate are planned for delivery over a 4 month period. The Current Estimate and Maximum Economic assume continued U.K. participation in the TRIDENT II (D-5) Missile Program.

Fiscal Year Of Delivery	Production Rates (Quantity/Year)			
	Planning Estimate	Production Estimate	Current Estimate	Maximum Economic
1989	65	63	63	65
1990	72	66	66	72
1991	72	66	66	72
1992	72	66	42	69
1993	72	72	52	58
1994	72	72	50	56
1995	72	72	44	50
1996	72	72	68	68
1997	72	72	64	64
1998	72	72	64	69
1999	0	72	64	72
2000	0	72	64	72
2001	0	72	64	72
2002	0	60	64	72
2003	0	0	64	N/A
2004	0	0	14	0

b. Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost(FY 1983$)	28,338.3	(457.1)	28,099.2	+ 4.0	28,095.2
(TY$)	35,318.5	1,771.8	37,290.3	+ 602.6	36,687.7
PAUC (FY 1983$)	31.428	(2.396)	29.031	+ 0.004	29.027
(TY$)	42.034	(0.554)	41.480	+ 0.670	40.800

c. Schedule Variance --

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum
Start Date (Mo/Yr)	Apr-87		Apr 1987		Apr 1987
Duration (in Months)	165	35	200	15	185
End Date (Mo/Yr)	Jan-2001		Dec 2003		Sep 2002

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	28/28
Procurement	37/11

e. Approved Design to Cost Goal -- None

18. Operating and Support Cost:

a. Assumptions and Ground Rules -- Not applicable since this is not a new SAR.

b. Cost -- Not applicable since this is not a new SAR.

c. Contractor Support Cost - -

(Then-Year Dollars in Millions)

	FY1988 & Prior	FY1988 Year	FY1991 Year	Balance to Complete 1/	Total
O&M	234.5	115.0	122.0	8,356.0	8,828.7
Industrial Fund	0.0	0.0	0.0	0.0	0.0
Total	234.5	115.0	122.0	8,356.0	8,828.7

1/ Balance to complete represents the life cycle costs through FY 2037 for the TRIDENT II Strategic Weapons System.

~~CONFIDENTIAL~~ SAR-89-001

N-11 DDG 51-1

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: DDG 51 DESTROYER

AS OF DATE: December 31, 1989

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1. [redacted] Designation and Nomenclature (Popular Name): DDG 51 Guided Missile Destroyer; ARLEIGH BURKE CLASS

2. ([redacted]) DoD Component: NAVY

3. ([redacted]) Responsible Office and Telephone Number:
AEGIS Shipbuilding Program Manager
PMS 400
Naval Sea Systems Command
WASHINGTON, DC 20362

RADM (SEL) J.T. HOOD, USN
Assigned: September 26,1989
AV 222-7395 COMM 703-602-7395

4. [redacted] Program Elements/Procurement Line Items:
RDT&E:
PE 0604307N Project 01337 (Shared)
PE 0604307N Project 01937 (Shared)
PE 0604567N Project 00857 (Shared)
PE 0604567N Project 01803 (Shared)
PROCUREMENT:
APPN 1611 ICN 24222N (Navy)
MILCON:
PE NONE

90-C-0672

No Security Objection to Open Publication
AS AMENDED
MAR 22 1990
Office of the Chief of Naval Operations
Dept. of the Navy

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~~Declassify on~~

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OASD(PA) DFOISR 90 -T- 0691/8

1 of 19

5. [redacted] Related Programs: CG 47, SM-2 (MR), TOMAHAWK, HARPOON, PHALANX, AN/SQQ-89, MK-46, LAMPS MK-I/MK-III, VERTICAL LAUNCH, and VERTICAL LAUNCH ASROC.

6. [redacted] Mission and Description: The Navy has a priority requirement for a battle force capable surface combatant as a replacement for retiring battle force guided missile destroyers. This program provides for DDG 51 class ships; includes a combat system with the capability to perform simultaneously in Anti-Air, Strike, Anti-Surface, and Anti-Submarine warfare areas; and operate as part of a Carrier Battle Group, Surface Action Group, Amphibious Task Force, and Underway Replenishment Group. The baseline ship will displace approximately 8300 tons and is designed with a gas turbine propulsion system. This design provides outstanding combat capability and survivability characteristics while considering procurement and lifetime support costs.

7. [redacted] Program Highlights:

a.(U)Significant Historical Developments -- Funding for the lead ship, ARLEIGH BURKE, was provided in FY 1985 with the lead ship construction contract awarded to Bath Iron Works, Bath, Maine, in April 1985. Approval for Limited Production was provided by the Milestone IIIA review decision memorandum of 30 October 1986 which granted production approval through FY 1989, and approval for long lead material for the FY 1990 ships. Approval for limited production was amended 28 September 1988 to include procurement through FY 1989 and long lead materials for FY 1990 ships and systems. Bath Iron Works submitted revised DDG 51 construction schedules which rescheduled the delivery of DDG 51 a total of 16 months due to a number of factors. The Navy has negotiated contract provisions to incorporate these schedule changes. The Navy established Ingalls Shipbuilding Incorporated(ISI) as the second source for DDG 51 Class construction by awarding ISI the DDG 52 construction contract in May 1987. DDG 51 keel was laid 8 December 1988. On 13 December 1988, two ship construction contracts were awarded for a total of five ships, three to BIW, and two to Ingalls. A ten ship multiyear procurement program is proposed for FY 1990 and FY 1991, 5 in FY 1990 and 5 in FY 1991.

b.(U)Significant Developments Since Last Report -- Approval for limited production was amended 21 August 1989 to include FY 1990 ships and subsystems for which funds are appropriated and long lead material for FY 1991 ships and systems.

The DDG 51 contract was restructured in September 1989; Detail Design and Construction were merged and the incentive share ratio and ceiling revised. The restructuring was accomplished to fairly compensate the shipbuilder for the increased risk associated with performing work not in the original contract. This work had unforeseen production impacts and restructuring the contract restored an equitable sharing of the risk of contract performance.

The DDG 53 delivery was rescheduled from July 1992 to February 1993 at no cost to the government. The effect was to move CG 70 delivery forward

7. (U) Program Highlights (Cont'd):

and the DDG 53 delivery back 7 months. This change was accomplished to permit the shipbuilder to achieve greater production efficiency.

The DDG 51 was launched 16 September 1989, as scheduled. DDG 51 was 47% complete at launch, a higher completion level than other lead ships which BIW has launched.

DDG 52 keel laying will occur as scheduled on 26 February 1990.

BIW is scheduled to deliver the lead ship of the ARLEIGH BURKE CLASS, the DDG 51, in February 1991.

The DDG 51 program will satisfy mission requirements.

c. (U) Changes Since As Of Date -- None.

8. (U) Threshold Breaches: DAE baseline of 31 December 1988 schedule breaches are: as reported in the 31 December 1988 SAR, the DDG 52 delivery has been rescheduled 8 months, from September 1991 to May 1992, due to incorporation of helicopter rearming and facilities upgrades. The DDG 53 delivery was rescheduled from July 1992 to February 1993 at no cost to the government. The effect was to move CG 70 delivery forward and the DDG 53 delivery back 7 months. This change was accomplished to permit the shipbuilder to achieve greater production efficiency. Total program costs exceed the approved program due to the addition of five ships in FY 1994.

9. (U) Schedule:

a. (U) Milestones --

	Production Estimate	Approved Program	Current Estimate
DNSARC I	JUN 81	JUN 81	JUN 81
DSARC II	DEC 83	DEC 83	DEC 83
DDG 51 Contract Award	APR 85	APR 85	APR 85
DSARC III	OCT 86	OCT 86	OCT 86
DDG 52 Contract Award	JAN 87	MAY 87	MAY 87
DDG 51 Delivery		OCT 89	FEB 91
DDG 52 Delivery		SEP 91	MAY 92
DDG 51 IOC	OCT 90	OCT 90	FEB 92
DDG 53 Delivery		JUL 92	FEB 93 (CH-1)

b. (U) Previous Change Explanations --

DDG 52 award delayed due to RFP changes to strenghten solicitation provisions.

Delay to DDG 51 IOC date due to rescheduling of DDG 51 delivery.

9. (U) Schedule (Cont'd):

DDG 52 schedule was adjusted 8 months due to incorporating helicopter rearming and facilities upgrades, as recommended by Congress.

c. (U) Current Change Explanations --

(CH-1) - The DDG 53 delivery was rescheduled from July 1992 to February 1993 at no cost to the government. The effect was to move CG 70 delivery forward and DDG 53 delivery back 7 months. This was done to permit the shipbuilder to achieve greater production efficiency.

d. (U) References --

Production Estimate: DCP #1337 Rev 1, Change 1 of 22 August 1986.

Approved Program: DAE Baseline of 31 December 1988.

10. (U) Technical/Operational Characteristics:

a. (U) Technical --	Prod Est	Approved Program Goal/Threshold		Demon-strated Perf	Current Estimate
Ship:					
Length (Ft)	466	166	466	466	466
Beam (Ft)	59	59	59	59	59
Navigational Draft (Ft)	30.6	30.6	30.6		30.6
Displacement (LT)	8300	8300	8300		8300
Propulsion LM (Gas Turbine)	2500	2500	2500	2500	2500
Accommodations	341	311	341		341
b. (U) Operational --					
Speed (Knots)	30	30	30		30
Endurance ([redacted] knots)	(b)(1)				

10.([redacted])Technical/Operational Characteristics (Cont'd):

b.([redacted])Operational --	Prod Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
ARMAMENT				
Anti-Submarine Warfare				
- ASW System	AN/SQQ-89	AN/SQQ-89	N/A	AN/SQQ-89
- ASROC	VLA	VLA	N/A	VLA
- Helo	SEAHAWK Land & Refuel; LAMPS Elec	SEAHAWK Land & Refuel; LAMPS Elec	N/A	SEAHAWK Land, Refuel,& Rearm; LAMPS Elec
Anti-Air Warfare				
- Launchers	MK 41 VLS	MK 41 VLS	N/A	MK 41 VLS
- Missiles	SM-2 MR	SM-2 MR	N/A	SM-2 MR
- Missile Fire Control System	3 MK 99	3 MK 99	N/A	3 MK 99
- Guns	2 PHALANX	2 PHALANX	N/A	2 PHALANX
Anti-Surface/Strike Warfare				
- Guns	1 5"/54	1 5"/54	N/A	1 5"/54
- Gunfire Control System	MK 160	MK 160	N/A	MK 160
- Anti-Ship Cruise Missile	HARPOON	HARPOON	N/A	HARPOON
- Cruise Missile	TOMAHAWK	TOMAHAWK	N/A	TOMAHAWK
Electronic Warfare	SLQ-32, SRBOC	SLQ-32, SRBOC	N/A	SLQ-32, SRBOC
Radars				
- Surface	SPS-67	SPS-67	N/A	SPS-67
- 3D	SPY-1D	SPY-1D	N/A	SPY-1D

c.([redacted])Previous Change Explanations --

Helicopter rearming and facilities upgrades were added to the DDG Class beginning with the DDG 52.

d.([redacted])Current Change Explanations -- None.

e.([redacted])References --

Production Estimate: DCP #1337 Rev 1, Change 1, of 22 August 1986.

Approved Program: DAE Baseline of 31 December 1988.

11. ( ) Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Production Estimate	Approved Program	Current Estimate
a. ( )Cost --			
Development (RDT&E)	979.8	1226.4	1240.5
Procurement	15948.3	20916.3	22663.6
Basic Ship Costs	(5383.6)	(7271.6)	(8413.2)
HM&E and Combat Sys	(9427.9)	(12467.1)	(13040.0)
Other Costs	(621.9)	(470.1)	(453.9)
OF/PD	(511.9)	(707.5)	(756.5)
Total Sailaway	(15948.3)	(20916.3)	(22663.6)
Other Wpn Sys Cost	(0.0)	(0.0)	(0.0)
Peculiar Support	(0.0)	(0.0)	(0.0)
Initial Spares	(0.0)	(0.0)	(0.0)
Construction	25.6	25.4	25.4
Ops. and Maint. (O&M)	0.0	0.0	0.0
Total FY 87 Base-Year $	16953.7	22168.1	23929.5
Escalation	3163.8	4889.3	7137.9
Development (RDT&E)	(-63.2)	(-12.3)	(-2.9)
Procurement	(3224.8)	(4899.2)	(7138.4)
Construction (MILCON)	(2.2)	(2.4)	(2.4)
Ops. and Maint. (O&M)	(0.0)	(0.0)	(0.0)
Total Then-Year $	20117.5	27057.4	31067.4
b. ( )Quantities --			
Development (RDT&E)	0	0	0
Procurement	23	33	38
Construction (MILCON)	0	0	0
Ops. and Maint. (O&M)	0	0	0
Total	23	33	38

Paragraph 11 Comments:
Procurement Cost Approved Program includes $262.9M (BY FY87$) of Advanced Procurement funding and Escalation, $38.8M.

Procurement Cost Current Estimate includes $254.3M (BY FY87$) of Advanced Procurement funding and Escalation, $30.1M.

c. ( )Foreign Military Sales -- None.

d. ( )Nuclear Costs -- None.

e. ( )References --

Production Estimate: DCP #1337 Rev 1, Change 1 of 22 August 1988

Approved Program: DAE Baseline of 31 December 1988

12. [redacted] Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. [redacted] Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1) Cost	31067.4	27057.4	31067.4
(2) Quantity	38.0	33.0	38.0
(3) Unit Cost	817.56	819.92	817.56
b. [redacted] Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	3463.3	3463.3	3599.3
Less CY Adv Proc	11.6	11.6	32.9
Plus PY Adv Proc	17.2	17.2	0.0
Net Total	3468.9	3468.9	3566.4
(2) Quantity	5.0	5.0	5.0
(3) Unit Cost	693.78	693.78	713.28

Paragraph 12 Comments:
The cost category "Less CY Adv Proc" includes $11.6M in FY 1990 and $29.3M in FY 1991 for Outfitting and Post Delivery.

13. (U) Cost Variance Analysis:

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	916.6	19173.1	27.8	20117.5
Previous Changes:				
Economic	+1.8	+31.7	+0.2	+33.7
Quantity	-	+7996.5	-	+7996.5
Schedule	-	+15.8	-	+15.8
Engineering	-	-	-	-
Estimating	+295.7	-1664.9	-	-1369.2
Other	-	-	-	-
Support	-	+263.3	-0.2	+263.1
Subtotal	+297.5	+6642.4	-	+6939.9
Current Changes:				
Economic	+7.3	+1140.2	-	+1147.5
Quantity	-	+4382.2	-	+4382.2
Schedule	-	-131.1	-	-131.1
Engineering	-	-	-	-
Estimating	+16.2	-1495.6	-	-1479.4
Other	-	-	-	-
Support	-	+90.8	-	+90.8
Subtotal	+23.5	+3986.5	-	+4010.0
Total Changes	+321.0	+10628.9	-	+10949.9
Current Estimate	1237.6	29802.0	27.8	31067.4

13. [redacted] Cost Variance Analysis (Cont'd):

(FY 1987 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	979.8	15948.3	25.6	16953.7
Previous Changes:				
Quantity	-	+6284.4	-	+6284.4
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+246.6	-1509.1	-	-1262.5
Other	-	-	-	-
Support	-	+192.7	-0.2	+192.5
Subtotal	+246.6	+4968.0	-0.2	+5214.4
Current Changes:				
Quantity	-	+3143.4	-	+3143.4
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+14.1	-1444.8	-	-1430.7
Other	-	-	-	-
Support	-	+48.8	-	+48.8
Subtotal	+14.1	+1747.4	-	+1761.5
Total Changes	+260.7	+6715.4	-0.2	+6975.9
Current Estimate	1240.5	22663.7	25.4	23929.6

b. [redacted] Previous Change Explanations --

RDT&E
- Economic: revised escalation indices
- Estimating: revised program funding requirements

PROCUREMENT
- Economic: revised escalation indices
- Quantity: addition of 10 ships (FY 1993-1994)
- Schedule: change in acquisition profile (FY87-FY92)
- Estimating: revised procurement estimates for ship construction and ship systems including estimated multiyear procurement savings
- Support: revised outfitting and post delivery requirements due to schedule and quantity change

b. [redacted] Previous Change Explanations -- (Cont'd)

MILCON
Economic: Revised indices
Support: Revised program funding requirements

c. [redacted] Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1)RDT&E		
Revised Dec 1989 economic escalation rates. (Economic)	N/A	+7.3
Revised program funding requirements. (Estimating)	+14.1	+16.2
(2)PROCUREMENT		
Revised Dec 1989 economic escalation rates. (Economic)	N/A	+1140.2
Change in Profile from 5, 5, to 10, 0 (FY 1992 and FY 1993) (Schedule)	N/A	-131.1
Addition of 5 ships in FY 1994. (Quantity)	+3143.4	+4382.2
Revisions to procurement estimates reflecting: Large Lot Procurement savings (-$751.0) GFE Estimating Savings (-$646.6) Testing and Engineering (-$85.5) Training Equipment (-$12.5) (Estimating)	-1445.1	-1495.6
Impact to outfitting and post delivery funding requirements for the revised procurement schedule and change in procurement quantity. (Support)	+49.0	+90.8
(3)MILCON		
Revised Dec 1989 economic escalation rates (Economic)	N/A	0.0

14. [redacted] Program Acquisition Unit Cost (PAUC) History: (Then-Year Dollars in Millions)

a. [redacted] Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Prod Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1217.1	-233.2	-263.2	+15.1	-25.1	+145.8	--	+18.2	-342.4	874.7

b. [redacted] Current Baseline Estimate to Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
874.7	+31.08	-19.54	-3.034	--	-74.96	--	+9.313	-57.14	817.6

15. [redacted] Contract Information: (Then-Year Dollars in Millions)

a. [redacted] Procurement

DDG 51:

	Initial Contract Price		
	Target	Ceiling	Qty
Bath Iron Works Bath, ME N00024-85-C-2144, FPI Award: April 2, 1985 Definitized: April 2, 1985	$322.0	$399.1	1.0

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$426.5	$571.7	1.0	$612.7	$630.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-13.1	$-6.0
Cumulative Variances To Date (12/31/89)	$-42.6	$-12.8
Net Change	$-29.5	$-6.8

Explanation of Change: Schedule variance is due to delayed material receipt in the Purchase Specification and Major Equipment category. Cost variance is due to rescheduling production work.

********** NOTE **********

Estimated Price at Completion incorporates incentive arrangements, projected change orders, and escalation commitments which are not included in the contract target and ceiling prices.

15. [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

The DDG 51 contract was restructed in September 1989; Detail Design and Construction were merged and the incentive share ratio and ceiling revised. This restructuring was accomplished to fairly compensate the shipbuilder for the increased risk associated with performing work not in the original contract. This work had unforeseen production impacts and restructuring the contract restored an equitable sharing of the risk of contract performance. Additional funding would be required to meet the estimated price at completion. The Lead ship program will complete within the $1252.4M (BY FY85$) cost goal established by the Secretary of the Navy in 1983.

DDG 52:
Ingalls Shipbuilding
Pascagoula, MS
N00024-87-C-2256, FPI
Award: May 26, 1987
Definitized: May 26, 1987

Initial Contract Price		
Target	Ceiling	Qty
$162.2	$191.4	1.0

Current Contract Price		
Target	Ceiling	Qty
$179.5	$211.6	1.0

Estimated Price At Completion	
Contractor	Program Manager
$252.5	$252.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$1.4	$-13.7
Cumulative Variances To Date (11/30/89)	$-0.1	$-5.4
Net Change	$-1.5	$8.3

Explanation of Change: Schedule variance is due to material procurement efficiency in invoicing the major procurement category. Current cost variance is not significant.

********** NOTE **********

The Estimated Price at Completion incorporates incentive arrangements, projected change orders, and escalation commitments which are not included in the contract target and ceiling prices.

This contract was modified to incorporate helo rearming and facilities upgrades. Current program funding is sufficient to cover the estimated price at completion

15. [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

DDG 53:
Bath Iron Works
Bath, ME
N00024-87-C-2257, FPI
Award: September 25, 1987
Definitized: September 25, 1987

Initial Contract Price		
Target	Ceiling	Qty
$189.8	$225.7	1.0

Current Contract Price		
Target	Ceiling	Qty
$194.9	$231.7	1.0

Estimated Price At Completion	
Contractor	Program Manager
$274.9	$288.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-0.7	$-8.0
Cumulative Variances To Date (12/31/89)	$-2.0	$2.9
Net Change	$-1.3	$10.9

Explanation of Change: Current variances are not significant.

********** NOTE **********

The Estimated Price at Completion incorporates incentive arrangements, projected change orders, and escalation commitments which are not included in the contract target and ceiling prices. Current program funding is sufficient to cover the estimated price at completion.

DDG 54, 56, 58:
Bath Iron Works
Bath, ME
N00024-89-C-2033, FPI
Award: December 13, 1988
Definitized: December 13, 1988

Initial Contract Price		
Target	Ceiling	Qty
$670.4	$771.6	3.0

Current Contract Price		
Target	Ceiling	Qty
$670.4	$771.6	3.0

Estimated Price At Completion	
Contractor	Program Manager
$810.3	$810.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date (11/30/89)	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: No cost or schedule variances have been reported to date.

********** NOTE **********

15. ~~(U)~~ Contract Information (Cont'd): (Then-Year Dollars in Millions)

The Estimated Price at Completion incorporates incentive arrangements, projected change orders, and escalation commitments which are not included in the contract target and ceiling prices. Current program funding is sufficient to cover the estimated price at completion.

DDG 55, 57:	Initial Contract Price Target	Ceiling	Qty
Ingalls Shipbuilding Pascagoula, MS N00024-89-C-2034, FPI Award: December 13, 1988 Definitized: December 13, 1988	$503.4	$575.1	2.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$503.6	$575.4	2.0	$604.6	$604.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date (11/30/89)	$0.2	$-3.8
Net Change	$0.2	$-3.8

Explanation of Change: Current variances are not significant.

********** NOTE **********

Estimated Price at Completion incorporates incentive arrangements, projected change orders, and escalation commitments which are not included in the contract target and ceiling prices. Current program funding is sufficient to cover the estimated price at completion.

15. (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

AEGIS Weapon System:	Initial Contract Price Target	Ceiling	Qty
GE Government Systems Div Moorestown, NJ N00024-88-C-5140, FPI Award: January 14, 1988 Definitized: January 14, 1988	$365.2	$393.4	5.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$705.2	$758.6	10.0	$735.5	$735.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$5.3	$-4.6
Cumulative Variances To Date (11/30/89)	$23.5	$-31.1
Net Change	$18.2	$-26.5

Explanation of Change: Favorable cost variance is attributable to performance on CGs 66-73 in Manufactured Support and Production Project. The unfavorable schedule variance is due to the shifting of manpower to earlier systems to meet production milestones. However, the contractor's schedule variance is supporting contract delivery dates.

This is a combined procurement contract for CGs 66-73 and DDGs 52 and 53. It is reported in the SARs of each program.

Estimated Price at Completion incorporates budgeted change orders, overrun estimates, and amortization for special tooling and special test equipment which are not included in the Current Contract Target Price.

16. (U) Program Funding Summary:

a. (U) Program Status --

(1) Percent Program Completed: 50.0% (11 yrs/22 yrs)

(2) Percent Program Cost Appropriated: 35.1% ($10901.3 / $31067.4)

DDG 51 DESTROYER, December 31, 1989

[redacted] Program Funding Summary (cont'd): (Current Estimate in Millions of Dollars)

b. [redacted] Appropriation Summary --

(Then Year Dollars in Millions)

Appropriation	Prior Years (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-01)	Total
RDT&E	897.8	42.7	80.9	216.2	1237.6
Procurement	6469.7	3463.3	3599.3	16269.7	29802.0
MILCON	27.8	--	--	--	27.8
O&M	--	--	--	--	--
Total	7395.3	3506.0	3680.2	16485.9	31067.4

c. [redacted] Annual Summary--

[redacted]	Qty	Flyaway FY87 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: 1319 Research, Development, Test & Eval, Navy								
1980				14.9	10.5	10.5	10.5	10.6
1981				45.1	35.3	35.3	35.3	10.6
1982				121.2	102.0	102.0	102.0	7.6
1983				170.8	150.7	150.7	150.7	4.9
1984				132.2	121.1	121.1	121.1	3.8
1985				146.1	138.4	138.4	138.4	3.4
1986				96.0	93.5	93.5	88.5	2.8
1987				99.5	99.5	99.5	96.2	2.7
1988				90.9	93.6	93.6	61.2	3.0

c. [redacted] Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY87 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: 1319 Research, Development, Test & Eval, Navy (Cont'd)								
1989				48.5	53.2	32.2	22.3	4.2
1990				37.4	42.7	4.5	1.0	4.0
1991				68.1	80.9			4.2
1992				64.0	79.0			4.0
1993				55.6	71.0			3.7
1994				50.2	66.2			3.4
Subtot	0			1240.5	1237.6	881.3	827.2	
Appropriation: 1611 Shipbuilding and Conversion, Navy								
1984					78.5	78.5	67.3	3.6
1985	1	267.9	869.4	1137.2	1097.9	971.4	816.1	2.1
1986					98.1	98.0	92.3	1.0
1987	3	92.9	2032.3	2130.2	2393.3	1657.1	676.8	1.5
1988				1.7	10.3	10.0	8.2	2.5
1989	4		2345.6	2315.7	2791.6	1753.4	198.4	2.8
1990	5		2758.1	2768.6	3463.3	379.1		4.0
1991	5		2695.8	2721.5	3599.3			1.2
1992	10		5397.4	5445.1	7432.7			1.0
1993				70.9	119.8			3.7
1994	10		5448.0	5528.1	7976.6			3.1

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY87 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 1611 Shipbuilding and Conversion, Navy (Cont'd)								
1995				92.9	121.9			3.1
1996				104.7	141.7			3.1
1997				82.9	115.7			3.1
1998				92.9	133.6			3.1
1999				80.0	118.6			3.1
2000				55.4	84.7			3.1
2001				2.8	4.4			
Subtot	38	360.8	21546.6	22663.6	29802.0	4947.5	1859.1	
Appropriation: 1205 Military Construction, Navy								
1986				4.5	4.6	4.1	4.1	2.8
1987								2.7
1988				13.1	14.7	11.4	10.3	3.0
1989				7.5	8.5	7.6	3.0	4.2
Subtot	0			25.1	27.8	23.1	17.4	
Total	38	360.8	21546.6	23929.5	31067.1	5851.9	2703.7	

17. Production Rate Data: None.

a. Annualized Production Rates -- None.

b. Cost Variance -- None.

17. (U) Production Rate Data (Cont'd)

c.(U)Schedule Variance -- None.

d.(U)Deliveries (Plan/Actual) -- None.

e.(U)Approved Design-to-Cost Goal -- None.

Paragraph 17 Comments:

********** NOTE **********

The DDG 51 program is exempt from production rate reporting as there are less than six ships per year production.

18. (U) Operating and Support Costs:

a.(U)Assumptions and Ground Rules --

Not applicable.

b.(U)Costs -- None.

c.(U)Contractor Support Costs -- (Current (Then-Year) Dollars in Millions)

Funding	FY1990 & Prior	FY1991	FY1992	Balance To Complete	Total
O&M	183.9	102.6	---	---	286.5
Industrial Fund	---	---	---	---	---
Total	183.9	102.6	---	---	286.5

Paragraph 18 Comments:
Contractor Support Costs - CSS are combined costs for both the CG 47 AEGIS Class Cruiser and the DDG 51 Class Destroyer programs. Funding for FY 1990 and prior includes FY 1988 - FY 1990 only.

AF-18 KC-135R

SAR-89-061

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: KC-135R

AS OF DATE: December 31, 1989

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1. Designation and Nomenclature (Popular Name): KC-135R Modernization Program

2. DoD Component: U. S. Air Force

3. Responsible Office and Telephone Number:
Modernization Management Section
C/KC-135 System Program Management Division
OC-ALC/MMSME, Tinker AFB OK 73145-5990

PM: Mr Art Skiles
Assigned: 6 June 1986
Autovon: 336-3064
Commercial: (405) 736-3064

4. Program Elements/Procurement Line Items:

RDT&E: 0101142F (Shared Funding)
PROCUREMENT: 0101142F APPN 3010 ICN C13500 (Shared Funding)
O&M (Installation): 0702207F (Shared Funding)

5. Related Programs: None

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#10

6. Mission and Description: The KC-135R is a modification to KC-135A strategic tanker aircraft being developed and procured to provide increased aerial refueling capabilities. Modification includes four fuel efficient turbofan CFM56/F108 engines and strengthened main landing gear and other system improvements. The reengined KC-135 is characterized by increased fuel off-load capability, improved fuel efficiency, enhanced takeoff performance, and reduced environmental impact compared to the KC-135A. This system replaces the KC-135A.

7. Program Highlights:

a. Significant Historical Developments--In December 1977, Boeing Military Airplane Company was selected as prime contractor to provide technical and cost information for replacing engines and modernizing KC-135A tanker aircraft. In January 1980, the CFM56/F108 engine was selected and Boeing was awarded a contract leading to the design and production of hardware for converting KC-135A into KC-135R aircraft. In January 1981, the Government of France entered into agreement with the U.S. Government to provide a portion of the development funding and to fund conversion of French C-135F aircraft on the KC-135R modification line. The first modified aircraft was rolled-out on 22 June 1982. The first production contract for nine modification kits was awarded on 28 February 1982. KC-135R Development Test and Evaluation (DT&E) was conducted at Wichita, KS, and Edwards AFB, CA, from 4 August 1982 to 5 April 1983, in a combined DT&E and Operational Test and Evaluation (OT&E) program. A total of 55 flights, 615.4 hours were flown. The KC-135R demonstrated satisfactory compliance with performance, flying qualifications, and propulsion specifications. In May 1984, Boeing Military Airplane Company (BMAC) was awarded a follow-on production contract for thirty shippable airframe kits. In July 1984, a contract for kit installation on one KC-135A airplane was awarded to Hayes International to establish a qualified competitive source for kit installation. The first modified KC-135R airplane was delivered to the U.S. Air Force on 29 June 1984. The PMRT from AFSC to AFLC for the airframe portion of the program occurred 30 October 1984. The installation contract for FY86 was awarded to Boeing in October 1985 as a result of competition with hayes International. The PMRT from AFSC to AFLC for the F-108 engine occurred in March 1986.

b. Significant Developments Since Last Report--One hundred seventy-six KC-135R aircraft have been delivered to date. Ten Main Operating Bases, four Tanker Task Force activities, and a Forward Operation Location have been activated. Two of the three previously activated Regional Engine Maintenance Organizations have been closed due to the reliability of the F108 engine. A total of 295 kits and 228 installations have been procured.

The KC-135R satisfies the mission requirement.

c. Changes Since "As of" Date - None.

8 Threshold Breaches: There are currently no DAE baseline (dated 31 Dec 88) threshold breaches.

9. Schedule:

a. Milestones --	Production Estimate/ Approved Program	Current Estimate
Program Initiation (Strategic Air Command Required Operational Capability (ROC 1-77)	Mar 77/ Mar 77	Mar 77
Engine Source Selection	Jan 80/ N/A	Jan 80
Contract Award (Production Certification A/C)	Jan 80/Jan 80	Jan 80
Begin Full Scale Production (Milestone III)	Jul 81/Jul 81	Jul 81
Contract Award (First Production Lot)	Feb 82/Feb 82	Feb 82
First Flight (Certification Flight)	Aug 82/Aug 82	Aug 82
Start DT&E/OT&E	Sep 82/Sep 82	Sep 82
Complete DT&E/OT&E	May 84/May 84	May 84
First Delivery to SAC	Jun 84/Jun 84	Jun 84
IOC (1st KC-135R Squadron Deployed)	Jun 85/Jun 85	Jun 85
FOC (Full Operational Capability)	N/A/Jun 85	Jun 85

b. Previous Change Explanations -- None

c. Current Change Explanations -- None

d. References --

Production Estimate: Program Management Directive (PMD) Number 7021 (14)/11142F, 31 August 1981

Approved Program: DAE baseline, dated 31 December 1988;

10. Technical/Operational Characteristics:

a. Technical --	Production Estimate	Approved *Program	Demonstrated Performance	Current Estimat
Max Gross Weight (lbs)	322,500	322,500	322,500	322,50(
Fuel Load at Max takeoff Gross Weight (lbs)	203,300	203,300	203,300	203,300
b. Operational --				
Critical Field Length (ft)	11,000	11,000	10,400	10,40(
Takeoff Distance (ft)	9,000	9,000	8,100	8,10(
Fuel Offload (2000 NM Radius) (lbs)	114,000	114,000	114,000	114,00(

c. Previous Change Explanation -- The demonstrated performance and current estimate of the critical field length and takeoff distance were changed from 11,000 ft to 10,400 ft and from 9,000 ft to 8,100 ft respectively based on actual experience during the test program.

Current Change Explanations -- None

e. References --

Production Estimate: Decision Coordination Paper (DSP), KC-135R Re-engine Program, April 1, 1981 and Program Management Directive (PMD) number 7021(14)/11142F, August 31, 1981.

Approved Program: DAE baseline, dated 31 December 1988

*Due to the maturity of the program, there are no separate goals for technical/operational characteristics. The KC-135R has been in full rate production since 1981 and is tracked to DCP thresholds only.

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	91.6	89.7	89.7
Procurement	4941.5	7310.9	6981.7
Airframe	(2033.0)	(2455.8)	(2336.7)
Engine	(2348.0)	(4262.9)	(3831.7)
Total Flyaway	(4381.0)	(6718.7)	(6168.4)
Other Weapon System Costs	(208.0)	(272.4)	(240.3)
Initial Spares	(352.5)	(319.8)	(434.1)
O&M (FY91 Out)			(138.9)
O&M (Installation) FY82-90)	196.0	248.4	108.8
Total FY81 Base-Year $	5229.1	7649.0	7130.2
Escalation --	2600.1	4920.5	3153.7
Development (RDT&E)	(5.6)	(5.0)	(5.0)
Procurement	(2515.2)	(4783.9)	(5113.2)
O&M (Installation)	(79.3)	(131.6)	(35.5)
Total Then-Year $	7829.2	12569.5	12333.9
b. Quantities --			
Development (RDT&E)	-	-	-
Procurement	334	637	633
Total	334	637	633

c. Foreign Military Sales -- Sales to date total eleven 11 for an estimated cost of $220,012,101 which includes two years of initial spares, support equipment, French peculiar design changes and eleven (11) installations.

d. Nuclear Costs -- None

e. References --

Production Estimate: Program Management Directive (PMD) Number 7021 (14)/11142F, 31 August 1981.

Approved Program: DAE Baseline, dated 31 December 1988.

12. Program Acquisition/Current Procurement Unit Cost Summary: Current (Then-Year) Dollars In Millions)

		Current Year		Budget Year
		SAR Current Estimate (Dec 89 SAR)	UCR Baseline Estimate (Dec 88 SAR)	UCR Baseline Estimate (Dec 89 SAR)
a.	Program Acquisition --			
	(1) Cost	12333.9	12569.5	12333.9
	(2) Quantity	633	637	633
	(3) Unit Cost	19.485	19.732	19.485
b.	Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
	(1) Cost	572.3	572.3	492.5
	Less CY Adv Proc	-	-	-
	Plus PY Adv Proc			
	Net Total	572.3	572.3	492.5
	(2) Quantity	36	36	24
	(3) Unit Cost	15.897	15.897	20.521

13. Cost Variance Analysis:

a. Summary - - (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	O&M	TOTAL
Production Estimate	97.2	7456.7	275.3	7829.2
Previous Changes:				
Economic	-0.2	- 665.5	- 13.2	- 678.9
Quantity	-	+5870.1	+186.6	+6056.7
Schedule	-	+ 393.3	+ 10.1	+ 403.4
Engineering	-	-	-	-
Estimating	-2.3	-1128.9	- 78.8	-1210.0
Other	-	-	-	-
Support	-	+ 169.1	-	+ 169.1
Subtotal	-2.5	+4638.1	+ 104.7	+4740.3
Current Changes				
Economic	-	+ 825.6	+ 62.9	+ 888.5
Quantity	-	- 94.6	- 5.2	- 99.8
Schedule	-	- 215.3	- 6.9	- 222.2
Engineering	-	-	-	-
Estimating	-	- 717.7	- 286.5	- 1004.2
[illegible]er	-	-	-	-
[illegible]port	-	202.1	-	+ 202.1
[illegible]Subtotal	0.0	+ 0.1	-235.7	- 235.6
TOTAL CHANGES	-2.5	+4638.2	-131.0	+ 4504.7
Current Estimate	94.7	12094.9	144.3	12333.9

(FY 1981 CONSTANT DOLLARS (BASE-YEAR) IN MILLIONS)

	RDT&E	PROC	O&M	TOTAL
Production Estimate	91.6	4941.5	196.0	5229.1
Previous Changes:				
Quantity	-	+3116.2	+107.8	+3224.0
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	- 1.9	- 778.5	- 55.4	- 835.8
Other	-	-	-	-
Support	-	+ 31.7	-	+ 31.7
Subtotal	- 1.9	+2369.4	+ 52.4	+2419.9
Current Changes:				
Quantity	-	- 41.7	- 2.8	- 44.5
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	- 373.5	- 136.8	- 510.3
Other	-	-		-
Support	-	+ 86.0	-	+ 86.0
[illegible]Subtotal	0.0	- 329.2	-139.6	- 468.8
[illegible]al Changes	- 1.9	+2040.2	- 87.2	+ 1951.1
[illegible]ent Estimate	89.7	6981.7	108.8	7180.2

Cost Variance Analysis (Cont'd):

b. Previous Change Explanations - -

RDT&E

Economic: revised economic escalation indices

Estimating: reduction of management reserve to cover approved reprogrammings and comply with approved funding levels

PROCUREMENT

Economic: revised economic escalation indices

Quantity: increased quantity of modification kits from 334 to 392 based on lower than anticipated costs for the kits and installation; decreased quantity from 392 to 389 to enable a constant six per month outyear production schedule; increased quantity by six based on outyear procurement rate of 50 per year; addition of 246 kits to include total planned for modification; decrease of 3 kits, 2 through attrition, 1 which was included in error; quantity decreased from 638 to 637, 1 aircraft lost to attrition, total engines decreased from 2,548 to 2,511, 34 excess engines to be used for installs, 3 free engines obtained through FY88 contract negotiations

Schedule: procurement program stretchout; decrease due to early procurement of 14 kits; schedule change associated with an increase in procurement in FY88 (47 to 50) and FY89 (36 to 47), schedule change associated with program stretchout, 56 kits moved from FY90-FY94 to outyears

Estimating: impact of revised economic escalation indices on current and prior years; decrease in kit price based on favorable firm fixed price contract proposals, estimating changes applicable to the kit reduction from 392 to 389; one-time change resulting from a correction to the methodology for computing inflation on programs with advance procurement funding; reduced estimate based on actual contract experience; recategorization of engine production support from flyaway estimating to support, revised hardware estimate based on latest prices for smaller annual buys, adjustment for prior year inflation indices

Support: reduced spare engine and support costs based on lower kit costs and refinement of the estimate; reduction and rephasing of initial spares estimate; increase and rephasing of the peculiar support equipment and tech data estimates; impact of revised economic escalation indices on prior year support costs; recategorization of engine production support costs from flyaway, definitization of prior year spares amounts, increase to data and product support for program stretchout, adjustment for prior year inflation indices

O&M INSTALLATION

Economic: revised economic escalation indices

Quantity: increased installation costs associated with the increase in quantity of modification kits from 334 to 392; reduced installation costs associated with the decrease in quantity of modification kits from 392 to 389; installation of 6 additional aircraft, increase of 246 aircraft; decrease of 3 aircraft, decreased installation costs associated with deletion of one aircraft from planned program

Schedule: installation schedule stretchout associated with kit procurement stretchout; decrease due to early procurement of 14 kits; installation schedule rephased to accomodate the kit procurement schedule change

Estimating: removal of interim contract support costs from the SAR; refinement of estimate based on contract negotiations; revised estimate of "Over and Above: contingency costs; estimating changes applicable to increase of six aircraft; adjustment for impact of revised economic indices on prior years; reduced cost based on contract experience; installation cost corrected to include aircraft preparation costs.

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanations --

	(Dollars in Millions) Base-Year $	Then-Year $
(1) RDT&E -- None		
(2) Procurement --		
Revised economic escalation indices (Economic)	---	+ 825.6
Quantity decreased from 637 to 633, 4 aircraft planned for reengining lost to attrition (Quantity)	- 41.7	- 94.6
Schedule change associated with program acceleration, procurement quantities increased in FY94 thru FY1999 by a total of 38 (Schedule)	---	- 215.3
Revised hardware estimate based on latest contract prices (Estimating)	- 246.1	- 441.6
Reestimate of program (Estimating)	- 294.9	- 628.9
Increase in hardware costs due to re-engining of KC-135E to the KC-135R configuration in the out years (Estimating)	+ 28.0	+ 57.8
Adjustment for prior year inflation indices (Estimating)	+ .6	+ .9
Increase in spares due to latest requirements computations (Support)	+ 115.7	+ 260.3
Decrease in support due to contract negotiations for reduced data and management support (Support)	- 36.5	- 69.6
Increase in support due to data and increased support equipment associated with modification of KC-135E aircraft to KC-135R in out years (Support)	+ 6.2	+ 10.5
Adjustment for prior year inflation indices (Support)	+ .6	+ .9
Procurement cost increased to include recatagorization of FY91 and out O&M funds to 3010 Procurement (Estimating)	+ 138.9	+ 294.1

13. Cost Variance Analysis (Cont'd):

	(Dollars in Millions) Base-Year $	Then-Year $
(2) O&M (Installation)		
Revised economic escalation indices (Economic)	---	+ 62.9
Decreased installation costs associated with deletion of four aircraft from planned program (Quantity)	- 2.8	- 5.2
Installation schedule rephased to accomodate the kit procurement schedule change Schedule)	---	- 6.9
Installation cost corrected to include additional costs for re-engining of the KC-135E to the KC-135R configuration in the out years of the program (Estimating)	+ 2.1	+ 7.6
Installation cost decreased for recatagorization of FY91 and out of O&M installation funds to 3010 procurement funds (Estimating)	- 138.9	- 294.1

References --

Production Estimate: FY 1984 President's Budget, Janaury 1983

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars

Initial SAR/Production Estimate (PdE) to Current Estimate (CE)

PAUC INITIAL SAR/PdE)	Changes								PAUC (Curr Estim
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
23.441	+0.331	-1.661	+0.286	0.000	-3.498	+0.586	0.000	-3.956	19.485

1. Contract Information: (Then Year Dollars in Millions)

a. RDT&E - no active contracts

b. Procurement - -

(1) Airframe Modification Kits
Boeing Military Airplane Co
F34601-87-C-2269, FFP
Award Date: July 31,1987
Definitized: July 31, 1987

Initial Contract Price

Target	Ceiling	Qty
165.0	N/A	50

Current Contract Price

Target	Ceiling	Qty
162.6	N/A	50

Estimated Price at Completion

Contractor	Program Manager
162.6	162.6

(2) Airframe Modification Kits
Boeing Military Airplane Company
F34601-88-C-1119, FFP
Award Date: April 8, 1988
Definitized: April 8, 1988

Initial Contract Price

Target	Ceiling	Qty
180.0	N/A	50

Current Contract Price

Target	Ceiling	Qty
180.0	N/A	50

Estimated Price at Completion

Contractor	Program Manager
180.0	180.0

3) Airframe Modification Kits
Boeing Military Airplane Co
F34601-89-C-0575, FFP
Award Date: Aug 18, 1989
Definitized: Aug 18, 1989

Initial Contract Price

Target	Ceiling	Qty
185.1	N/A	50

Current Contract Price

Target	Ceiling	Qty
185.1	N/A	50

First time contract reported in SAR

Estimated Price at Completion

Contractor	Program Manager
185.1	185.1

15. Contract Information (Cont'd): (Then Year Dollars in Millions)

(4) Engine

CFM International
F33657-84-C-2128, Opt III, FFP
Award Date: May 12, 1987
Definitized: May 12, 1987

Initial Contract Price		
Target	Ceiling	Qty
542.6	N/A	244

Current Contract Price		
Target	Ceiling	Qty
542.6	N/A	244

Estimated Price at Completion	
Contractor	Program Manager
542.6	542.6

(5) Engine

CFM International
F33657-84-C-2128, Opt IV, FFP
Award Date: Mar 28, 1988
Definitized: Mar 28, 1988

Initial Contract Price		
Target	Ceiling	Qty
467.4	N/A	185

Current Contract Price		
Target	Ceiling	Qty
467.4	N/A	185

Estimated Price at Completion	
Contractor	Program Manager
467.4	467.4

(6) Engine

CFM International
F33657-89-C-2140, Basic
Award Date: Sep 15, 1989
Definiitzed: Sep 15, 1989

Initial Contract Price		
Target	Ceiling	Qty
497.7	N/A	182

Current Contract Price		
Target	Ceiling	Qty
497.7	N/A	182

First time contract reported in SAR

Estimated Price at Completion	
Contractor	Program Manager
497.7	467.4

c. Contracts removed from SAR:

Contractor	Contract Number
Boeing Military Airplane Co	F33657-82-C-2068
Boeing Military Airplane Co	F34601-84-C-1135
Boeing Military Airplane Co	F34601-85-C-0135
Boeing Military Airplane Co	F34601-86-C-2171
CFM International	F33657-84-C-2128, Basic, Opt I
CFM International	F33657-84-C-2128, Opt II

These contracts are more than 95% complete and have been deleted and replaced with later contracts.

Cost/Schedule Variances - - All contracts are Firm Fixed Price (FFP). Cost Performance is not a contractual requirement and CPR data is not available.

17. Production Rate Data (Cont'd):

a. Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1981	1	1	1	1
1982	9	9	9	9
1983	19	19	19	19
1984	31	31	30	30
1985	65	65	43	43
1986	65	65	46	46
1987	72	72	50	50
1988	72	72	50	50
1989			47	47
1990			36	50
1991			24	72
1992			22	72
1993			37	72
[illegible]			39	72
[illegible]			34	
1996			33	
1997			36	
1998			40	
1999			37	
2000				
2001				

b. Cost Variance - - Dollars in Millions

Item		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY$)	5229.1	+1951.1	7180.2	+360.3	6819.9
	(TY$)	7829.2	+4504.7	12333.9	+1710.2	10623.7
AUC	(BY$)	15.656	-4.313	11.343	+ .637	10.706
	(TY$)	23.441	-3.956	19.485	+2.807	16.678

c. Schedule Variance - -

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	7/81		7/81	-	7/81
Duration (in Mos)	98	+ 153 mos	251	+ 69 mos	182
End Date (Mo/Yr)	9/89	+ 153 mos	6/02	+ 69 mos	9/96

6. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 53.8% (14 yrs/26 yrs)

(2) Percent program Cost Appropriated: 45.7% ($5632.6/12333.9)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY77-90)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-02)	Total
RDT&E	94.7	-	-	-	94.7
Procurement	4814.8	572.3	492.5	6215.3	12094.9
O&M	122.1	22.2	*	*	144.3
Total	5031.6	594.5	492.5	6215.3	12333.9

* O&M included in procurement from FY91 to end of program.

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY81 Dollars		Total Base Year$	Total Then Year $			Escl Rate
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1977	-			2.6	1.9	1.9	1.9	6.9
1978	-			3.3	2.6	2.6	2.6	6.8
1979	-			8.2	7.0	7.0	7.0	8.4
1980	-			10.6	10.0	10.0	10.0	9.4
1981	-			15.5	16.2	15.9	15.7	11.9
1982	-			22.3	24.9	24.3	24.3	9.2
1983	-			21.8	25.5	24.8	20.3	4.9
1984	-			5.4	6.6	5.9	3.5	3.8
Subtotal	-			89.7	94.7	92.4	85.3	
Appropriation: Procurement								
1980	-	4.7		4.7	5.0	5.0	5.0	9.7
1981	1	47.9	19.8	93.3	108.9	108.9	108.9	11.9
1982	9	31.7	154.2	189.4	232.6	232.6	232.6	9.6
1983	19	11.4	239.2	318.2	414.3	414.3	414.3	9.0
1984	30	4.7	330.3	399.1	541.7	541.7	541.7	7.9
1985	43	2.0	398.7	468.7	656.7	656.7	656.7	3.4
1986	46	1.1	403.2	441.6	636.4	636.4	560.3	2.8
1987	50	.5	457.3	506.0	760.0	760.0	520.7	2.7
1988	50	.3	454.3	456.6	713.2	708.2	238.9	3.1
1989	47		457.7	459.9	746.0	709.6	12.5	4.2
1990	36		334.2	335.7	572.3			4.0
1991	24		254.9	278.6	492.5			4.2
1992	24	249.8	229.0	250.2	457.4			4.0
1993	36	362.0	372.1	395.4	746.1			3.7
1994	36	362.0	392.2	411.0	799.8			3.4
1995	36	362.0	341.9	362.8	727.7			3.1
1996	36	370.4	339.5	358.0	740.7			3.1
1997	50	525.1	378.1	521.3	1111.9			3.1
1998	40	416.8	416.8	453.5	997.2			3.1
1999	20	208.4	385.6	237.8	539.0			3.1
2000				16.5				3.1
2001				19.2				3.1
2002				4.2				
Subtotal	633	104.3	6360.3	6981.7	12094.9	4765.4	3291.6	

* Obligations/expenditures are from Accounting/Finance records, as of December 1989.

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary - -

Fiscal Year	Qty	Flyaway FY81 Dollars		Total Base Year $	Then-Year Dollars			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: O&M Installation								
1982	1			2.6	2.9	2.9	2.9	9.4
1983	--			2.1	2.4	2.4	2.4	4.6
1984	5			8.4	10.1	10.1	10.1	4.0
1985	28			15.9	19.8	19.8	19.8	3.4
1986	33			16.9	21.6	21.6	21.6	2.9
1987	32			16.1	21.2	21.2	21.2	2.7
1988	34			16.2	22.0	22.0	22.0	3.1
1989	46			15.6	22.1	22.1	15.5	4.2
1990	40			15.0	22.2			4.0
1991	47			*	*	*	*	
[illegible]2	45							
[illegible]3	31							
1994	24							
1995	31							
1996	38							
1997	35							
1998	34							
1999	35							
2000	40							
2001	46							
2002	8							
Subtotal	633			108.8	144.3	122.1	115.5	
Total		104.3	6360.3	7180.2	12333.9	4987.9	3492.4	

FY1991 and out installation O&M transferred to Procurement.

17. Production Rate Data (Cont'd):

a. Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1981	1	1	1	1
1982	9	9	9	9
1983	19	19	19	19
1984	31	31	30	30
1985	65	65	43	43
1986	65	65	46	46
1987	72	72	50	50
1988	72	72	50	50
1989			47	47
1990			36	50
1991			24	72
1992			22	72
1993			37	72
4			39	72
5			34	
1996			33	
1997			36	
1998			40	
1999			37	
2000				
2001				

b. Cost Variance - - Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost (BY$)	5229.1	+1951.1	7180.2	+360.3	6819.9
(TY$)	7829.2	+4504.7	12333.9	+1710.2	10623.7
AUC (BY$)	15.656	-4.313	11.343	+ .637	10.706
(TY$)	23.441	-3.956	19.485	+2.807	16.678

c. Schedule Variance - -

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	7/81		7/81	-	7/81
Duration (in mos)	98	+ 153 mos	251	+ 69 mos	182
End Date (Mo/Yr)	9/89	+ 153 mos	6/02	+ 69 mos	9/96

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	N/A
Procurement	176/176

18. Operating and Support Costs -- Sections a. and b. are N/A.

c. Contractor Support Costs --

(Then-Year Dollars in Millions)

	FY 1989 & PRIOR	FY 1990 YEAR	FY 1991 YEAR	BALANCE TO COMPLETE	TOTAL
O&M (AF)	4.4	8.2	9.6	TBD	22.2
Industrial Fund	56.1	44.2	40.7	TBD	141.0
TOTAL	60.5	52.4	50.3	TBD	163.2

AF-2 AMRAAM

SECRET

SAR-89-073

SELECTED ACQUISITION REPORT [RCS: DD-COMP (Q&AR) 823]

PROGRAM: AMRAAM (AIM-120A)

SAF/PAS
90-099 -T
#07
BKS

AS OF DATE: December 31, 1989

INDEX

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AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

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1. Designation and Nomenclature (Popular Name): AIM-120A Advanced Medium Range Air-to-Air Missile (AMRAAM)

2. DoD Component: U.S. Air Force/Navy

3. Responsible Office and Telephone Number:

AMRAAM Joint System Program Office PD: Brigadier General Charles E. Franklin
Armament Division
Eglin AFB, FL 32942
Assigned: July 25, 1988
AV 872-2307; COMM (904) 882-2307

Naval Air Systems Command (PMA-268)
AMRAAM Joint System Program Office
Armament Division (Navy)
Eglin AFB, FL 32542
Captain Todd W. Givens, USN
Assigned: May 6, 1988
AV 872-2412; COMM (904) 882-2412

4. Program Elements/Procurement Line Items:

RDT&E,AF:	PE 0603316F; PE 0603370F; PE 0604314F; PE 0207163F
PROCUREMENT,AF:	APPN 3020 ICN MAMRAO PE 0207163F
MILCON:	None
RDT&E,N:	PE 0603370N; PE 0604314N PROJ W0981
PROCUREMENT,N:	APPN 1507 ICN 2206 PE 0206138M
	APPN 1507 ICN 2206 PE 0204162N
MILCON:	None

~~WHEN ATTACHMENT (S) 1-9 IS WITHDRAWN THIS DOCUMENT BECOMES unclassified~~

CLASSIFIED BY: ~~AMRAAM SECURITY CLASSIFICAT GUIDE DATED 1 September 1984~~

DECLASSIFY ON: ~~ORIGINATING AGENCY'S DETERMINATION REQUIRED~~

SECRET

5. (U) Related Programs: F-14, F-15, F-16, F/A-18, NATO Aircraft.

6. (U) Mission and Description: The AMRAAM Program provides for the acquisition of the next generation all-weather, all-environment medium range air-to-air missile system in response to USAF, USN, and NATO operational requirements for the 1989-2005 time period. The system is designed so that AMRAAM can be employed within and beyond visual range, with or without an operational aircraft radar. Compared to the existing AIM-7 SPARROW which it replaces, AMRAAM design features provide increased firepower and combat utility/effectiveness while significantly reducing aircraft/aircrew vulnerability. Increased average velocity provides the capability to outshoot threat aircraft by increasing the separation between the launch aircraft and the target at AMRAAM intercept. Reduced miss distance and improved fusing combine to increase missile probability of kill. The active radar seeker provides a launch-and-maneuver capability and multiple target engagement on a single intercept. Improved clutter rejection and inherent ECCM capability enhance the performance at low altitudes and in a countermeasure environment. Improved system reliability, maintainability, and logistic supportability increase overall operational availability and effectiveness.

7. (U) Program Highlights:

a. Significant Historical Developments -- DSARC (DAB) Milestone I (January 1979) validated the requirement for AMRAAM. DSARC (DAB) Milestone II (September 1982) authorized Full-Scale Development (FSD) and delegated the production decision responsibility to the Air Force. The FSD contract with two priced production lots was competitively awarded to Hughes Aircraft Company in December 1981. In July 1982, Raytheon was selected as the Follower Contractor for eventual competitive production of AMRAAM. In February 1985, the F-15 was established as the lead aircraft for the Initial Operational Capability (IOC). In February 1986, the Secretary of Defense certified to Congress a revised AMRAAM program which incorporated a set of cost reduction measures and a procurement cost of $7.0 billion (FY84$, 24,000 missiles, Joint Program). Producibility enhancement contracts were awarded to Hughes and Raytheon in July and August 1986 respectively. The July 1987 Authorization Bill for procurement officially accepted the cost cap certification on AMRAAM. However, Congress decreed that this amount ($7.0B) may be adjusted to reflect the effects of the FY87 and succeeding FYs Congressional funding actions. Any such adjustment will be reported to Congress in this report. The FY87 Congressional funding actions reduced Lot I from 260 to 180 missiles and did increase the Congressional Cap from $7.000B to $7.172B in Fiscal Year (FY) 1984 dollars. AMRAAM received a favorable Low Rate Initial Production (LRIP, Milestone IIIA) decision by the Defense Acquisition Board (DAB) in June 1987.

The 1988 Appropriation Act for Procurement reduced Lot II funding from $837M to $673.1M and quantities from 630 to 400. This Congressional action, increased the cost cap from $7.172B to $7.585B in FY84 dollars.

7. [redacted] Program Highlights (continued):

b. Significant Developments Since Last Report -- AMRAAM FSD (Hughes) flight testing and Raytheon qualification testing were completed in January 1989. The test programs consisted of 86 scored launches from F-15, F-16, and F/A-18 aircraft with 69 successful (19 direct hits) for an overall 80 percent success rate. A much more turbulent environment at the F-15 fuselage stations than previously anticipated was confirmed in early 1989. The environment was characterized and specifications modified to increase missile reliability. A new wing design was implemented and tested and a three stage captive carry reliability program initiated to track reliability growth. Stage II of the reliability program exceeded the reliability goals. Stage III was initiated in December 1989.

A limited operational utility exercise was conducted by the 57th Fighter Weapons Wing Development Tactics Branch at Nellis AFB, NV in July 1989. Results of this test showed that AMRAAM provided a greatly increased lethality over the AIM-7 and dramatically increased aircraft survivability. The Live Fire Test Program was successfully completed in August 1989 and vividly demonstrated AMRAAM's lethality.

A four missiles versus four drones (4v4) test shot from a single F-15 aircraft was conducted on August 2, 1989 to test AMRAAM's multiple targeting capability. All four missiles missed their targets; three of the missiles were misdirected due to F-15 radar tracking errors while the fourth missed due to missile ECCM software errors. The missile software error was corrected and when tested resulted in a direct hit. The aircraft radar tracking problem correction is being tested with a 4v4 re-shoot planned for March 1990.

Lot I deliveries were scheduled to complete in October 1989 but were delayed by vendor and high frequency hybrid manufacturing problems. Hughes is projected to complete Lot I deliveries in February 1990 and Raytheon in May 1990. The late deliveries and the F-15 radar tape have delayed IOC until May 1990. The more severe F-15 environment coupled with the manufacturing difficulties led to an Air Force decision to revise the Lot IV acquisition strategy to foster teamwork in resolving the problems. The original strategy was full and open competition between Hughes and Raytheon from Lot III forward. The Lot III was competitively awarded, but the strategy was revised to a 50/50 quantity split, non-competitive buy for Lot IV only, with full and open competition resuming in Lot V.

The FY90 President's Budget requested Lot IV funding in the amount of $1,050.1M ($918.4M USAF; $131.7M USN) and 1,600 missiles (1,450 USAF; 150 USN). The Procurement Authorization and Appropriation Bills provided for continuing Joint Service Procurement of AMRAAMs into Lot IV with funding for the USAF at $687.8M (TY$)/815 missiles and the USN at $108.1M (TY$)/85 missiles (exclusive of Initial Spares).

7. [redacted] Program Highlights (continued): On November 6, 1989 the AMRAAM program reported that certain cost and schedule parameters from the AMRAAM Acquisition Program Baseline (dated August 26, 1989) would be breached. Reasons for this breach include Congressional quantity reductions, higher than anticipated costs due to manufacturing problems, the F-15 environment, lower than expected competitive savings in Lot III, changes in Lot IV acquisition strategy, and delays in introducing cost reduction producibility initiatives due to the F-15 environment. This cost increase and the schedule delays led to a DAB program review on December 4, 1989. Missile performance, reliability, production cost, and schedule performance were reviewed. The DAB approved the Air Force proceeding with Lot III Low Rate Procurement, but released only $84.5M of Lot IV funding for a limited set of Long Lead Items, APREP enhancements, and test support. The remaining funds are being held pending the Full Rate Production Decision (DAB IIIB) review in May 1990. Additionally, the DAB approved a revised program cost estimate which includes flatter learning curves and reduced competition savings assumptions and directed that this SAR reflect the revised estimate of approximately $9.3B (FY84$).

In December 1989 the Air Force and Hughes reached agreement on $72M of claims Hughes made against the full scale development contract. The final settlement was for a total of $17M ($13M of claims and $4M in interest). Funding was requested and approved from successor (M account) funds and are not included in this SAR. This settlement raises the total Hughes FSD contract value to $573M, $17M over the FY86 Appropriations Act directed contractual cap of $556M.

The full go-ahead options for the Lot III (FY89) contracts were exercised with Raytheon and Hughes on December 22 and 29, 1989 respectively. Contracts for Lot IV (FY90) long-lead components for 450 missiles were awarded in late December 1989 to both contractors.

AMRAAM is expected to meet all mission requirements.

c. Changes since "As Of" Date: SECAF notified Congress of 28.3% Unit Cost Breach on 26 February 1990.

8. [redacted] Threshold Breaches: There are some breaches of the DAE Baseline, dated December 1988. The latest DAE baseline was approved by the Service Acquisition Executive (SAE) on August 26, 1989 and is awaiting DAE signature. This baseline supports the FY90-91 Biennial President's Budget (PB) submission (January 1989; as presented in the December 31, 1988 Selected Acquisition Report). There are breaches in the cost and schedule areas from this SAE approved baseline.

9. [redacted] Schedule:

a. Milestones:

	Development Estimate	Approved Program	Current Estimate
Preliminary Design Review	Aug 82	Aug 82	Aug 82
DSARC II (DAB) (SDDM)	Nov 82	Nov 82	Nov 82
Advance Buy Long Lead for Lot I	NA	Dec 86	Dec 86
DAB IIIA (Lot I Low Rate Initial Production)	NA	Jun 87	Jun 87
Production Contract Full Go-Ahead for Lot I	NA	Oct 87	Oct 87
Complete D/IOT&E with FSD Assets	NA	Jan 89	Jan 89 (CH-1)
Complete IOT&E/Captive Carry Reliability Pgm w/Lot I Assets (AF)	NA	Apr 89	Mar 90 (CH-2)
DAB IIIB (Lot III Full Go-Ahead Rate Production)	NA	May 89	May 90 (CH-3)
IOC (Air Force)	Sep 86	Oct 89	May 90 (CH-4)
Full Operational Capability (FOC) 1st F-16 Fully Operational w/AMRAAMs	NA	Mar 91	Jul 91

b. Previous Change Explanations:

Pre-priced options for Lots I and II expired July 1984 and were not negotiated. Milestones were updated to reflect the restructured program. Lot I Advance Buy/Long Lead Contract awards, Lot I Full Go-Ahead, and IOC were delayed because of missile quantity reductions and late approval of the FY87 budget by Congress. OSD approved revised schedules and decision milestones have been incorporated into the initial Joint Air Force/Navy SAR submission. Schedule slip (from Apr 87 to Jun 87 for DAB IIIA and Mar 89 to Sep 89 for DAB IIIB) is due to flight test delays from the cumulative effects of drone control problems, need for additional preflight simulations/evaluations, missile guidance section software modifications and additional drone controller training requirements. All flight test requirements for the OSD Program Review were completed by May 1, 1987. Delay in release of the manpower package to Congress caused a corresponding slip (from Jul 87 to Oct 87) in the release of the Lot I Full Go-Ahead Contracts. DT&E/IOT&E complete and FOC milestones added in accordance with USD(A) direction.

9. (U) Schedule (continued):

c. Current Change Explanations:

(CH-1) All FSD assets were expended as of January 1989. Additional testing requirements (Captive Carry, aircraft environment studies) will be accomplished with Lot I (production) assets.

(CH-2) F-15 fuselage environment fixes have impacted delivery of the stage 3 CCRP missiles. This effort will be completed prior to the Full Rate Production Decision.

(CH-3) The Defense Acquisition Board (DAB) Full Rate Production Decision (DAB IIIB) scheduled for Sep 1989 has slipped to May 1990 to accommodate re-shoot of the 4v4 test and 1,000 hours of Stage III Captive Carry Reliability Testing.

(CH-4) The IOC has slipped to May 1990 due to the F-15 radar software problems and late Lot I deliveries.

d. References:

Development Estimate: SDDM dated November 3, 1982, #X22681

Approved Program: The DAE approved baseline dated December 14, 1988. The latest DAE baseline was approved by the Service Acquisition Executive (SAE) on August 26, 1989 and is awaiting DAE signature.

0. (U) Technical/Operational Characteristics:

a. (U) Technical	Dev Est	Approved Program (Goal/Threshold)	Demonstrated Perf	Current Estimate
(U) Weight (lbs)	327	327/350	342	335
(U) Length (in)	143	143/144.2	143.9	143.9
(U) Reliability 1/				
Ready Storage (hrs) 2/	60000	60000/45000		45000
Availability (%)	86	86/82		93
Captive-Carry (MBTM-Type I (hrs) 3/	600	600/450	129 (CH-1)	450 (CH-1)
b. (U) Operational				
(U) Range (NM)				
Maximum 4/	(b)(1)			
Minimum Tail Aspect 5/				
Active Acquisition Range 6/				
HPRF	(b)(1)			
MPRF				
(U) Probability of Kill (PK) 7/				
(U) Guidance Probability (GP) 8/				
Clear Environment	(b)(1)			
ECM Environment 9/				
(U) Multiple Target Separation				
Range (ft) or	(b)(1)			
Range Rate (ft/sec) or 10/				
Angle (degrees)				
(U) Multiple Launch Capability (# of missiles)				
(U) F-Pole at 25NM Range 11/	(b)(1)			
(U) Look-Down Shoot-Down (Land ft)				
(U) Aircraft Load/Reload 12/ (CH-4)				
Host Aircraft Load Time F-15:				
4 missiles				
3 man load crew				
Aircraft/missile checks included				
Same Configuration	N/A	NA/NA		20 min
Change Configuration	N/A	NA/NA		45 min
Host Aircraft Load Time F-16:				
4 missiles				
3 man load crew				
Aircraft/missile checks included				
Same Configuration	N/A	NA/NA		20 min
Change Configuration	N/A	NA/NA		35 min

10. (U) Technical/Operational Characteristics: (continued)

b. (U) Operational	Dev Est	Approved Program (Goal/Threshold)	Demon-strated Perf	Current Estimate
(U) Crew Size (CH-4)	N/A	N/A		3 men
(U) Configure Clean Aircraft to Fighter Configuration (CH-4)	N/A	NA/NA		30 min

1/ (U) Standard reliability terminology per AFR 80-5.
2/ (U) Mature missile values are shown.
3/ (U) Mature missile values (90,000 operational flight hours). The Captive-Carry MTBM (Type I) threshold value applicable to Milestone IIIA is 100 hours. The Captive-Carry MTBM (Type I) value applicable to Milestone IIIB is 200 hours.
4/ (U) Per Joint Service Operational Requirements (JSOR) conditions and definitions.
5/ (U) Non-maneuvering, co-speed, co-altitude target.
6/ (U) Ro, 2M2 cross-section, clear air
HPRF - High Pulse Repetition Frequency
MPRF - Medium Pulse Repetition Frequency
7/ (U) Probability of K-Kill (Reference AMRAAM Specification).
8/ (U) Miss distance in accordance with system specification.
9/ (U) (b)(1)
10/ (U) Current estimate based on a (b)(1)
11/ (U) Missile separation distance from launch aircraft at occurence of missile target intercept. The F-Pole requirement for the AMRAAM is not a significant measure of operational performance since the missile's active seeker allows the aircraft to exercise a significant launch and maneuver without tracking missile to the target.
12/ (U) The above language encompasses load/ reload, or change-configuration-to-load contingencies given current typical aircraft configuration philosophy.

c. (U) Previous Change Explanations:

Reliability Ready Storage (hrs), Probability of Kill, Multiple Target Separation Range and Range Rate, F-Pole Range, and Look-Down-Shoot-Down -- current estimate revised to reflect approved and required program as documented in Decision Coordinating Paper, November 27, 1985.

Reliability Availability and Captive-Carry (MTBM Type I) -- current estimate revised to reflect results of FSD test and analysis.

3. (U) Technical/Operational Characteristics: (continued)

c. (U) Previous Change Explanations:

Multiple Launch Capability -- current estimate in previous report reflected missile maximum range capability. The estimate has been updated to show prime range of the missile based on Air Force and Navy aircraft operational characteristics.

Maximum Range Adjustment based on aerodynamic data derived from flight test.

d. (U) Current Change Explanations:

(CH-1) (U) Captive-Carry: Stages I and II of the Captive-Carry Reliability Program (CCRP) have demonstrated a marked improvement in overall reliability from 39 to 90 hours for the eject station and 59 to 203 hours for the pylon. Current estimate revised to reflect AMRAAM anticipation of meeting the Captive-Carry Threshold.
(CH-2) (U) Minimum Tail Aspect: Incorporated results of FY89 flight testing.
(CH-3) (U) Probability of Kill: The maximum Pk for the missile was recalculated based on the LP-44 and LP-54 shot results. This recalculation has decreased the Pk to 3.0 percent below the current baseline requirement. The Pk fluctuated with shot results and although current slightly below the baseline, future shots should restore the Pk to an acceptable level.
(CH-4) (U) New added characteristics.

e. (U) References:

Development Estimate: SDDM, November 3, 1982, #X22681.

Approved Program: The DAE approved baseline dated December 14, 1988. The latest DAE baseline was approved by the Service Acquisition Executive (SAE) on August 26, 1989 and is awaiting DAE signature.

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Nov 82 Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	730.2	824.1	822.7
Procurement	4031.6	4488.4	5447.1 *
Air Vehicle Flyaway	3508.2	4258.8	5208.4
Other Weapon Sys Cost	264.0	176.4	182.6
Initial Spares	84.9	53.2	56.1
Other Procurements	174.5	0.0	0.0
Construction	--	--	--
Total FY 78 Base-Year $	4761.8	5312.5	6269.8
Escalation	6829.8	6279.9	8615.6
Development (RDT&E)	447.9	508.2	518.1
Procurement	6381.9	5771.7	8097.5
Construction (MILCON)	--	--	--
Total Then-Year $	11591.6	11592.4	14885.4
b. Quantities --			
Development (RDT&E)	169	111	111
Procurement	24335	24320	24320
Total	24504	24431	24431

* This equates to $9,379.6M (FY84$)

c. Foreign Military Sales -- Commitments to date are 11 AMRAAMs (Lot II) for the United Kingdom at $24.4 million and six (6) (Lot III) for Germany at $6.0 million.

d. Nuclear Costs -- None

e. References --

Development Estimate: SDDM dated November 3, 1982, #X22681

11. [redacted] Program Acquisition Cost: (Current Estimate in Millions of Dollars)

e. References --

Approved Program: DAE Baseline dated 31 Dec 88. The latest DAE baseline was approved by the Service Acquisition Executive (SAE) on August 26,1989 and is awaiting DAE signature.

12. [redacted] Program Acquisition/Current Procurement Unit Cost Summary:

(Current (Then-Year) Dollars in Millions)

		Current Year		Budget Year
		Current Est Dec 89 SAR	UCR Baseline Dec 88 SAR	UCR Baseline Dec 89 SAR
a.	Program Acquisition			
	(1) Cost	14885.4	11592.4	14885.4
	(2) Quantity 1/	24320	24320	24320
	(3) Unit Cost	0.612	0.477	0.612
b.	Current Procurement	FY 1990	FY 1990 2/	FY 1991
	(1) Cost	807.2	807.2	1338.4
	Less CY Adv Proc	0.0	0.0	0.0
	Plus PY Adv Proc	0.0	0.0	0.0
	Net Total	807.2	807.2	1338.4
	(2) Quantity	900	900	1800
	(3) Unit Cost	0.897	0.897	0.744

1/ This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation.

2/ Differs from the December 1988 SAR to reflect the FY90 Appropriations Act.

12. Program Acquisition/Current Procurement Unit Cost Summary: (con't)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
c. Program Acquisition --	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost (BY$)	6269.8	5312.5	6269.8
(2) Unit Cost 1/	0.258	0.218	0.258
d. Current Procurement --	(FY 1990)	(FY 1990 APPN) 2/	(FY 1991)
(1) Cost (BY$)	353.0	353.0	564.5
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	353.0	353.0	564.5
(2) Unit Cost	0.392	0.392	0.314

e. Changes from the Baseline Report

	Change in Dollars/Qty	Percent Change
(1) PAUC (TY$)	0.135	28.301%
(2) CPUC (TY$)	0.000	0.000%
(3) Quantity	0	0
(4) PAUC (BY78$)	0.040	18.349%
(5) CPUC (BY78$)	0.000	0.000%

f. Changes from the Previous SAR

	Change in Dollars/Qty	Percent Change
(1) PAUC (TY$)	0.135	28.301%
(2) CPUC (TY$)	0.000	0.000%
(3) Quantity	0	0
(4) PAUC (BY78$)	0.040	18.349%
(5) CPUC (BY78$)	0.000	0.000%

g. Initial SAR (Dec 82)
(1) Program Acquisition Cost (TY$) -- $11,591.6M
(2) Program Acquisition Cost (BY78$) -- $4,761.8M

h. Unit Cost Changes:
(1) PAUC: Program Acquisition Unit Cost changes are composed of the following:

(a) RDT&E -- Revised economic escalation rates, additional USAF funding to support the Live Fire Test Program (FY88), FY90 Appropriations Actions, USN miscellaneous headquarters/support reductions.

(b) Proc -- Revised economic escalation rates, additional USAF funding to support definition of the F-15 environment (FY87), FY90 Appropriations Actions, incorporation of the Defense Acquisition Board (DAB) approved alternative program estimate that includes flatter learning curves and reduced competition savings assumptions, and USN miscellaneous headquarters/support reductions.

(2) CPUC: None.

12. Program Acquisition/Current Procurement Unit Cost Summary: (con't)

i. Program Management and Control.

Program Director: Brig Gen Charles E. Franklin, USAF
AMRAAM JSPO
MSD/YM
Munitions Systems Division
Eglin AFB, FL. 32542-5000
Commercial Phone: (904) 882-2307
Autovon Phone: 872-2307

USN Program Director: Captain Todd W. Givens, USN
AMRAAM JSPO
PMA-268
Munitions Systems Division (Navy)
Eglin AFB, FL 32542-5000
Commercial Phone: (904) 882-2412
Autovon Phone: 872-2412

JSPO Focal for Cost Control:
Mr Jerome Sutton
AMRAAM JSPO
MSD/YM
Munitions Systems Division
Eglin AFB, FL. 32542-5000
Commercial Phone: (904) 882-2307
Autovon Phone: 872-2307

j. Cost Control Actions: The AMRAAM Joint System Program Office (JSPO), under the direction of Mr Jerome Sutton (Deputy Program Director, AMRAAM), is aggressively pursuing opportunities to reduce costs on the AMRAAM program. Extensive in-house and contractor reviews are being conducted to identify and eliminate non-value added activities. The areas and activities currently under review include the following: expanded cooperation between the contractors to stabilize the design as a result of the non-competitive acquisition strategy for Lot IV; contractor cost improvement activities monitored at the piece part level to identify cost drivers; vendor "should cost" reviews; identification of inhibiting activities to "full and open" competition; acceleration of the AMRAAM Producibility Enhancement Program (APREP) incorporation into the missile baseline; expansion of the vendor base; examination of the application of total quality management (TQM) and cost of quality initiatives; and planned acquisition strategy of "full and open" competition between the AMRAAM producers emphasizing cost.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: (con't)

The contractors are motivated to control costs through the use of fixed price type contracts on the AMRAAM Program. The firm fixed price (FFP) contracts use the profit motive as incentive for a contractor to control costs. For the fixed price incentive (FPIF) contracts, the contractor's ability to control costs determines the amount of incentive they may receive under the contract. All future procurement contracts are planned as FFP contract type awards under "full and open" competition.

The following contract types have been awarded to date for the AMRAAM missile procurements:

(1) Hughes

F08635-87-C-0070	Lot I Production	FFP
F08635-88-C-0093	Lot II Production	FFP
F08635-89-C-0036	Lot III Production	FFP
F08635-90-C-0003	Lot IV Production	FFP
F08635-86-C-0201	AMRAAM Producibility Enhancement Program	FFP

(2) Raytheon

F08635-87-C-0065	Lot I Production	FPIF
F08635-88-C-0116	Lot II Production	FPIF
F08635-89-C-0037	Lot III Production	FFP
F08635-90-C-0004	Lot IV Production	FFP
F08635-83-C-0105	AMRAAM Producibility Enhancement Program	FPIF

The AMRAAM JSPO has an active producibility enhancement program. The objective of the AMRAAM Producibility Enhancement Program (APREP) is to obtain cost savings in AMRAAM production and system life cycle costs without degrading system performance. This achievement was planned by selecting and contracting for the design and qualification of leader and follower cost reduction initiatives. Candidates with the potential for significant savings including vendor expansion and redesign projects were considered for implementation.

k. (U) Impact of Performance or Schedule Changes on Unit Costs: The FY90 Congressional Actions cut the FY90 procurement from the requested $1,050.1M (USAF/USN) and 1,600 quantity to $807.2M (USAF/USN) and 900 quantity resulting in a rephase of program and incorporation of an additional procurement lot to buy out the program. This change is identified in section 13 of this report (Schedule Changes). The draft DAE baseline (as approved by the Service Acquisition Executive on August 26, 1989, and awaiting DAE signature) tracks to the same cost, technical, and schedule baseline as the December 1988 SAR report. The remaining cost change to the procurement program is due to incorporation of the Defense Acquisition Board (DAB) approved alternative program estimate that includes flatter learning curves and reduced competition savings assumptions. This ADM directed that the JSPO use the alternative estimate as the basis for the December 1989 Selected Acquisition Report (SAR) submission.

12. Program Acquisition/Current Procurement Unit Cost Summary: (con't)

1. Contract Information (in Millions of Then-Year Dollars)

(1) Procurement.

(a) Hughes Lot III Procurement

(1) Contractor: Hughes Aircraft Company
Missile Systems Group
Canoga Park, CA

(2) Contract Title: Hughes Lot III Low Rate Production

(3) Contract Number: F08635-89-C-0036

(4) Actual Cost of Work Performed (as of Dec 89): $9.1M

(5) Percent Contract Completed: 2.3%

(6) Variances: N/A, FFP Contract.

(7) Explanation of Variances. N/A, FFP Contract.

(8) Impact of Variance on Contract. N/A, FFP Contract.

(9) Impact of Variance on Unit Cost. N/A, FFP Contract.

(b) Hughes Lot II Procurement

(1) Contractor: Hughes Aircraft Company
Missile Systems Group
Canoga Park, CA

(2) Contract Title: Hughes Lot II Low Rate Production

(3) Contract Number: F08635-88-C-0093

(4) Actual Cost of Work Performed (as of Dec 89): $100.0M

(5) Percent Contract Completed: 29.5%

(6) Variances: N/A, FFP Contract.

(7) Explanation of Variances. N/A, FFP Contract.

(8) Impact of Variance on Contract. N/A, FFP Contract.

(9) Impact of Variance on Unit Cost. N/A, FFP Contract.

(c) Hughes Lot I Procurement

(1) Contractor: Hughes Aircraft Company
Missile Systems Group
Canoga Park, CA

(2) Contract Title: Hughes Lot I Low Rate Production

(3) Contract Number: F08635-87-C-0070

(4) Actual Cost of Work Performed (as of Dec 89): $221.4M

(5) Percent Contract Completed: 75.0%

(6) Variances: N/A, FFP Contract.

(7) Explanation of Variances. N/A, FFP Contract.

(8) Impact of Variance on Contract. N/A, FFP Contract.

(9) Impact of Variance on Unit Cost. N/A, FFP Contract.

12. Program Acquisition/Current Procurement Unit Cost Summary: (con't)

(d) Raytheon Lot III Procurement
(1) Contractor: Raytheon Company
Bedford, MA
(2) Contract Title: Raytheon Lot III Low Rate Production
(3) Contract Number: F08635-89-C-0037
(4) Actual Cost of Work Performed (as of Dec 89): $12.0M
(5) Percent Contract Completed: 4.4%
(6) Variances: N/A, FFP Contract.
(7) Explanation of Variances. N/A, FFP Contract.
(8) Impact of Variance on Contract. N/A, FFP Contract.
(9) Impact of Variance on Unit Cost. N/A, FFP Contract.

(e) Raytheon Lot II Procurement
(1) Contractor: Raytheon Company
Bedford, MA
(2) Contract Title: Raytheon Lot II Low Rate Production
(3) Contract Number: F08635-89-C-0116
(4) Actual Cost of Work Performed (as of Oct 89): $103.5M
(5) Percent Contract Completed (as of October 1989 Performance Period): 44.9%
(6) Variances:

	Cost Variance ($/%)	Schedule Variance ($/%)
UCR Baseline	$- 0.7/- 7.2%	$+ 4.9/+101.0%
Previous SAR (Dec 88)	$ N/A / N/A %	$ N/A / N/A %
Current Values (Oct 89)	$- 0.6/- 0.6%	$-34.9/- 25.3%
Change from Baseline Rpt	$+ 0.1/+ 6.6%	$-39.8/-126.3%
Change from Previous SAR	$ N/A / N/A %	$ N/A / N/A %

(7) Explanation of Variances. Cost Variance - Positive trend due to level-of-effort work accruing earned value (BCWP) as time passes, while actual costs (ACWP) are not accruing because the work is not in progress. Schedule Variance - Heavy emphasis on Lot I missile deliveries to meet Initial Operational Capability has caused delays in Lot II effort. Subsequent vendor material deliveries and configuration changes are also to blame. The delivery schedule for Lot II is projected for June 1990 through February 1991.
(8) Impact of Variance on Contract. The delivery schedule for Lot II is currently projected for June 1990 through February 1991.
(9) Impact of Variance on Unit Cost. As lot I effort is completed, the resources used can be redirected towards the Lot II missile deliveries. This contract is a fixed price incentive firm (FPIF) contract.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: (con't)

1. (U) Contract Information (in Millions of Then-Year Dollars) (con't)

(1) Procurement.

(f) Raytheon Lot I Procurement

(1) Contractor: Raytheon Company
Bedford, MA

(2) Contract Title: Raytheon Lot I Low Rate Production

(3) Contract Number: F08635-87-C-0065

(4) Actual Cost of Work Performed (as of Oct 89): $119.3M

(5) Percent Contract Completed (as of October 1989 Performance Period): 78.7%

(6) Variances:

	Cost Variance ($/%)	Schedule Variance ($/%)
UCR Baseline	$+ 7.1/+ 8.5%	$-16.9/- 16.8%
Previous SAR (Dec 88)	$+ 7.1/+ 8.5%	$-16.9/- 16.8%
Current Values (Oct 89)	$+ 1.6/+ 1.2%	$- 9.3/- 6.3%
Change from Baseline Rpt	$- 5.5/- 7.3%	$+ 7.6/+ 10.5%
Change from Previous SAR	$ N/A / N/A %	$ N/A / N/A %

(7) Explanation of Variances. Cost Variance - Artificial positive variance is due to level-of-effort work accruing earned value (BCWP) prior to the actual performance of the work. The contract was scheduled to complete in October 1989, but due to the difficulties expressed in the schedule variance explanation, the contract is now expected to complete in May 1990. Schedule Variance - Raytheon is currently projecting completion of missile deliveries in May 1990 (seven (7) months behind schedule). Delays are due to vendor quality problems and high frequency hybrid manufacturing difficulties. (8) Impact of Variance on Contract. The delivery schedule for Lot I is currently projected to complete in May 1990.

(9) Impact of Variance on Unit Cost. As lot I effort is completed, the resources used can be redirected towards the Lot II missile deliveries. This contract is a fixed price incentive firm (FPIF) contract.

m. (U) Contracts Exceeding Contract Cost Baseline Thresholds. None.

13. Cost Variance Analysis:

a. Summary -- Current (Then Year) Dollars in Millions

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1178.1	10413.5		11591.6
Previous Changes:				
Economic	-44.8	-2062.3		-2107.1
Quantity	-39.2	0.0		-39.2
Schedule	-19.1	416.4		397.3
Engineering	208.4	170.3		378.7
Estimating	48.9	1951.1		2000.0
Other	0.0	0.0		0.0
Support	0.0	-628.9		-628.9
Subtotal	154.2	-153.4		0.8
Current Changes				
Economic	11.8	616.4		628.2
Quantity	0.0	0.0		0.0
Schedule	0.0	138.4		138.4
Engineering	0.0	0.0		0.0
Estimating	-3.3	2502.7		2499.4
Other	0.0	0.0		0.0
Support	0.0	27.0		27.0
Subtotal	8.5	3284.5		3293.0
Total Changes	162.7	3131.1		3293.8
Current Estimate	1340.8	13544.6		14885.4

13. [redacted] Cost Variance Analysis (continued):

(FY78 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	730.2	4031.6		4761.8
Previous Changes:				
Quantity	-18.7	0.0		-18.7
Schedule	-12.0	-146.2		-158.2
Engineering	98.5	64.3		162.8
Estimating	26.1	832.6		858.7
Other	0.0	0.0		0.0
Support	0.0	-293.9		-293.9
Subtotal	93.9	456.8		550.7
Current Changes				
Quantity	0.0	0.0		0.0
Schedule	0.0	0.0		0.0
Engineering	0.0	0.0		0.0
Estimating	-1.4	950.2		948.8
Other	0.0	0.0		0.0
Support	0.0	8.5		8.5
Subtotal.	-1.4	958.7		957.3
Total Changes	92.5	1415.5		1508.0
Current Estimate	822.7	5447.1		6269.8

13. (U) Cost Variance Analysis (continued):

b. Previous Change Explanations:

RDT&E

Economic: RDT&E economic change is due to incorporation of revised economic escalation indices.

Schedule: RDT&E schedule change is due to revision of the development estimate caused by a reduction in the total number of evaluation missiles.

Engineering: RDT&E engineering change is due to the addition of the AMRAAM Pre-Planned Product Improvement (P^3I) program beginning in FY90.

Estimating: RDT&E estimating changes are due to the following causes: extension of the FSD program into FY88, additional funding required for USN missile/aircraft platforms development and testing, Congressional Appropriations actions reducing flight test content, funding of Small Business and unfunded requirements, and adjustments for current and prior year escalation.

PROCUREMENT

Economic: Procurement economic change is due to incorporation of revised economic escalation indices.

Schedule: Procurement schedule change is caused by the rephase of quantities due to Congressional Appropriations actions, which funded a lower quantity of missiles than planned in the budget estimate submissions.

Engineering: Procurement engineering change is due to an extension of production funds and deletion of the HAVE SPEAR program effort, a limited access program.

Estimating: Procurement estimating changes are due to the following causes: the addition of warranty provisions, Congressional transfer of the Advance Procurement TY$ funding from FY84 to FY86, recategorization of adjustment for current and prior year escalation properly attributable to support category, revised estimating methodology to support the DAB and Congressional realignment of quantities, adjustment of the AMRAAM Producibility Enhancement Program (APREP) investment costs and additional flight test requirements for the projects, and adjustments for current and prior year escalation.

13. [redacted] Cost Variance Analysis (continued):

b. Previous Change Explanations: (continued)

PROCUREMENT (continued)
Support: Procurement support changes are due to the following causes: rephase of support requirements caused by Congressional Appropriations actions, reevaluation and rephasing of AMRAAM initial spares, recategorization of adjustment for current and prior year escalation properly attributable to the support category, recategorization of USN support costs properly attributable to the estimating category (nonrecurring effort), rephase of the Joint Depot to incorporate the Joint Depot Maintenance Group (JDMG) decision for Organic Depot capability at Alameda, CA (USN facility) at the end of the five (5) year interim contractor support (ICS) period, and adjustments for current and prior year escalation.

MILCON N/A

13. Cost Variance Analysis (continued):

c. Current Variance Analysis:

	(Dollars in Millions) Base Year	Then Year
(1) RDT&E		
Revised Economic Escalation Indices (Economic)	N/A	11.8
Offset for Current and Prior Year escalation (Estimating)	0.1	0.1
Reprogrammings to support Live Fire Test Program (USAF) (Estimating)	1.7	3.1
Navy funding for inflation not applied to program element (Estimating)	-3.2	-6.5
(2) PROCUREMENT		
Revised Economic Escalation Indices (Economic)	N/A	616.4
Schedule adjustment to incorporate FY90 Congressional actions (Schedule)	0.0	138.4
Adjustment to estimating methodology to incorporate the DAB approved alternative estimate which includes flatter learning curves and reduced competition savings assumptions (Estimating)	767.6	1962.6
Offset for Current and Prior Year escalation (Estimating)	-19.4	-44.2

13. (U) Cost Variance Analysis (continued):

c. Current Variance Analysis:

	(Dollars in Millions) Base Year	Then Year
(2) PROCUREMENT (continued)		
Withdrawal of Multiyear Procurement initiative due to incorporation of the alternative estimate directed by the AMRAAM ADM dated December 11, 1989 (Estimating)	61.1	195.3
Revision of the Program Office Estimate to correspond to the alternative estimate	140.9	389.0
Revised estimating methodology for Special Tooling/Special Test Equipment (ST/STE) (Estimating)	(+31.4)	(+95.2)
Revised estimate for Production Test requirements based on actuals (Estimating)	(+46.0)	(+123.9)
Revised estimating methodology for Production Activities including technical analysis (Estimating)	(+52.1)	(+143.2)
Revised estimate of the APREP investment costs of the projects and additional flight test requirements for the APREP projects (Estimating)	(+11.4)	(+26.7)
Offset for Current and Prior Year escalation (Support)	-0.9	-2.0
Revision of the estimate for Navy Logistics Support requirements (Support)	-2.9	-7.3

13. (U) Cost Variance Analysis (continued):

c. Current Variance Analysis:

	(Dollars in Millions) Base Year	Then Year
(2) PROCUREMENT (continued)		
Revision of the estimate for the AMRAAM Organic Depot Facility (Support)	25.3	76.3
Revision of the estimate for AMRAAM Peculiar Support Equipment (PSE) corresponding to the alternative estimate	-13.0	-40.0
Revision & rephasing of the Data Requirements (Support)	(+9.6)	(+22.8)
Revision & rephase of Training Equipment Requirements (Support)	(-0.7)	(-1.3)
Revision & rephase of the Containers and Peculiar Support Equipment estimate (Support)	(-25.1)	(-69.8)
Revision of the Initial Spares estimate to correspond to the alternative estimate directed by the AMRAAM ADM dated December 11, 1989 (Support)	(+3.2)	(+8.3)

14. [redacted] Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

a. Initial SAR/Development Estimate to Current Estimate

1/ PAUC (Initial SAR/DEV Est)	Changes								1/ PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
.476	-0.061	0.000	0.022	0.015	0.185	0.000	-0.025	0.137	0.612

1/ This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation.

15. Contract Information: (Then Year Dollars in Millions)

a. RDT&E: NONE.

b. PRODUCTION

AMRAAM (AIM-120A):

AMRAAM Low Rate Initial Production	Initial Contract Price Target	Ceiling	Qty
Lot III Procurement	399.4	N/A	534*

Hughes Aircraft Company
Missile Systems Division
Canoga Park, CA
F08635-89-C-0036, FFP**
Award: December 29, 1989
Definitization: December 29, 1989 (Full Go-Ahead)

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
399.4	N/A	534	399.4	399.4

* Quantity Procurements as follows: USAF - 518 Units; USN - 13 Units; FMS (German Case)- 3 Units.
** CPR data is not required on Firm Fixed Price (FFP) Contracts.

Change Explanation: This is the first SAR submission for this Contract.

Target price includes identified funding of $13.2 for 13 USN missiles, $4.5 million for Interim Contractor Support, and $2.2 million (FMS GY Case) for 3 missiles and associated support.

AMRAAM Low Rate Initial Production	Initial Contract Price Target	Ceiling	Qty
(LRIP) Lot II Procurement	312.4	N/A	223*

Hughes Aircraft Company
Missile Systems Division
Canoga Park, CA
F08635-88-C-0093, FFP**
Award: July 15, 1988
Definitization: July 15, 1988 (Full Go-Ahead)

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
339.2	N/A	223	339.2	339.2

15. ~~(U)~~ Contract Information (continued):

b. PRODUCTION (continued)

AMRAAM (AIM-120A):

AMRAAM Low Rate Initial Production
(LRIP) Lot II Procurement
Hughes Aircraft Company
Missile System Division
Canoga Park, CA
F08635-88-C-0093, FFP** (continued)

* Quantity Procurements as follows: USAF - 200 Units; USN - 12 Units; FMS (United Kingdom Case) - 11 Units.
**CPR data is not required on Firm Fixed Price (FFP) Contracts

Change Explanation: Target Price increased due to exercise of contract options, wing/wing attach modifications, ECM System updates, and miscellaneous small engineering changes.

Target Price includes identified funding of $13.6 million for 12 USN RDT&E missiles, $3.1 million for Interim Contractor Support, and $20.5 million (FMS UK Case) for 11 missiles and associated support.

	Initial Contract Price		
Lot I Low Rate Initial Production	Target	Ceiling	Qty
Hughes Aircraft Company	279.4	N/A	105
Missile Systems Division			
Canoga Park, CA			
F08635-87-C-0070, FFP**			
Award: October 31, 1987			
Definitization: October 31, 1987 (Full Go-Ahead)			

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
295.1	N/A	105	295.1	295.1

** CPR data is not required on Firm Fixed Price (FFP) Contracts

Change Explanation: Target Price increased due to incorporation of: Aircraft environment testing and F-15 environment fixes; PMTC reliability test implementation; Retrofit of Captive Carry Reliabilty Vehicles; and miscellaneous small engineering changes.

15. [redacted] Contract Information (continued):

b. PRODUCTION (continued)

AMRAAM (AIM-120A):

	Initial Contract Price		
AMRAAM Low Rate Initial Production	Target	Ceiling	Qty
Lot XII Procurement	270.6	N/A	372*

Raytheon Company
Bedford, MA
F08635-89-C-0037, FFP**
Award: December 22, 1989
Definitization: December 22, 1989 (Full Go-Ahead)

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
270.6	N/A	372	270.6	270.6

** CPR data is not required on Firm Fixed Price (FFP) Contracts.

Change Explanation: This is the first SAR submission for this contract. Target Price includes identified funding of $12.3 million for 13 USN missiles, and $2.4 million (FMS GY Case) for 3 missiles and associated support.

	Initial Contract Price		
AMRAAM Low Rate Initial Production	Target	Ceiling	Qty
(LRIP) Lot II Procurement	258.9	292.1	200

Raytheon Company
Bedford, MA
F08635-88-C-0116, FPIF
Award: July 15, 1988
Definitization: July 15, 1988 (Full Go-Ahead)

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
264.4	298.3	200	264.4	264.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (Oct 89)	-0.6	-34.9
Net Change	N/A	N/A
Cumulative Variance Change Percent	N/A	N/A

15. Contract Information (continued):

b. PRODUCTION (continued)

AMRAAM (AIM-120A):

AMRAAM Low Rate Initial Production
(LRIP) Lot II Procurement
Raytheon Company
Bedford, MA
F08635-88-C-0116, FPIF (continued)

Change Explanation: Target Price increased due to incorporation of: Interim Contractor Support; Follow-on Trade Studies and Analysis; and miscellaneous engineering changes. Cost variance - Artificial positive trend due to level-of-effort work accruing earned value (BCWP) as time passes, while actual costs (ACWP) are not accuring because the work is not in progress. Schedule Variance - (-25.3%) Heavy emphasis on Lot I missile deliveries to meet Initial Operational Capability has caused delays in Lot II effort. Subsequent late vendor material deliveries and configuration changes are also contributing. Impact to the Program: The delivery schedule for Lot II is now projected for June 1990 thru February 1991.

	Initial Contract Price		
AMRAAM Low Rate Initial Production	Target	Ceiling	Qty
(LRIP) Lot I Procurement	152.8	175.8	75

Raytheon Company
Bedford, MA
F08635-87-C-0065, FPIF/FFP
Award: October 30, 1987
Definitization: October 30, 1987 (Full Go-Ahead)

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
178.4	196.5	75	180.6	178.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	+7.1	-16.9
Cumulative Variances to Date (Oct 89)	+1.6	= 9.3
Net Change	-5.5	+7.6
Cumulative Variance Change Percent	-77.5%	+45.0%

15. (U) Contract Information (continued):

b. PRODUCTION (continued)

AMRAAM (AIM-120A):

AMRAAM Low Rate Initial Production
(LRIP) Lot I Procurement
Raytheon Company
Bedford, MA
F08635-87-C-0065, FPIF/FFP (continued)

Change Explanation: Target Price increased due to incorporation of: technical support/assistance restructure; missile data updates; special test equipment modifications; incorporation of software revisions; and miscellaneous small engineering changes. Cost Variance - Artificial positive variance is due to level-of-effort work accruing earned value (BCWP) prior to the actual performance of the work. The contract was scheduled to complete in October 1989, but due to the difficulties expressed in the schedule variance explanation, the contract is now expected to complete in May 1990. Schedule Variance - Raytheon is currently projecting completion of missile deliveries in May 1990 (seven (7) months behind schedule). Delays are due to vendor quality problems and high frequency hybrid manufacturing difficulties. Impact to the Program: The delivery schedule for Lot I is currently projected to complete in May 1990.

16. [redacted] Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status

(1) Percent Program Completed: 63.6% (14 yrs/22 yrs)

(2) Percent Program Cost Appropriated: 29.0% ($4,315.7/$14,885.4)

b. Appropriation Summary

(Then-Year Dollars in Millions)

Appropriation	Prior Years	Budget Year	Budget Year	Balance to Complete	Total
	(FY77-89)	(FY90)	(FY91)	(FY92-98)	
RDT&E	1114.5	21.9	29.2	175.2	1340.8
Procurement	2372.1	807.2	1338.4	9026.9	13544.6
MILCON					0.0
Total	3486.6	829.1	1367.6	9202.1	14885.4

16. [redacted] Program Funding Summary: (continued)

c: Annual Summary

Fiscal Year	Qty	Flyaway FY78 Dollars		Total	Total Then-Year Dollars			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
Appropriation: RDT&E (Air Force/Navy)								
1977				5.0	4.8	4.8	4.8	--
1978				12.5	12.7	12.7	12.7	6.0
1979				30.6	34.4	34.4	34.4	8.4
1980				42.7	53.5	53.5	53.5	9.4
1981				34.0	47.1	47.1	47.1	11.9
1982				95.1	140.9	140.9	140.9	9.2
1983				138.0	213.8	213.8	213.8	4.9
1984				122.9	197.9	197.9	197.9	3.8
1985				127.1	211.1	211.1	211.1	3.4
1986				55.0	93.8	93.8	93.8	2.8
1987				24.2	42.7	42.7	33.2	2.7
1988				27.1	49.3	49.3	19.2	3.1
1989				6.6	12.5	12.2	7.0	4.2
1990				11.0	21.9	0.8	0.1	4.0
1991				14.2	29.2	--	--	4.2
1992				16.1	34.5	--	--	4.0
1993				14.9	32.9	--	--	3.7

* Obligations and Expenditure information contained in this report is from from program office records as of December 31, 1989.

16. (U) Program Funding Summary: (continued)

c: Annual Summary

Fiscal Year	Qty*	Flyaway FY78 Dollars		Total	Total Then-Year Dollars			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E (Air Force/Navy)								
1994				13.8	31.5	--	--	3.4
1995				17.9	42.2	--	--	3.1
1996				13.4	32.6	--	--	3.1
1997				0.6	1.5	--	--	3.1
Subtotal	0	**	**	822.7	1340.8	1115.0	1069.5	

* Obligations and Expenditure information contained in this report is from from program office records as of December 31, 1989.

** Not Available

16. (U) Program Funding Summary: (continued)

c: Annual Summary

Fiscal Year	Qty	Flyaway FY78 Dollars		Total	Total Then-Year Dollars			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
Appropriation: Procurement (Air Force/Navy)								
1984	--	15.2	--	15.2	27.8	27.8	27.8	8.0
1985	--	37.4	--	37.4	69.8	69.8	65.2	3.4
1986	--	69.7	--	98.6	191.1	191.1	184.9	2.8
1987	180	80.6	199.5	283.4	570.3	570.3	379.7	2.7
1988	400	85.8	250.4	323.4	677.2	575.5	186.9	3.1
1989	900	64.5	305.2	379.6	835.9	675.8	40.9	4.2
1990	900	58.8	266.6	353.0	807.2	8.5	0.0	4.0
1991	1800	84.6	430.5	564.5	1338.4	--	--	4.2
1992	3000	84.6	563.3	682.9	1674.5	--	--	4.0
1993	3000	49.9	488.2	551.3	1394.7	--	--	3.7
1994	3000	26.1	435.3	472.3	1232.3	--	--	3.4
1995	3000	30.0	421.5	475.3	1278.6	--	--	3.1
1996	3000	27.1	408.9	470.7	1305.3	--	--	3.1
1997	3000	26.5	396.1	436.2	1247.3	--	--	3.1
1998	2140	16.2	286.0	303.3	894.2	--	--	3.1
Subtotal	24320	756.8	4451.6	5447.1	13544.6	2118.8	885.4	
Total	24320			6269.8	14885.4	3233.8	1954.9	

* Obligations and Expenditure information contained in this report is from from program office records as of December 31, 1989.

16. Program Funding Summary: (continued)

c: Annual Summary

Fiscal Year	Qty	Flyaway FY78 Dollars		Total Then-Year Dollars				Escl Rate (%)
		Nonrec	Rec	Total	Program	Obligated *	Expended *	
Appropriation: RDT&E (Air Force)								
1977				5.0	4.8	4.8	4.8	--
1978				6.6	6.7	6.7	6.7	6.0
1979				14.3	16.1	16.1	16.1	8.4
1980				20.9	26.2	26.2	26.2	9.4
1981				16.5	22.9	22.9	22.9	11.9
1982				92.9	137.6	137.6	137.6	9.2
1983				135.2	209.5	209.5	209.5	4.9
1984				118.4	190.6	190.6	190.6	3.8
1985				122.4	203.3	203.3	203.3	3.4
1986				52.5	89.6	89.6	89.6	2.8
1987				21.4	37.7	37.7	29.2	2.7
1988				14.6	26.6	26.6	11.2	3.1
1989				0.0	0.0	0.0	0.0	4.2
1990				7.5	14.9	0.0	0.0	4.0
1991				12.4	25.5	--	--	4.2
1992				14.4	30.8	--	--	4.0

* Obligations and Expenditure information contained in this report is from from program office records as of December 31, 1989.

16. (U) Program Funding Summary: (continued)

c: Annual Summary

Fiscal Year	Qty	Flyaway FY78 Dollars		Total	Total Then-Year Dollars			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
Appropriation: RDT&E (Air Force)								
1993				14.1	31.2	--	--	3.7
1994				13.8	31.5	--	--	3.4
1995				13.2	31.1	--	--	3.1
1996				12.6	30.6	--	--	3.1
1997				0.0	0.0	--	--	3.1
Subtotal	94	**	**	708.7	1167.2	971.6	947.7	

* Obligations and Expenditure information contained in this report is from from program office records as of December 31, 1989.

** Not Available

16. [redacted] Program Funding Summary: (continued)

c: Annual Summary

Fiscal Year	Qty	Flyaway FY78 Dollars		Total	Total Then-Year Dollars			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
Appropriation: Procurement (Air Force)								
1984	--	15.2	--	15.2	27.8	27.8	27.8	8.0
1985	--	37.4	--	37.4	69.8	69.8	65.2	3.4
1986	--	69.7	--	98.6	191.1	191.1	184.9	2.8
1987	180	80.6	199.5	283.4	570.3	570.3	379.7	2.7
1988	400	85.8	250.4	323.4	677.2	575.5	186.9	3.1
1989	874	58.1	298.5	363.8	801.1	661.9	35.3	4.2
1990	815	44.9	237.0	305.5	698.6	5.8	0.0	4.0
1991	1250	60.9	301.9	386.1	915.5	--	--	4.2
1992	1800	53.4	336.8	414.3	1015.9	--	--	4.0
1993	1800	30.4	296.2	331.7	839.1	--	--	3.7
1994	1800	16.1	265.4	283.7	740.3	--	--	3.4
1995	1800	17.0	252.6	282.5	759.9	--	--	3.1
1996	1800	15.6	245.0	283.5	786.2	--	--	3.1
1997	2449	16.8	322.4	340.4	973.3	--	--	3.1
1998	2140	16.2	286.0	303.3	894.2	--	--	3.1
Subtotal	17108	618.1	3291.6	4052.8	9960.3	2102.2	879.8	
Total	17202	--	--	4761.5	11127.5	3073.8	1827.5	

* Obligations and Expenditure information contained in this report is from from program office records as of December 31, 1989.

16. Program Funding Summary: (continued)

c: Annual Summary

Fiscal Year	Qty	Flyaway FY78 Dollars		Total	Total Then-Year Dollars			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
Appropriation: RDT&E (Navy)								
1978				5.9	6.0	6.0	6.0	6.0
1979				16.3	18.3	18.3	18.3	8.4
1980				21.8	27.3	27.3	27.3	9.4
1981				17.5	24.2	24.2	24.2	11.9
1982				2.2	3.3	3.3	3.3	9.2
1983				2.8	4.3	4.3	4.3	4.9
1984				4.5	7.3	7.3	7.3	3.8
1985				4.7	7.8	7.8	7.8	3.4
1986				2.5	4.2	4.2	4.2	2.8
1987				2.8	5.0	5.0	4.0	2.7
1988				12.5	22.7	22.7	8.0	3.1
1989				6.6	12.5	12.2	7.0	4.2
1990				3.5	7.0	0.8	0.1	4.0
1991				1.8	3.7	--	--	4.2
1992				1.7	3.7	--	--	4.0
1993				0.8	1.7	--	--	3.7
1994				0.0	0.0	--	--	3.4

* Obligations and Expenditure information contained in this report is from from program office records as of December 31, 1989.

16. (U) Program Funding Summary: (continued)

c: Annual Summary

Fiscal Year	Qty	Flyaway FY78 Dollars		Total	Total Then-Year Dollars			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
Appropriation: RDT&E (Navy)								
1995				4.7	11.1	--	--	3.1
1996				0.8	2.0	--	--	3.1
1997				0.6	1.5	--	--	3.1
Subtotal	17	**	**	114.0	173.6	143.4	121.8	

* Obligations and Expenditure information contained in this report is from from program office records as of December 31, 1989.

** Not Available

16. (U) Program Funding Summary: (continued)

c: Annual Summary

Fiscal Year	Qty	Flyaway FY78 Dollars		Total	Total Then-Year Dollars			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
Appropriation: Procurement (Navy)								
1989	26	6.3	6.8	15.8	34.8	13.9	5.6	4.2
1990	85	13.9	29.5	47.5	108.6	2.7	0.0	4.0
1991	550	23.7	128.6	178.4	422.9	--	--	4.2
1992	1200	31.2	226.5	268.6	658.6	--	--	4.0
1993	1200	19.4	192.0	219.6	555.6	--	--	3.7
1994	1200	10.0	170.0	188.6	492.0	--	--	3.4
1995	1200	12.9	168.9	192.8	518.7	--	--	3.1
1996	1200	11.5	163.9	187.2	519.1	--	--	3.1
1997	551	9.7	73.8	95.8	274.0	--	--	3.1
1998	0	0.0	0.0	0.0	0.0	--	--	3.1
Subtotal	7212	138.7	1160.0	1394.3	3584.3	16.6	5.6	
Total	7229			1508.3	3757.9	160.0	127.4	

* Obligations and Expenditure information contained in this report is from from program office records as of December 31, 1989.

17. Production Rate Data

a. Annualized Production Rates:

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1985	249			
1986	1067			
1987	1964	196.4 1/	131.7 2/	131.7 2/
1988	3000	400	542.9 3/	542.9 3/
1989	3000	1270	948.3 4/	948.3 4/
1990	3000	2550	900	900
1991	3000	2255	1800	1800
1992	3000	2420	3000	3000
1993	3000	3000	3000	3000
1994	3055	3000	3000	3000
1995		3000	3000	3000
1996		3000	3000	3000
1997		3245	3000	3000
1998			3000	3000

1/ Funded delivery period is 11 months
2/ Funded delivery period for Hughes is 16 months and Raytheon is 17 months
3/ Funded delivery period for Hughes is 12 months and Raytheon is 7 months
4/ Funded delivery period for Hughes is 11 months and Raytheon is 12 months

17. Production Rate Data (continued)

b. Cost Variance:

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less max)	Maximum Economic
Prog Acq Cost (BY$)	5102.3	1167.5	6269.8	0.0	6269.8
Prog Acq Cost (TY$)	11199.2	3686.2	14885.4	0.0	14885.4
PAUC 1/ (BY$)	0.209	0.049	0.258	0.000	0.258
PAUC 1/ (TY$)	0.458	0.154	0.612	0.000	0.612

c. Schedule Variance:

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less max)	Maximum Economic
Start Date (Mo/Yr)	12/86	N/A	12/86	N/A	12/86
Duration (in Mos)	164	12	176	0	176
End Date (Mo/Yr)	07/99	N/A	07/00	N/A	07/00

1/ This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation.

17. (U) Production Rate Data (continued)

d. Deliveries (Plan/Actual):

	To Date
RDTE	99/99
Procurement	107/107

e. Approved Design to Cost Goal:

(Average Unit Flyaway Cost)

	Development Estimate	Current Estimate	Latest Approved Threshold*
Air Force			
Qty: 17,108			
Peak Rate: 250/mo			
FY78 Base-Year $	0.154	0.229	0.229
Then-Year $	0.397	0.562	0.562
Navy			
Qty: 7,212			
Peak Rate: 250/mo			
FY78 Base-Year $	0.122	0.180	0.180
Then-Year $	0.315	0.463	0.463

* Program Funding and Quantities reflect the FY91 Amended President's Budget, as adjusted for FY90 Congressional Actions.

18. (U) Operating and Support Costs:

a. (U) Assumptions and Groundrules --

The AMRAAM concept of operation is an all-weather, radar-guided, all-environment tactical missile for use on F-14, F-15, F-16, and F/A-18 aircraft. The AMRAAM will replace the AIM-7 and be integrated and maintained using existing support resources with no additional manpower requirements. The All-Up-Round (AUR) maintenance concept calls for aircraft loading/unloading, removal/replacement of wings and fins and Built-In-Test (BIT) within the missile. A missile failing BIT will be sent to the Intermediate-Level Shop for test verification on the Missile BIT Test Set (MBTS). For the Navy, the missile will be downloaded/uploaded on a different station or aircraft to verify missile failure. Failed missiles, AF or Navy, will be returned to a Naval Weapons Station (NWS) for failure confirmation and isolation to the failed missile section. Defective sections will be returned to the AMRAAM depot for repair (Naval Aviation Depot, Alameda, CA).

The O&S costs are the direct costs for the tactical missile and the Load Trainer/Captive Carry Missile (LT/CCM) associated with operating, supporting, and maintaining the AMRAAM missile over a fifteen (15) year deployment phase starting in FY 1990 for the AF and FY 1992 for the Navy. The AF estimate covers base operations including Load Trainer/Captive Carry Missile (LT/CCM), AUR fault verification, operational firings, depot repairs (five (5) year Interim Contractor Support (ICS)), supply/item management, transportation, replenishment spares, and field software updates. The Navy estimate includes AMRAAM fleet operations and support, intermediate maintenance (NWS), depot rework (two (2) years ICS), technical support (fleet support, engineering services, quality surveillance, program management), supply support, replenishment spares, and contractor augmented support.

b. (U) Costs -- (1984 Base Year Dollars in Thousands - 15 Years)

Cost Element	AIR FORCE	Cost Element	NAVY
Operations	$182,193	Operations	$16,459
Below Depot	1,496	Indirect Cost	5,694
Installation Spt	156	Intermediate Maint	59,522
Depot Maint	34,417	Depot Rework	39,736
Depot Supply	39,822	Tech Spt	52,929
Transportation	10,409	Supply Spt	4,496
Personnel Spt	10,372	Sustaining Inv	88,178
Sustaining Inv	79,129	Contr Augmtd Spt	10,825
Total	$357,994	Total	$277,839

18. (U) Operating and Support Costs: (con't)

c. (U) Contractor Support Costs -- (Current (Then-Year) Dollars in Millions)

Funding	FY 1989 & Prior	FY 1990 Year	FY 1991 Year	Balance To Complete	Total
O&M (USAF)	$0.1	$1.1	$1.9	TBD	$ 3.1
Industrial Fund	0.0	0.0	0.0	TBD	0.0
Total	$0.1	$1.1	$1.9	TBD	$ 3.1

SAR-89-057

AF-15 IUS
SAF/PAS

89-099 -T
#13

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: IUS

AS OF DATE: DECEMBER 31, 1989

INDEX

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FOR OPEN PUBLICATION
MAR 1 1990
DIRECTORATE FOR FREEDOM OF INFORMATION
AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

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1. Designation and Nomenclature (Popular Name): Inertial Upper Stage (IUS)

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:
   Upper Stages Program Office
   Space Division
   Los Angeles AFB, CA 90009
   PM: Col Norman Buchanan
   Assigned: 30 Sep 88
   AUTOVON: 833-1480
   Commercial: (213) 643-1480

4. Program Elements/Procurement Line Items:

RDT&E:	PE64411F	(Shared Funding)
	PE63411F	(Shared Funding)
	PE35171F	(Shared Funding)
PROCUREMENT:	APPN 3020	ICN MLASUP
MILCON:	PE12449F	(Shared Funding)

5. Related Programs:
   Space Transportation System (STS - NASA), Titan IV, Defense Satellite Communications System (DSCS), Defense Support Program (DSP), NASA scientific and communications satellites, Air Force Special Projects (SP)

6. **Mission and Description:**

The Inertial Upper Stage (IUS) is a two-stage, solid propellant, high altitude rocket booster. It can be used in conjunction with the Space Transportation System (Shuttle) or Titan IV launch vehicle. It is used to deploy payloads from low earth orbit to a higher energy mission orbit. These orbits are higher than the Space Shuttle or Titan IV rocket alone can provide. The primary users are NASA and DOD. The IUS replaced the Transtage as the primary upper stage vehicle.

7. **Program Highlights:**

a. Significant Historical Developments -- In April 1972, the Inertial Upper Stage was born as the NASA concept of the "Space Tug". By October 1973, the Air Force had assumed responsibility for what was then called the "Interim Upper Stage" with the agreement that NASA requirements would be accommodated.

The concept validation phase began in 1975 and resulted in selection of the solid rocket motor (SRM) concept for the now designated Inertial Upper Stage. It was agreed that the IUS would support DOD/NASA missions in the 1980 - 1986 time frame. In 1976 Boeing Aerospace Company won the competition to develop the IUS, commencing the 18-month-long validation phase. In this time period, the IUS grew from the idea of adapting an existing stage to the concept of developing a new generic upper stage to accommodate improved reliability parameters and increased mission requirements.

The program moved into Full-Scale Development in 1978 with Boeing Aerospace Company as the prime contractor. Component and vehicle qualification testing was completed in mid 1982, ending with 26 consecutive successful solid rocket motor firings. The contract was awarded for nine vehicles with heavy emphasis on reliability and system redundancy. At that time, poor cost and schedule performance as well as inexperience in procuring high qualification piece parts led to significant cost overruns and, subsequently, to two separate contract restructures. Six of those FSD vehicles have been launched. In October 1982, a 3871-lb. DSCS II/III satellite package launched on a Titan 34-D booster was completely successful. The second launch, in April 1983, was a NASA TDRS-A satellite in the first IUS/Shuttle mission. Although the payload reached nominal mission orbit, in-flight technical problems initiated the 'IUS Anomaly Recovery Plan' and led to the third restructure of the FSD contract. Eventually, the problem was successfully identified and resolved. The third FSD IUS launch was a NASA TDRS satellite aboard the Space Shuttle "Challenger", discussed below. In September 1988 the fourth FSD vehicle deployed a NASA TDRS satellite from the STS marking an end to the two-and-a-half year standdown caused by the Challenger disaster. The most recent FSD vehicle launches are described in subparagraph b. below.

In 1983, the program entered into a follow-on production contract(F04701-82-C-0110). The total quantity to be produced was reduced from 18 to 10 due to the transfer of some payloads to the Centaur Upper Stage. The procurement strategy was also changed to annual buy. Thus far, three of those production vehicles have flown payloads successfully to nominal mission altitudes from the Space Shuttle park orbit. On 6 Feb 1984, the Secretary of the Air Force determined that the production quantity decrease from 18 to 10 vehicles would result in a Program Acquisition Unit Cost (PAUC) breach and notified Congress.

7. Program Highlights (Cont'd)

In 1985 the IUS successfully launched a number of classified payloads. In September of that year, the program began work on the second follow-on production and launch services contract(F04701-85-C-0101) to produce three IUS vehicles to be delivered in 1988 and 1989. Two of these vehicles have been flown. On 28 January 1986 the Space Shuttle orbiter "Challenger" exploded moments after takeoff which caused the IUS and its NASA payload to be completely destroyed before deployment.

In December 1986, the IUS program was directed to compete the acquisition of five Upper Stage Vehicles (USV) for the Defense Support Program's (DSP) satellites 18-22. The IUS program was to fund only four of these vehicles. In July, the Inertial Upper Stage was selected, and negotiations began. The buy of five IUS vehicles intended for DSP satellites 18-22 was subsequently canceled due to an initiative presented to the SAF in October known as Atlas II. Direction was received to remove five Defense Satellite Communication Systems (DSCS) payloads (ten satellites) from the shuttle and to fly on Atlas II. This allowed the IUS program to dedicate these IUS vehicles to DSP satellites 18-22.

In FY88, the IUS program procured a user-funded IUS in a stand-alone buy of one vehicle. The contract was awarded to Boeing Aerospace. The program is also procuring three new IUS vehicles in FY 93 with advance procurement in FY 92. These vehicles will be used to support DSP requirements.

b. Significant Developments Since Last Report -- Since the last SAR report was submitted, there have been five IUS missions. Two of the four remaining FSD vehicles were successfully flown. One of the vehicles from the follow-on production contract(F04701-82-C-0110) launched a NASA TDRS satellite from the STS. In May and October two IUS' successfully launched the NASA interplanetary probes Magellan and Galileo, respectively. These IUS' were the first two flown of the nine procured in the second follow-on production and launch services contract(F04701-85-C-0101). Also included in these missions was the successful first launch of an IUS from a Titan IV launch vehicle.

The Inertial Upper Stage system is expected to satisfy mission requirements.

c. Changes Since "As of" Date -- None.

8. Threshold Breaches:

There is no approved DAE baseline for this program.

9. Schedule:

a. Milestones --

	Development Estimate	Approved Program	Current Estimate
JRMB II (Full Scale Dev.)	Mar 78	N/A	Mar 78
Development Contract Award	Mar 78	N/A	Mar 78
Engine Qualification Test			
(1) Titan Configured	Oct 82	N/A	Oct 82
(2) STS Configured	Jan 83	N/A	Jan 83
First Flight Vehicles			
(1) Titan Configured	Oct 82	N/A	Oct 82
(2) STS Configured	Mar 83	N/A	Mar 83
First Production Contract Award	Jan 83	N/A	Jan 83

9. Schedule (Cont'd)

a. Milestones (Contd) --

	Development Estimate	Approved Program	Current Estimate
Initial Launch Capability (ILC)*			
(1) Titan Configured	Oct 82	N/A	Oct 82
(2) STS Configured	Mar 83	N/A	Apr 83
Delivery of First Production Contract Vehicle	Nov 83	N/A	Jan 84
Awarded Follow-On Production Contract	N/A	N/A	Jul 85
Change Proposal to Contract (add 1 vehicle)	N/A	N/A	Aug 88
Award Follow-On Launch Contract	N/A	N/A	Jul 90
Delivered Last Production Vehicle	N/A	N/A	Feb 91

*ILC is defined as the first IUS launch of each configuration.

b. Previous Change Explanations -- The initial launch of an STS configured IUS was delayed from March 1983 to April 1983 due to Shuttle related technical problems. The first production vehicle delivery was delayed until after the anomaly investigation and subsequent design changes.

c. Current Change Explanations -- None.

d. References --

Development Estimate: PMD R-S 5068(26), 2 December 1982, Space Transportation System; R-S 7123(10), 21 June 1982, Space Launch Support.

Approved Program: There is no DAE approved Baseline for this program.

10. Technical/Operational Characteristics:

	Dev Est	Approved Program Goals/Thresholds	Demonstrated Performance	Current Estimate
a. Technical				
Reliability (%)				
(1) Titan 34D	96	N/A	100.0	99.3
(2) Space Shuttle	96	N/A	87.5	98.5
(3) Titan IV	96	N/A	100.0	99.3
Accuracies				
(1) GSO Position (NM)	+/-92	N/A	+/-10.5	+/-91
(2) GSO Velocity (ft/s)	+/-78	N/A	+/- 7.8	+/-38
(3) GSO Inclination (Degrees)	+/-0.12	N/A	+/- 0.078	+/-0.10
b. Operational				
Payload Wt. to Geosynch. Orbit (GSO) from the Space Shuttle (lb.) (park orbit @ 175 NM)	5,000	N/A	5,133	5,137
Payload Wt. to GSO from Titan 34D (lb.)	4,000	N/A	3,871	3,853
Payload Wt. to GSO from Titan IV (lb.) (park orbit @ 87 x 140 NM)	5,300	N/A	5,163	5,282

10. Technical/Operational Characteristics (Cont'd)

c. Previous Change Explanations —

Payload Wt. to GSO for the STS and Titan changed from 5000 to 5133 and from 4000 to 4008 respectively, due to an extendable exit cone on the second stage solid rocket motor that increases thrust, and weight reduction engineering changes. Reliabilities for the Titan and the STS changed from 96% to 99.3% and 96% to 98.5% respectively and reflect maximum use of high reliability piece parts, stringent test requirements, and redundancy. In addition, all probable single point failures have been eliminated. The 87.5% demonstrated performance for the STS reflected 7 of 8 missions being said to be 100% successful. Position, velocity and inclination first changed from +/- 92 NM, 78 ft/s and 0.12 degrees to +/- 58 NM, 50 ft/s and 0.055 degrees respectively, due to the use of sophisticated gamma guidance techniques. In 1985, they became +/-28.0 NM, 7.8 ft/s and 0.02 degrees. The newer parameters were taken from STS missions as opposed to Titan 34D. The estimated payload weight to GSO from the Space Shuttle changed from 5089 pounds to 5002 pounds. There are two causes: 1. SRM-1 and SRM-2 specific impulses are approximately 0.5% lower than predicted (accounting for about 45 pounds). 2. Vehicle weight increased due to the IUS anomaly fix (accounts for about 40 pounds). The estimated payload weight to GSO on the Titan 34D changed from 4000 to 3924 to reflect the maximum predicted satellite payload weight. The SRM-1 and SRM-2 specific impulse change (see (1) above) accounts for about 35 pounds. The current estimate of 3853 pounds will still accommodate all payload requirements aboard Titan 34D. New entries for Titan IV were added. The Titan IV is a new expendable launch vehicle compatible with the IUS. The Titan IV missions flown were all successful. To compensate for the degradation of the Space Shuttle's park orbit, design enhancements will be implemented in order to achieve the current estimate of IUS performance (5250 lb from a park orbit of 216 n.mi.). There are two reasons for the decrease of the current IUS-Titan IV performance estimate : (a) completion of booster analyses resulting in decreased Titan performance estimates, and (b) implementation of dual string Tracking, Telemetry, and Control avionics hardware on IUS. The IUS performance estimate has decreased from 5250 to 5137 due to degradation of the Shuttle's park orbit. The IUS-Titan IV current performance estimate has decreasd due to a degradation in the Titan IV performance estimate.

d. Current Change Explanations — None.

e. References —

Development Estimate: PMD R-S 5068(26), 2 December 1982, Space Transportation System; R-S 7123(10), 21 June 1982, Space Launch Support.

Approved Program: There is no approved DAE baseline for this program.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost —	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	$424.2	N/A	$429.3
Procurement	533.6	N/A	401.8
Flyaway	(437.0)	N/A	(321.0)
Other	(96.6)	N/A	(80.8)
Initial Spares	(-)	N/A	(-)
Construction (MILCON)	5.2	N/A	4.6
Total FY 75 Base-Year $	$963.0	N/A	$835.7
Escalation	1049.3	N/A	842.5
Development (RDT&E)	(269.0)	N/A	(272.3)
Procurement	(777.2)	N/A	(567.5)
Construction (MILCON)	(3.1)	N/A	(2.7)
Total Then-Year $	$2012.3	N/A	$1678.2
b. Quantities —			
Development (RDT&E)	1	N/A	1
Procurement	17	N/A	10
Total	18	N/A	11

c. Foreign Military Sales -- None

d. Nuclear Costs — None

e. References --
Development Estimate: PMD R-S 5068(26), 2 December 1982, Space Transportation System; R-S 7123(10), 21 June 1982, Space Launch Support.
Approved Program: There is no DAF baseline.

12. Program Acquisition/Current Procurement Unit Cost Summary:(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition —	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	1678.2	1632.9	1678.2
(2) Quantity	11	11	11
(3) Unit Cost	152.564	148.445	152.564
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	26.7	26.7	14.3
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	26.7	26.7	14.3
(2) Quantity	0	0	0
(3) Unit Cost	N/A	N/A	N/A

13. Cost Variance Analysis:

a. Summary — (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	693.2	1310.8	8.3	2012.3
Previous Changes:				
Economic	-3.2	-13.3	-	-16.5
Quantity	-	-489.3	-	-489.3
Schedule	-	-	-	-
Engineering	+42.7	+66.8	-	+109.5
Estimating	-45.7	+77.7	-1.0	+31.0
Other	-	-	-	-
Support	+8.1	-22.2	-	-14.1
Subtotal	+1.9	-380.3	-1.0	-379.4
Current Changes:				
Economic	+0.8	+21.7	-	+22.5
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+5.7	+11.2	-	+16.9
Other	-	-	-	-
Support	-	+5.9	-	+5.9
Subtotal	+6.5	+38.8	-	+45.3
Total Changes	+8.4	-341.5	-1.0	-334.1
Current Estimate	701.6	969.3	7.3	1678.2

(FY 1975 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	424.2	533.6	5.2	963.0
Previous Changes:				
Quantity	-	-177.8	-	-177.8
Schedule	-	-	-	-
Engineering	+18.6	+23.0	-	+41.6
Estimating	-19.1	+23.3	-0.6	+3.6
Other	-	-	-	-
Support	+3.2	-7.1	-	-3.9
Subtotal	+2.7	-138.6	-0.6	-136.5
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+2.4	+4.5	-	+6.9
Other	-	-	-	-
Support	-	+2.3	-	+2.3
Subtotal	+2.4	+6.8	-	+9.2
Total Changes	+5.1	-131.8	-0.6	-127.3
Current Estimate	429.3	401.8	4.6	835.7

13. Cost Variance Analysis (Cont'd)

b. Previous Change Explanations --

RDT&E

Economic: Revised economic escalation indices.

Engineering: Increase to implement design enhancements specific to the DSP satellite to improve performance.

Estimating: Changes to absorb the impact of revised economic rates in prior years. Launch mission model changes caused launches to be spread over more years than planned. Elimination of performance improvements to increase the IUS payload throw weight. Design changes due to on-orbit anomaly experienced in April 1983. Over estimated development activity associated with the IUS-1 anomaly. Additional analysis of first flight after anomaly. Additional tasks associated with integrating IUS-4, 6 and 8 to a Titan IV. Adjustment of engineering support to reflect NASA buy of additional IUS vehicles. Adjustment for addition of Space Launch Recovery funds. Under estimated IUS development costs due to standdown. Over estimated IUS development costs associated with increased performance. Re-estimated IUS development costs due to standdown. Budget authority withdrawn due to inability to accomplish development of upgraded IUS, new batteries and new computers in the near future. Re-estimated development costs for software and hardware associated with three new vehicles.

Support: Additional 2 years of technical effort (1991 and 1992).

Procurement

Economic: Revised economic escalation indices.

Quantity: Deletion of ten vehicles. Increase of four vehicles. Deletion of four vehicles. Increase of three vehicles.

Engineering: Engineering changes associated with ten deleted vehicles. Engineering changes associated with IUS Useful Life Extension Program and Solid Rocket Motor unit upgrade.

Estimating: Changed from multi-year to annual buy strategy. Engineering changes to second stage motors relating to on-orbit anomaly experienced in April 1983. Estimating changes associated with two deleted vehicles. Changed to an annual buy strategy. Cancellation of an STS to Titan Mod Kit. Reduction of production closeout. Contractor reduced the unit cost of IUS vehicles to be more competitive with Centaur. Decrease in IUS production costs due to favorable negotiations on Production and Launch Support Contract. Adjustment for prior year

13. Cost Variance Analysis (Cont'd)

b. Previous Change Explanations (Cont'd) —

escalation. Deleted IUS Titan-to-Shuttle conversion kits. Solid Rocket Motor replacement eliminated as a requirement. Reduced close-out costs to reflect actuals. Estimating category adjustment. Adjustment of engineering support to reflect NASA buy of additional IUS vehicles. Increased cost for hardware due to change in number of flights per year from 3 to 6. This increase was due to STS-51L disaster. Estimating changes applicable to four vehicles since baseline. Adjustment for addition of Space Launch Recovery funds. Correction of categorization and costs reflected in error in previous SAR. Estimating changes applicable to deletion of four vehicles. Over estimated production costs associated with IUS-1 anomaly. Under estimated costs associated with the follow-on IUS production contract. Changes to reflect Congressional rescissions based upon Shuttle launch slips. Additional funds for the Space Launch Recovery. Requalification of vendors for three new vehicles. Re-estimated costs of upgrading and replacing aging unit hardware and Space Launch Recovery costs. Miscategorized FY86 funds associated with IUS. Deletion of funds due to Congressional Appropriation caused by the inability to replace aging hardware in the near future.

Support: Support change associated with Quantity change. Federally funded Research Center support for extra years launches. Support category adjustment. Reduced IUS technical effort in FY 85-90 to a level consistent with an "Operational Program". Additional 2 years of technical effort in FY91 and FY92. Additional year of Aerospace Corp. support. Correction of categorization and costs reflected in error in previous SAR. Deletion of funds due to the inability to upgrade the Systems Integration Laboratory (SIL).

MILCON

Estimating: Adjustment for prior year actuals.

c. Current Change Explanations —

	(Dollars in Millions) Base-Year $	Then-Year $
(1) RDT&E		
Revised economic escalation indices. (Economic)	N/A	+0.8
Adjustment for current and prior year escalation. (Estimating)	+0.0	-0.1
Re-estimated IUS study costs due to termination of Flight Weight Engine Technology Program (XLR-132) funding. (Estimating)	+2.6	+6.3

13. Cost Variance Analysis (Cont'd)

c. Current Change Explanations (Cont'd)--

(Dollars in Millions)

	Base-Year $	Then-Year $
Reduced estimate to absorb increase resulting from Jan 90 economic escalation indices (Estimating)	-0.2	-0.5
(2) Procurement		
Revised economic escalation indices. (Economic)	N/A	+21.7
Adjustment for current and prior year escalation. (Estimating)	-0.1	-0.3
Re-estimated funds used for problems and upgrades. (Estimating)	+7.0	+18.3
Unforeseen use of funds for production support. (Estimating)	(+4.6)	(+12.2)
Unforeseen problem with Safe & Arm Device. (Estimating)	(+0.6)	(+1.5)
Unforeseen problem with Flight Terminations system. (Estimating)	(+0.9)	(+2.3)
Unforeseen addition of FM-FM Instrumentation. (Estimating)	(+0.5)	(+1.3)
Unforeseen Retrofit of Shielded Mild Detonator Cord. (Estimating)	(+0.4)	(+1.0)
Re-estimate due to increased risk.	-2.3	-6.7
Re-estimated cost of 3 vehicle buy. (Estimating)	-0.1	-0.1
Re-estimated cost of Computer Operating System (COS) upgrade. (Support)	+2.3	+5.9

(3) MILCON

No current changes.

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

Initial SAR/Development Estimate to Current Estimate

PAUC (Init SAR DEV Estim)	Changes								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Tptal	
111.794	+0.545	+26.660	-	+9.955	+4.355	-	-0.745	+40.770	152.564

15. Contract Information: (Then Year Dollars in Millions)

a. RDT&E — No RDT&E Contracts

b. Procurement--

IUS Vehicle:
Boeing Aerospace Company, Seattle, WA
F04701-82-C-0110, FPIF
Award: July 30, 1980
Definitized: January 27, 1983

Initial Contract Price		
Target	Ceiling	Qty
130.9	138.6	6

Cost reporting for this contract has ceased due to the fact that the contract is over 90% complete.

IUS Vehicle:
BoeingAerospaceCompany,Seattle, WA
F04701-85-C-0101, FPIF/AF/PI
Award: July 3, 1985
Definitized: September 11, 1985

Initial Contract Price		
Target	Ceiling	Qty
373.7	416.5	3

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
899.5	984.9	9 1/	895.0	957.8

1/ Note: The contract price as listed here should not be used in computing a unit price for the IUS. Almost half of this figure represents Launch Support which is budgeted for in O&M.

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-19.7	-64.9
Cumulative Variances To Date (11/23/89)	-25.1	-34.2
Net Change	- 5.4	+30.7
Cumulative Variance Change Percent —	-27.4%	+47.3%

Explanation of Changes:
Cost Variance - The cost variance is attributed to an increase in manufacturing labor costs, unforeseen design problems and changes in Major Purchase Equipment from the subcontractor (McDonnell Douglas), a greater use of production material than planned, and manufacturing problems at Boeing Electronic Co. (BECo).
Schedule Variance - The improvement in schedule variance was caused by Chemical Systems Division (CSD) shipping several behind-schedule parts. No impact to program or contract.

c. MILCON — No MILCON contracts.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status —

(1) Percent Program Completed: 78.9% (15 yrs/ 19 yrs)

(2) Percent Program Cost Appropriated: 79.2%($1329.4/$ 1678.2)

b. Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY76-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-94)	Total
RDT&E	669.7	13.0	4.8	14.1	701.6
Procurement	612.7	26.7	14.3	315.6	969.3
MILCON	7.3	-	-	-	7.3
Total	1289.7	39.7	19.1	329.7	1678.2

c. Annual Summary —

Fiscal Year	Qty	FY 75 Base-Year Dollars			Total Then Year Dollars			Escl Rate (%)
		Flyaway						
		Nonrec	Rec	Total	Program	Obligated*	Expended*	
Appropriation: RDT&E								
1976				4.5	4.9	4.9	4.9	7.0
1977				21.9	25.7	25.7	25.7	7.4
1978				55.0	69.8	69.8	69.8	7.0
1979				74.7	103.3	103.3	103.3	8.4
1980				64.2	98.8	98.8	98.8	9.4
1981				63.4	108.0	108.0	108.0	11.9
1982				24.1	43.9	43.9	43.9	9.2
1983				60.9	115.9	115.9	115.9	4.9
1984				18.1	35.8	35.8	35.8	3.8
1985				15.4	31.4	31.4	31.4	3.4
1986				5.3	11.1	11.1	10.0	2.8
1987				3.6	7.7	7.7	6.9	2.7
1988				1.7	3.9	3.8	3.8	3.1
1989				4.1	9.5	8.1	4.9	4.2
1990				5.4	13.0	0.3	0.0	4.0
1991				1.9	4.8			4.2
1992				2.2	5.8			4.0
1993				1.4	4.0			3.7
1994				1.5	4.3			3.4
Subtotal	1			429.3	701.6	668.5	663.1	

* Reflects Program Office values as of: 31 DEC 89

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	FY 75 Base-Year Dollars			Total Then-Year Dollars			Escl Rate (%)
		Flyaway						
		Nonrec	Rec	Total	Program	Obli-gated*	Ex-pended*	
Appropriation: Procurement								
1978			—	0.7	1.0	1.0	1.0	7.0
1979			—	35.6	54.6	54.6	54.6	8.7
1980			—	24.0	41.9	41.9	41.9	9.7
1981			—	8.8	16.8	16.8	16.8	11.9
1982	2		59.5	38.2	78.4	78.4	78.4	9.6
1983	2		33.8	38.7	84.1	79.5	79.5	9.0
1984			—	30.4	68.8	62.4	62.4	8.0
1985			—	38.8	90.0	90.0	53.2	3.4
1986	3		81.4	43.3	104.3	98.5	79.9	2.8
1987			—	2.8	7.0	7.0	3.4	2.7
1988			—	25.3	65.8	49.2	24.2	3.1
1989			—	0.0	0.0	0.0	0.0	4.2
1990			—	9.4	26.7	3.6	0.0	4.0
1991			—	4.9	14.3			4.2
1992			—	29.0	88.4			4.0
1993	3		146.3	60.4	189.8			3.7
1994			—	11.5	37.4			3.4
Subtotal	10		321.0	401.8	969.3	582.9	495.3	
Appropriation: MILCON								
1979				4.6	7.3	7.3	7.3	9.6
Subtotal				4.6	7.3	7.3	7.3	
Total	11			835.7	1678.2	1258.7	1165.7	

* Reflects Program Office values as of: 31 DEC 89

17. Production Rate Data:

No report. Production less than six per year.

18. Operating and Support Costs:

a. Not Available

b. Not Available

c. Contractor Support Costs - N/A

SAR-89-078

AF-19 LANTIRN

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: LANTIRN

AS OF DATE: December 31, 1989

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CLEARED
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FEB 28 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE
24

1. Designation and Nomenclature (Popular Name): Low Altitude Navigation and Targeting Infrared System for Night (LANTIRN)

2. DOD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

LANTIRN System Program Office
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433-6503

Col T. Westover
Assigned: 30 Jun 87
AUTOVON: 785-7273
(513) 255-7273

4. Program Elements/Procurement Line Items:

RDT&E: (3600) PE 0603249F
PE 0604249F

PROCUREMENT: APPN: 3010 PE 0207249F ICN # - NONE

MILCON: N/A

5. Related Programs: Infrared Maverick
F-16 Aircraft
F-15E Aircraft

SAF/PAS
90-099 -T
#22

6. Mission and Description: The LANTIRN program was initiated in August 1979 to develop a system to allow low altitude navigation and manual terrain following at night and under adverse weather, as well as automating target acquisition and weapon delivery tasks to allow a higher probability of a successful single pass attack. The LANTIRN system is composed of a wide field of view raster Head-Up Display (HUD) and an externally mounted Fire Control System (FCS) consisting of a Navigation Pod and a Targeting Pod. Both the HUD and FCS contracts were awarded competitively in 1980, July and September respectively. The first FSD HUD was delivered in February 1982, and the first FSD Navigation Pod was delivered in February 1983 with an FSD Targeting Pod following in June 1983. Direction was given in July 1984 to integrate the LANTIRN system on the F-15E aircraft. LANTIRN does not replace any current system.

LANTIRN is an integrated system. The HUD displays wide field of view infrared video imagery and terrain following cues. The Navigation Pod provides infrared video to the HUD for night navigation and contains Ku band terrain following radar. The Targeting Pod has the capability to track targets, automatically cue the AGM-65D IR Maverick missile to the target and interface with the aircraft to accomplish automatic AGM-65 delivery upon pilot consent. It also contains a laser designator/ranger for delivery of laser guided ordinance. The Targeting Pod has been designed with growth provisions for an automatic target recognizer.

7. Program Highlights:

a. Significant Historical Developments: Direction from HQ USAF for the LANTIRN Full Scale Development (FSD) program was issued in December 1979. The Request for Proposal was issued in February 1980 with a competitive source selection following from April-September 1980. Marconi Avionics Ltd. was awarded the Head-Up Display contract in July 1980. Martin Marietta Corporation was awarded the Fire Control System contract in September 1980. In 1984, the program was restructured to match the revised President's Budget for FY85, 86, and 87. Recognizing that the Targeting Pod would require more development work and testing before production, the Air Force allowed a one-year delay for Targeting Pod production in the restructure. During 1983 and 1984, the Navigation Pod successfully completed fifteen months of flight testing at Edwards AFB and two months flying over Canada, in a weather/terrain environment similar to Western Europe. The ability to fly very low at night and attack targets was fully demonstrated. In Feb 85, the Navigation Pod received AFSARC III production approval. The production contract was awarded to Martin Marietta Corporation on 1 Apr 85. In Jul 85, the program received direction to transfer the HUD portion of the system to the F-16 Program Office, where it will be supplied as contractor furnished equipment. In Sep 85, a highly successful AFSARC update report on IOT&E deficiencies/fixes took place. As a result, the first production option was exercised in Dec 85 for an additional seven Navigation Pods and four sets of intermediate level support equipment. In May 86, the AFSARC IIIA low rate production decision authority for an initial buy of 2 Targeting pods was received. In Nov 86, the Navigation Pod was approved for high rate production. Authority was received to procure 143 Nav Pods, 7 Targeting Pods and 6 sets of intermediate-level Support Equipment. In Nov 86, the LANTIRN system successfully demonstrated a dual Maverick Missile launch capability. The FY87 production option was awarded to Martin Marietta Corporation on 1 Dec 86. By the end of 1986 the LANTIRN FSD Targeting Pod had successfully completed all DT&E and IOT&E flight testing. The first flight of a development navigation pod on an F-15E took place in May 87. In Mar and Jun 87, the first and second production navigation pods were both delivered to the Air Force one month ahead of schedule. The LANTIRN system (navigation and target Pods) underwent Follow-on Test and

7. Program Highlights (Cont'd):

Evaluation during May-July 1987. The results presented by the Air Force Operational Test and Evaluation Center were positive. Flight test of the production navigation pod on the F-16 started in Aug 87. No major problems were encountered. The FY88 option for 169 navigation pods, 81 targeting pods and 12 sets of Support Equipment was fully awarded on 30 Dec 87 upon passage of the FY88 budget. A high rate production decision for the targeting pod was deferred until early FY89 to allow completion of the LANTIRN integration on the F-15E and weapons delivery testing on the F-16 aircraft. Deliveries were on time for the first eight production navigation pods and two production targeting pods. First operational demonstration sorties were flown on the F-15E aircraft. Authorization was received to enter targeting pod full-rate production. FY89 Option for 240 navigation pods, 231 targeting pods and four sets of Intermediate Level Support Equipment was exercised in December 1988. The FY90 President's Budget deleted 72 pod sets from the 700 pod set program.

b. Significant Developments Since Last Report: On time deliveries of production navigation pods 9 through 86, production targeting pods three through seven, and the third through ninth sets of Intermediate-Level Support Equipment. Required Assets Available (RAA) for the Navigation Pod was achieved at Seymour Johnson AFB NC in Sep 89. TAC has flown 138 F-16 LANTIRN sorties or 165.6 hours and 1481 F-15E LANTIRN sorties or 1921.3 hours and has achieved 96.9% and 97.5% effectiveness rates respectively. Air Force maintenance training was established at the Technical Training Center at Lowry AFB CO. The first three acquisition phases of the LANTIRN Computer integrated repair capability for Warner-Robins ALC have been awarded. This state-of-the-art Paperless LANTIRN Automated Depot (PLAD) includes quality and efficiency initiatives for digitized technical orders and a field failure data collection system. The FY 90-91 Amended President's Budget reduced the 628 Pod Set program to a 561 Pod Set program thus deleting an additional 67 Pod Sets. The FY90 Option for 120 targeting pods was exercised in Dec 89.

The LANTIRN system is expected to satisfy the mission requirement.

c. Changes since "As Of" Date: None.

8. Threshold Breaches: None.

9. Schedule:

a. Milestones --

	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
1. Program Initiation (PMD)	Dec 79	Dec 79	Dec 79
2. Contract Award (HUD)	Jul 80	NA	Jul 80
3. Contract Award (FCS)	Sep 80	NA	Sep 80
4. FCS Program Restructure	Sep 81	NA	Sep 81
5. HUD F-16 Flight Test Complete	Dec 82	NA	Dec 82
6. HUD A-10 Flight Test Complete	Dec 82	NA	Dec 82
7. HUD F-16 Production Decision	Jan 83	NA	Dec 84
8. HUD A-10 Production Decision	May 83	NA	
9. First FSD Navigation Pod Delivery	Feb 83	NA	Feb 83
10. First FSD Targeting Pod Delivery	Jul 83	NA	Jul 83
11. Auto Target Recognizer			
12. Adv Dev Tech Eval	Oct 84	NA	Oct 84
13. Competitive Targeting Pod Fly Off	Dec 84	NA	N/A
14. FCS F-16 Flight Test Complete	Dec 84	Mar 86	Mar 86

9. Schedule (Cont'd):

15.	Navigation Pod (FSD)			Sep 85(CH-1)
16.	Targeting Pod (FSD)			Mar 86(CH-1)
17.	Production Decision	Feb 85		N/A
18.	Navigation Pod		Mar 85	Mar 85
19.	Targeting Pod		May 86	May 86
20.	FCS F-15E Flight Test Complete (FSD)	May 88	NA	Mar 89(CH-1)
21.	FCS A-10 Flight Test Complete	Sep 87	NA	N/A
22.	First FCS Production Delivery	Aug 87	NA	N/A
23.	Navigation Pod		NA	Apr 87(CH-2)
24.	Targeting Pod		NA	Jun 88
25.	IOC	TBD		N/A
26.	Navigation Pod		FY89	Sep 89(CH-2)
27.	Targeting Pod		FY90	Sep 90(CH-3)

b. Previous Change Explanations:

Automatic Target Recognizer deleted. HUD F-16 Production Decision was delayed from Jan 83 to Feb 85 to reflect actual need, then changed to Dec 84. F-16 flight testing extended to allow additional time for flight test improvements. The August 1984 restructure delayed Targeting Pod program 1 year. F-15E was added to program scope. A-10 aircraft program changed to meet 1991 TAC IOC. A-10 Aircraft requirement has been deleted. Prior dates were Jul 88 for 8 and Dec 89 for 21. Additional time was required for flight test improvements. Date of actual production decision slipped from Feb 85 to Mar 85. Completion of IOT&E changed from Feb 86 to May 86. Changed IOC date for Nav Pod from TBD to FY89, and Target Pod from TBD to FY90 to reflect current contractual commitment. Changed item 23 and item 26 from TBD to current estimate to reflect contractual commitment. Completion of DT&E on F-15E aircraft (item 20) by both contractor and Air Force changed from Aug 88 to Mar 89. Change made to item 23 to reflect actual delivery of the Nav Pod one month early (Mar 87 vs Apr 87). Production decisions for navigation and targeting pods (items 14, 18 & 19) adjusted to reflect USD(A) baseline approval. Targeting pod (item 24) updated to reflect actual delivery one month early.

c. Current Change Explanations --

(CH-1) Milestone title modified (FSD added) to more accurately identify the milestone.

(CH-2) Corrects errors in last SAR to reflect actual dates of accomplishment.

(CH-3) Corrects error in last SAR.

d. References --

DEVELOPMENT ESTIMATE: Secretary of the Air Force Review 18 Nov 82. Original PMD R-00023(1)/63249F, 21 Dec 79.

APPROVED PROGRAM: DAE Baseline, 31 Dec 88.

10. Technical/Operational Characteristics:

a. Technical --	Dev Est	Approved Program Goal/ Threshold	Demon-strated Perf	Current Estimate
HUD				
Transmissivity (Percent)	70/65	NA	70/65	NA
Display Contrast (Ratio)	1.20	NA	1.38	NA
MTBF (Hours)				
Mature Requirement		NA	NA	NA
A-10	250	NA	NA	NA
F-16	250	NA	NA	NA
Field Projections				
Interim Goal (End of DT&E/IOT&E)	31	NA	40	NA
Mature Requirement (10,000 Hrs)	125	NA	NA	NA
Weight (Lbs)				
A-10	95	NA	95	NA
F-16	82	NA	80	NA
FCS				
Maximum Total Weight (lbs)	985	990/990 (CH-1)	953 (CH-2)	980 (Lot 3)
Terrain Following Altitudt	NA	200/200	NA	NA
Maximum Total AC Power (kilovolt amperes)	10.8	NA	14.8	14.8
FCS:				
Mature Requirement	50	NA	NA	NA
Field Projection				
Interim Threshold (end DT&E/IOT&E)	9	NA	NA	NA
Mature Requirement (10,000 hrs)	34	34	NA	NA
Navigation Pod:				
Lab Lower Test Limit-Mature Reqmt	73	NA	NA	NA
Field Projection Interim Threshold (end DT&E/IOT&E)	13.2	NA	11.2	NA
Mature Requirement (10,000 hrs)	50	50	NA	NA
Targeting Pod:				
Lab Lower Test Limit-Mature Rqmt	159	NA	NA	NA
Field Projection Interim Threshold (end DT&E/IOT&E)	28.5	NA	40.1	NA
Mature Threshold (10,000 hrs)	108	108	NA	NA
Terrain Following Altitude (Ft Manual)	200	NA	NA	NA

10. Technical/Operational Characteristics (Cont'd):

b. Operational --	Dev Est	Approved Program Goal/ Threshold	Demon-strated Perf	Current Estimate
HUD				
Total Field of View (Degrees)				
Horizontal	25	NA	30	NA
Vertical	20	NA	20	NA
Instantaneous Field of View				
Horizontal	25	NA	30	NA
Head Down Display (HDD)				
Targeting sensor FLIR field of view (FOV) (Degrees)				
Wide FOV (WFOV)				
Horizontal	8	NA	6	6
Vertical	8	NA	6	6
Narrow FOV (NFOV)				
Horizontal	1.7	NA	1.7	1.7
Vertical	1.7	NA	1.7	1.7
Navigation sensor video visual display of terrain on aircraft HUD				
WFOV Forward Looking Infrared				
Horizontal	28	NA	28	28
Vertical	21	NA	21	21
FCS				
Terrain Following				
Altitude (Ft Manual)	200	NA	200	200
Maneuvering flight				
Maximum aircraft Speed (MACH)	NA	NA	.85	.85
Degree of Bank	NA	NA	60	60
Navigation Capability Under the weather				
Day	NA	NA	Yes	Yes
Night	NA	NA	Yes	Yes
Terrain Avoidance (vertical plane only)				
In Clouds	NA	NA	Yes	Yes
Hourly rainfall (mm/Hr)	NA	NA	10	10

10. Technical/Operational Characteristics (Cont'd):

	Dev Est	Approved Program Goal/ Threshold	Demon-strated Perf	Current Estimate
Target Attack				
Targeting Recognition range for a 4 degree Centigrade background to target temperature difference for an inter-diction type target and an atmosphe-ric transmissivity of 0.45 per 4KM (Nautical Miles)	NA	NA	4	4
LANTIRN Laser Guided Bomb (LGB) Successful LANTIRN system performance (IP to impact not counting bomb performance) (Percent)	NA	NA	50	50
Automatic IR Maverick Handoffs per pass	NA	NA	2	2
Automatic Handoff single Maverick launch on 1st pass (Percent)	NA	NA	75	75
LANTIRN unguided toss Conventional toss accuracy with targeting pod cuing. Improved over Aircraft baseline without LANTIRN	NA	NA	Yes	Yes
Multi-aircraft compatibility				
System operability with:				
F-15E (with CFTs)	NA	NA	Yes	Yes
F-16C/D Block 40/42	NA	NA	Yes	Yes
Reliability/Maintainability (standard terminology for AFR 80-5)				
MTBM - Type 1 (mature system - 10,000 operational flight hours)	NA	NA	21.4*	34
Fully Mission Capable (FMC) (Percent)	NA	NA	63	80
Weapon system reliability (Percent)	NA	NA	88	95
Mean corrective time (O-Level) - Minutes	NA	NA		20

* This value is above the expected growth curve.

10. Technical/Operational Characteristics (Cont'd):

	Dev Est	Approved Program Goal/ Threshold	Demon-strated Perf	Current Estimate
Mean corrective time (I-Level)				
Pod system maintenance - Hours by LRU replacement	NA	NA		1.5
by SRU replacement in targeting pod, nose section, or R&R of wiring harness	NA	NA		3.5
all other	NA	NA		4.0
LRU maintenance	NA	NA		2.0
Built-in-test of mission-critical fault identification on flight line (Percent)	NA	NA		95

c. Previous Change Explanations:

Automatic Target Recognizer deleted. The Navigation Pod Field Projection Interim Threshold development estimate was 13.2 hours and demonstrated performance from IOT&E was 11.2 hours. Operational HUD Horizontal Total Field of View and Instantaneous Field of View development estimate was 25 degrees and demonstrated performance was 30 degrees. FCS MTBF modified to reflect field projection. HUD weight revised to measured value. HUD MTBF revised to reflect impact of DT&E/IOT&E performance. Navigation and Targeting Pod reliability data was added as a result of separating procurement of these two pods. Additional weight allowed in specifications for F-15E integration. Prior estimate was 978. Target Pod reliability growth curve restructured in March 1985. Development estimate was 28.5. Demonstrated performance from IOT&E on the Target Pod Field Projection increased from 26.3 to 40.1. Demonstrated performance for auto IR Maverick Handoffs per pass increased from 1 to 2. A-10 requirement deleted. Weight changed from 990 to 999 as a result of minor redesign for compatability with F-15E flight environment. Maximum power changed to 14.8 to provide additional power for the Environmental Control Unit to handle the F-15E flight environment. Adjusted to reflect USD(A) baseline approval. Adjusted to reflect items not previously reported. Updated to reflect latest information on delivered production pod set weight.

d. Current Change explanations --

(CH-1) Corrects error in last SAR.

10. Technical/Operational Characteristics (Cont'd):

(CH-2) Reflects latest information on delivered production pod set weight. (Navigation Pod #7, Lot 2, 458 lbs and Targeting Pod #2, Lot 1, 560 lbs). Lot 3 production pods, that are the first operational pods, begin with #10.

e. References --,

DEVELOPMENT ESTIMATE: Secretary of the Air Force Review, 18 Nov 82. Original PMD R-00023(1)/63249F, 21 Dec 79.

APPROVED PROGRAM: DAE Baseline, dated 31 Dec 1988.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	420.4	402.7	403.6
Procurement	1681.7	2026.6	1873.2
Pod Sets	(1297.9)	(1578.0)	(1414.3)
Total Flyaway	(1297.9)	(1578.0)	(1414.3)
Other Weapon System Cost	(311.7)	(355.1)	(375.5)
Initial Spares & Repair Parts	(72.1)	(93.5)	(83.4)
Construction (MILCON)	--	--	--
Total FY80 Base-Year $	$2102.1	$2429.3	$2276.8
Escalation	1721.1	1601.1	1524.5
Development (RDT&E)	(128.5)	(124.1)	(124.7)
Procurement	(1592.6)	(1477.0)	(1399.8)
Construction (MILCON)	--	--	--
Total Then-Year $	$3823.2	$4030.4	$3801.3
b. Quantities -- *			
Development (RDT&E)	12	12	12
Procurement	1316	1256	1067
Total	1328	1268	1079

c. Foreign Military Sales -- LOAs signed to date include 20 targeting pods for Israel ($62.5 M), 12 pod sets for Egypt ($107.8 M), and 10 pod sets for Korea ($103.8 M).

d. Nuclear Costs -- None.

e. References --

DEVELOPMENT ESTIMATE: Secretary of the Air Force Review, 18 Nov 82. Original PMD R-00023(1)/63249F, 21 Dec 79.

APPROVED PROGRAM: DAE Baseline, 31 December 1988.

* Quantity includes Targeting and Navigation Pods.

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12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current [Then-Year] Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	$3801.3	$ 3909.9	$3801.3
(2) Quantity *	1067	1122	1067
(3) Unit Cost	3.563	3.485	3.563
b. Current Procurement --	(FY 1990)	(FY 1990)**	(FY 1991)
(1) Cost	250.1	250.1	192.5
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	250.1	250.1	192.5
(2) Quantity	120	120	65
(3) Unit Cost	2.084	2.084	2.962

* This value was revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured for the purpose of this calculation.

** Adjusted to reflect FY90 Appropriation Act in accordance with Congressional change to the SAR law.

13. Cost Variance Analysis:

a. Summary -- (Current [Then Year] Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	548.9	3274.3	--	3823.2
Previous Changes:				
Economic	-12.9	-362.6	--	-375.5
Quantity	--	-25.8	--	-25.8
Schedule	+28.5	+4.3	--	+32.8
Engineering	-67.7	+40.0	--	-27.7
Estimating	+12.0	+459.6	--	+471.6
Other	--	--	--	--
Support	+18.0	+113.8	--	+131.8
Subtotal	-22.1	+229.3	--	+207.2
Current Changes:				
Economic	-0.1	+61.0	--	+60.9
Quantity	--	-239.2	--	-239.2
Schedule	--	+20.2	--	+20.2
Engineering	--	-1.6	--	-1.6
Estimating	+1.6	-91.5	--	-89.9
Other	--	--	--	--
Support	--	+20.5	--	+20.5
Subtotal	+1.5	-230.6	--	-229.1
Total Changes	-20.6	-1.3	--	-21.9
Current Estimate	528.3	3273.0	--	3801.3

13. Cost Variance Analysis (Cont'd):

(FY 1980 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	420.4	1681.7	--	2102.1
Previous Changes:				
Quantity	--	-17.8	--	-17.8
Schedule	+19.8	--	--	+19.8
Engineering	-49.0	+19.7	--	-29.3
Estimating	+2.2	+278.2	--	+280.4
Other	--	--	--	--
Support	+9.3	+64.8	--	+74.1
Subtotal	-17.7	+344.9	--	+327.2
Current Changes:				--
Quantity	--	-123.0	--	-123.0
Schedule	--	+8.0	--	+8.0
Engineering	--	-0.8	--	-0.8
Estimating	+0.9	-47.9	--	-47.0
Other	--	--	--	--
Support	--	+10.3	--	+10.3
Subtotal	+0.9	-153.4	--	-152.5
Total Changes	-16.8	+191.5	--	+174.7
Current Estimate	403.6	1873.2	--	2276.8

13. Cost Variance Analysis (Cont'd):

b. Previous Change Explanations --

RDT&E

Economic:	Revised economic and OSD inflation/escalation indices.
Schedule:	A-10 slipped to out years to compensate for FY84 program reductions.
Engineering:	Funding and technology for the ATR deleted from the program. Adjustment for prior year escalation A-10 Aircraft removed from program.
Estimating:	Program restructure due to FY84 congressional cuts and increased test requirements. Also adjusted for changes in current and prior year escalation indices. Corrected error from 31 Dec 84 SAR. Reestimate of program. Refinement of estimate.
Support:	Support equipment program restructured to reflect $30M FY84 congressional cut.

Procurement

Economic:	Revised economic and OSD inflation/escalation indices.
Quantity:	Change in the number of pod sets from 700 to 628 (1400 pods to 1256 pods).
Schedule:	Target Pod production start date delayed by one year. Total buy schedule extended one year. Moved production up from FYs 90-91 to FYs 88-89.
Estimating:	Adjustment for current and prior year escalation. Corrected error from 31 Dec 84 SAR. Include additional R&M/Warranty requirements. Restoration of FY88-91 FFP Contract. Reestimate of ECO requirements.
Support:	Reestimate of spares requirement. Added 4 Support Equipment and revised initial spares in FY83 SAR. Subsequently, SE sets have been reduced from 40 to 29 based on user requirements. Restoration of FY88-91 FFP contract. Adjustment for current and prior year escalation. Reestimate of spares and PSE requirements.
Engineering:	Additional funds for Eye Safe Laser and F-15E Compatibility.

MILCON - None.

c. Current Change Explanations

(1) RDT&E	(Dollars in Millions) Base-Year	Then-Year
Revised economic escalation indices (Economic)	N/A	-0.1
Increase in FY91 funding for completion of Software DT&E efforts (Estimating)	+0.9	+1.6

13. Cost Variance Analysis (Cont'd):

(2) Procurement	(Dollars in Millions) Base-Year	Then-Year
Revised economic escalation indices (Economic)	N/A	+9.6
Quantity decrease of 189 pods (67 NAV & 122 TGT)	-129.9	-196.6
Decrease of 189 Pods (Quantity)	(-123.0)	(-239.2)
Engineering changes applicable to decrease of 189 pods (Engineering)	(-0.8)	(-1.6)
Estimating changes applicable to decrease of 189 pods (Estimating)	(-14.1)	(-27.4)
Adjusted escalation cost associated with the reduction of 189 pods (Economic)	N/A	(+51.4)
Revised Schedule applicable to reduced Pod Quantity (Schedule)	(+8.0)	(+20.2)
Reestimate of flyaway cost based on actual contractual negotiations (Estimating)	-12.9	-26.0
Adjustment for current and prior years escalation (Estimating)	-20.9	-38.1
Reestimate of Other Government Costs due to better definition of requirements (Support)	+18.8	+35.9
Reestimate of PSE based on actuals from contractual negotiations (Support)	-9.5	-17.5
Reestimate of Depot Requirements due to increases for repair equipment, AISF software and quality/efficiency initiatives (Support)	+15.0	+27.1
Reestimate of Initial Spares requirements (Support)	-8.9	-15.9
Adjustment for current and prior year escalation for Support Equipment (Support)	-5.1	-9.1

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

a. Initial SAR/Development Estimate to Current Estimate --

PAUC Initial SAR/ Development Estimate	Changes								PAUC (Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
2.905	-.295	+.429	+.050	-.027	+.358	--	+.143	+.658	3.563

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E -- Pods:

	Initial Contract Price		
	Target	Ceiling	Qty
Martin-Marietta Corporation P.O. Box 5837 Orlando, FL 32855 Contract F33657-80-C-0441 Award: FFP, September 1980 (Fire Control System)	$94.0	N/A	12 Pods

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$428.5	N/A	12 Pods	$428.5	$428.5

b. Procurement -- Pods:

	Initial Contract Price		
	Target	Ceiling	Qty
Martin-Marietta Corporation P.O. Box 5837 Orlando, FL 32855 Contract F33657-84-C-0004 Award: FFP, April 1985 (Pod Prod & Support Equipment)	$ 87.3	N/A	2 Pods

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Quantity	Contractor	Program Manager
$2620.7 *	N/A	882 Pods 26 Support Equipment	$2945.1	$2945.1

* Current Contract Price does not include the final 2 fiscal year options.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 92.3% (12 years/13 years)

(2) Percent Program Cost Appropriated: 94.9% ($3607.1/$3801.3)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appn	Prior Years	Budget Year	Budget Year	Balance To Complete	Total
	(FY79-89)	(FY90)	(FY91)	(N/A)	
RDT&E	523.1	3.5	1.7	--	528.3
Procurement	2830.4	250.1	192.5	--	3273.0
MILCON	0.0	0.0	0.0	--	0.0
Total	3353.5	253.6	194.2	--	3801.3

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty Nav/Tgt	FY80 Base-Year Dollars: Flyaway Nonrec	Flyaway Rec	FY80 Base-Year Dollars: Total	Total Then-Year Dollars: Program	Obligated *	Expended *	Escl Rate (%)
Appropriation: RDT&E								
1979	N/A	N/A	N/A	11.2	10.6	10.6	10.6	8.4
1980				30.0	31.7	31.7	31.7	9.4
1981				35.4	41.4	41.4	41.4	11.9
1982				68.9	86.1	86.1	86.1	9.2
1983				76.4	99.8	99.8	99.8	4.9
1984				42.2	57.3	57.3	57.3	3.8
1985				69.8	97.7	97.7	97.7	3.4
1986				25.6	36.8	36.8	36.8	2.8
1987				25.6	37.9	37.4	32.2	2.7
1988				12.6	19.3	19.1	17.1	3.1
1989				2.8	4.5	4.2	2.3	4.2
1990				2.1	3.5	.3	.1	4.0
1991				1.0	1.7	--	--	4.2
SUBTOTAL	6/6			403.6	528.3	522.4	513.1	

* Reflects Program Office records as of 12 Jan 90.

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty Nav/Tgt	FY80 Base-Year Dollars			Total Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Program	Obligated *	Expended *	
		Nonrec	Rec					
Appropriation: Procurement								
1981		.8		.8	1.0	1.0	1.0	11.9
1982		3.6		3.6	5.0	5.0	5.0	9.6
1983								
1984								
1985	2/0	31.2	25.2	57.4	90.0	89.4	89.4	3.4
1986	7/2	104.8	99.6	262.8	423.9	420.6	414.3	2.8
1987	143/7	112.7	223.2	478.0	803.5	803.5	669.9	2.7
1988	169/81	38.9	262.4	456.1	797.3	767.3	207.2	3.1
1989	240/231	8.0	314.5	386.3	709.7	687.7	61.6	4.2
1990	0/120	9.9	101.3	131.0	250.1	3.2	0.0	4.0
1991	0/65	9.1	69.1	97.2	192.5	--	--	4.2
Sub-Total	561/506	319.0	1095.3	1873.2	3273.0	2777.7	1448.4	
TOTAL	567/512	319.0	1095.3	2276.8	3801.3	3300.1	1961.5	

* Reflects Program Office records as of 12 Jan 90.

Appropriation: MILCON -- N/A

17. Production Rate Data:

a. Annual Production Rates (NAV/TGT) *

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1985	2/2	2/0	6/0	6/0
1986	14/14	7/2	7/6	7/6
1987	142/142	107/7	101/6	101/6
1988	376/376	203/81	156/81	156/81
1989	384/384	240/231	192/198	192/198
1990	522/522	238/240	NA/160	NA/160
1991	NA	NA/238	NA/130	NA /130

b. Cost Variance -- Dollars in Millions *

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
PAC (BY $)	2457.6	-180.8	2276.8	0	2276.8
(TY $)	4108.6	-307.3	3801.3	0	3801.3
PAUC(BY $)	1.741	+.393	2.134	0	2.134
(TY $)	2.910	+.653	3.563	0	3.563

* The annual production rates shown differ from the annual funded quantities because the funded delivery period in months is as shown below:

FY	Navigation Pod	Targeting Pod
85	4	0
86	12	4
87	17	14
88	13	12
89	15	14
90	0	9
91	0	6

17. Production Rate (Cont'd):

c. Schedule Variance --

Item	Production Estimate (Nav/Tgt)	Variance (CE less PdE)	Current Estimate (Nav/Tgt)	Variance (CE less Max)	Maximum (Nav/Tgt)
Start Date (Month/Yr)	4/85 5/86	0	4/85 5/86	0	4/85 5/86
Duration (In Months)	89/88	0	89/88	0	89/88
End Date (Month/Year)	9/92 9/93	0	9/92 9/93	0	9/92 9/93

d. Deliveries (Plan/Actual) --

	To Date	
	NAV POD	TGT POD
RDT&E	6/6	6/6
Procurement	85/86	7/7

e. Approved Design to Cost Goal -- N/A.

18. Operating Support Costs:

a. Assumptions and Ground Rules --

Current Estimate: Feb 85 Independent Cost Analysis (ICA).

This estimate documents those costs incurred in support of LANTIRN equipment after all weapon platforms have been modified and all group B kits are installed. Cost elements include Depot Maintenance, Second Destination Transportation, Unit Mission Personnel, Installation Support Personnel, Indirect Personnel Support, Personnel Acquisition and Training, Sustaining Investment, and Avionics Integration Support Facility (AISF). Unit level consumption was not calculated because it did not apply to this system since there will not be an increase in consumable supplies over what is already programmed for flight-line maintenance.

b. Costs -- (FY 1980 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost
Depot Maintenance	1.7
Second Destination	.2
Unit Mission Personnel	8.6
Installation Support Personnel	1.7
Indirect Personnel Support	3.0
Personnel Acq and Training	3.7
Sustaining Investment	9.9
AISF	1.2
TOTAL	30.0

c. Contractor Support Costs -- N/A

A-2 ADDS

89-135

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)
PROGRAM: Army Data Distribution System (ADDS)

AS OF DATE: December 31, 1989

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1. Designation/Nomenclature (Popular Name): Army Data Distribution System (ADDS) (Enhanced Position Location Reporting System (EPLRS) and the Joint Tactical Information Distribution System (JTIDS)).

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MAR 22 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

21

2. DOD Component: U.S. Army

3. Responsible Office and Telephone Number:

Project Manager
ADDS
Ft Monmouth, NJ 07703-5216

PM: COL LELAND H. HEWITT
Assigned: 9 Jan 89
AUTOVON: 992-4251
Commercial: (201) 532-4251

4. Program Elements/Procurement Line Items:

RDT&E: PE 63713A Project D370

Procurement: APPN 2035 - BU1400, T06200, T06300, T06400, BA9620 (shared), BA970A (shared), BL5264 (shared), T01600 (shared), T03200 (shared)

MILCON: N/A

No SECURITY Objection to PUBLIC RELEASE
21 MAR 1990
SECURITY REVIEW, ODCSINT, HQDA

OASD(PA) DFOISR 90-T-0703

5. Related Programs: Position Location Reporting System (PLRS) Joint Tactical Information Distribution System (JTIDS), Forward Area Air Defense Command, Control and Intelligence (FAAD C^2I), and Army Tactical Command & Control System (ATCCS).

6. Mission and Description: To achieve required performance, emerging tactical automated battlefield systems (e.g. ASAS, FAAD C2I, AFATDS, etc.) need real time and jam resistant data communications. Current deployed communication systems used for this purpose are limited by restricted data handling capacity, electronic warfare (EW) vulnerability, voice/data contention, lack of adequate automatic relay capabilities or poor mobility. To correct a majority of these "short-falls," the Army Data Distribution System (ADDS) builds on proven components/modules of two existing systems: the Joint Army and Marine Corps Position Location Reporting System (PLRS) and the Tri-Service Joint Tactical Information Distribution System (JTIDS). By taking advantage of the advanced state of development of these two projects, it is possible in production to satisfy the stated data distribution requirements of the Army and overcome existing deficiencies earlier than would otherwise be possible with a totally new development that would start in the formative stage. The ADDS supports the real time and high priority data communication requirements associated with the five functional divisional mission areas of air defense, fire support, intelligence/electronic warfare, maneuver control and combat service support. FAAD C^2I requires both the ADDS EPLRS and the JTIDS Class 2M terminal to meet its data distribution requirement.

7. Program Highlights:

a. Significant Historical Developments - On 8 August 1979 the Under Secretary of Defense for Research and Engineering authorized the Army to proceed with development of the PLRS/JTIDS Hybrid (PJH) (now EPLRS). In July of 1980 the Training and Doctrine Command (TRADOC) approved an Operational and Organizational (O&O) Concept, which established PJH (now EPLRS) as a Division-based system and identified fielding requirements for sixteen (16) Army divisions. In September 1982, the Army System Acquisition Review Council (ASARC) approved PLRS production and endorsed the accelerated, overlapping five-phase development strategy for PJH (now EPLRS). In August 1984, TRADOC approved a revised O&O Plan which established PJH (now EPLRS) as a Corps-based system instead of a Division-based system and expanded the fielding requirement to eighteen (18) divisions and five (5) corps. In February 1985, the Assistant Secretary of Defense for Command, Control, Communications and Intelligence (ASD-C^3I) approved the development of the downsized version of the JTIDS Terminal, the Class 2M. In March 1985, the Under Secretary of the Army approved continued development of the EPLRS. Concurrent approval was given for development of Very High Speed Integrated Circuit (VHSIC) technology in the Enhanced PLRS User Unit (EPUU), and downsizing of the Net Control Station (NCS). In the September to December 1985 timeframe, the Combined Arms Center conducted the Battlefield Command and Control System Review (BC^2SR). The BC^2SR determined that the Army Air Defense community was the only user requiring JTIDS terminals. On 8 September 86, the Army approved a Required Operational Capability (ROC) for ADDS. In May 1988 Milestone IIIA for EPLRS

Pre-Planned Product Improvement (P3I) was successfully completed. EPLRS technical test conducted Jan - Mar 1989 revealed several system anomalies in software and hardware. A decision was made to minimize the government risk by restructuring the program to include correction of system deficiencies, removal of the concurrency in the schedule, and by reducing near term procurement quantities to units necessary for operational test only. On 22 August 1989 the rebaselined, restructured program was presented to OSD C3I Committee chaired by the ASDC3I. The committee accepted the restructure and agreed that the Army should proceed.

b. Significant Developments Since Last Report - As a result of funding decrements the program required restructuring. The changes to program schedule and projected cost are reflected in the new approved DAE Baseline.

The ADDS system is expected to satisfy the mission requirement.

c. Changes Since "As Of" Date. None.

8. Threshold Breaches: There are currently no DAE Baseline (dated March 1990) breaches.

9. Schedule:

a. Milestones	Planning Estimate	Approved Program	Current Estimate	
EPLRS				
Required Operational Capability Approval	Jul 84	Sep 86	Sep 86	
P3I Phase A Software Contract Awd	Sep 86	Feb 88	Feb 88	
Milestone IIIA P3I LRIP	Sep 87	May 88	May 88	
Technical Test Start	Aug 87	May 88	May 88	
P3I Phase B Hardware/Firmware Contract Award	N/A	Jun 88	Jun 88	
Technical Test End	N/A	N/A	N/A	(CH-1)
Technical Test Phase 2	N/A	Mar 89	Mar 89	(CH-2)
Production System Verification Awd	N/A	Sep 89	Sep 89	(CH-2)
P3I Phase C Basic Award	N/A	Jan 90	Jan 90	(CH-2)
Production System Verification Demo	N/A	May 90	May 90	(CH-2)
P3I Phase C Option 1 Award	N/A	Jul 90	Jul 90	(CH-2)
Technical Test Phase 3	N/A	Oct 90	Oct 90	(CH-2)
P3I Phase C Option 2 Award	N/A	Mar 91	Mar 91	(CH-2)
P3I First Production Delivery	N/A	Jul 92	Jul 92	(CH-3)
P3I First Unit Equipped (FUE)	Sep 88	N/A	N/A	(CH-4)
Operational Test & Evaluation (OT&E)	Aug 87	Apr 94	Apr 94	(CH-5)
P3I First Unit Equipped (FUE) Conditional	N/A	May 94	May 94	(CH-4)
Milestone IIIB (DAB)	N/A	Sep 94	Sep 94	(CH-6)
Full Scale Production Contract Awd	Jul 88	N/A	N/A	(CH-7)
Production Award	N/A	Nov 94	Nov 94	(CH-7)
Follow-On Test & Evaluation (FOT&E)	N/A	Nov 95	Nov 95	(CH-2)

9. Schedule: (Cont'd)

	Planning Estimate	Approved Program	Current Estimate	
EPLRS (Cont'd)				
First Production Delivery	N/A	Nov 96	Nov 96	(CH-2)
First Unit Equipped (FUE)	N/A	Feb 97	Feb 97	(CH-2)
JTIDS				
Technical Test Start	N/A	Jun 90	Jun 90	
Technical Test End	N/A	Dec 90	Dec 90	
Operational Test & Evaluation Start	N/A	Mar 91	Mar 91	
Operational Test & Evaluation End	N/A	Jun 91	Jun 91	
Milestone III	N/A	Oct 91	Oct 91	
Full Scale Production Contract Awd	N/A	Oct 91	Oct 91	
First Production Delivery	N/A	Feb 93	Feb 93	(CH-8)
First Unit Equipped (FUE)	N/A	Apr 93	Apr 93	

b. Previous Change Explanations --

All PLRS and EPLRS historical milestones not in the ADDS DAE Program Baseline have been deleted. With the approval of the ADDS DAE Program Baseline, milestones in the Approved Program and Current Estimate columns reflecting "N/A" have been deleted from the SAR and are not reflected in the ADDS Approved Baseline. The P3I contract is shown in Phases A, B and C. Dates for OT&E and all subsequent milestones directly related to them changed because of complications with the completion of Technical Test (TT). EPLRS Milestone IIIA occured May 88 versus Apr 88. EPLRS milestone IIIB was an added milestone to occur May 93. JTIDS milestones have been added since EPLRS and JTIDS make up the ADDS system. EPLRS Technical Test conducted January - March 1989 revealed several system anomalies in software and hardware. A program rebaselining effort was undertaken to include correction of system deficiencies, removal of the concurrency in this highly accelerated program schedule, and reduction of the near term procurement quantities to units necessary for operational test only.

c. Current Change Explanations --

(CH-1) This milestone has been replaced by Technical Test Phase 2 and Phase 3.

(CH-2) As a result of system anomalies revealed during EPLRS technical test, funding decrements and delayed award of the P3I Phase C contract, program restructuring was necessary. Schedule milestones are added that reflect the current program schedule and approved DAE Baseline (March 1990).

(CH-3) With the program restructure P3I First Production Delivery is changed from June 91 to July 92.

c. Current Change Explanations -- (Cont'd)

(CH-4) This milestone has been changed to P3I First Unit Equipped (FUE) conditional to occur in May 94 versus April 92.

(CH-5) With the approved program restructure, Operational Test & Evaluation (OT&E) is changed from Apr 90 to Apr 94.

(CH-6) Milestone IIIB has been changed from Sep 90 to Sep 94.

(CH-7) Full Scale Production Contract award has been changed to Production Award to occur in Nov 94 versus Nov 90.

(CH-8) First Production Delivery will occur in Feb 93 versus Oct 91.

d. References:

Planning Estimate: SDDM, dated 8 Aug 79
Approved Program: Approved DAE Baseline March 1990.

10. Technical/Operational Characteristics: 1/

a. Technical	Planning Estimate	Approved Program Goal/Threshold	Demo Perf	Current Estimate
Size (Length x Width x Height)				
NCS-E (S-280C)	12'x7.3'x7'	12'x7.3'x7'/12'x7.3'x7'		12'x7.3'x7'
Downsized NCS-E (S-250C)	7'x6.5'x6'	N/A / N/A		N/A (CH-1)
EPUU/Manpack	10.1"x10.7"X4"	14.7"x10.5"x5.1"/ 14.7"x10.5"x5.1"		14.7"x10.5"x5.1" (CH-2)
JTIDS Class 2M	N/A	25"x15"x10"/ 25"x15"x10"		25"x15"x10"
Weight (lbs) - Upper Limit				
NCS-E (S-280C)	6200	6300/6300		6300
Downsized NCS-E (S-250C)	2300	N/A / N/A		N/A (CH-1)
EPUU/Manpack	17	28/28		28 2/
JTIDS Class 2M Terminal	N/A	88/88		88 3/

1/ The Department of the Army made a decision not to procure additional JTIDS Class 2 terminals. (Source: Msg, SARD-SMC, 072145Z May 87, Subj: Army Procurement of JTIDS Class 2 Terminals.)

2/ EPUU/Manpack configuration includes an EPUU, User Read Out, cable assembly, two BA5590 batteries, battery box and antenna.

3/ Weight does not include the Interface Control Panel and interconnecting cables.

10. Technical/Operational Characteristics: (Cont'd)

a. Technical	Planning Estimate	Approved Program Goal/Threshold	Demo Perf	Current Estimate
Power Requirements (NCS-E)				
Voltage (AC)	115-208	115-208/115-208		115-208
Frequency (HZ)	50-60	60/60		60
Power Requirements (EPUU)				
Voltage (DC)	20-28	20-28/20-28		20-28
Power Requirements (JTIDS)				
Voltage (DC)	22-28	22-28/22-28		22-28
Frequency Band (MHZ)				
NCS-E	420-450	420-450/420-450		420-450
EPUU	420-450	420-450/420-450		420-450
JTIDS Class 2M	960-1215	960-1215/960-1215		960-1215

b. Operational	Planning Estimate	Approved Program Goal/Threshold	Demo Perf 1/	Current Estimate
MTBF (Hrs) (Lower Limit/Confidence Level)				
NCS-E	100	125/100 (80%)		125 (80%)
EPUU	500	700/500 (80%)		500 (80%)
Class 2M Terminal	120	400/400 (70%)		400 (70%)
MTTR (Min)				
NCS-E	30	30/30		30
EPUU	30	15/15		15
Class 2M Terminal	30	30/30		30
Channels				
EPUU	8	8/8		8
Class 2M Terminal	128	51/51		51

Message Length/Speed of Service Criteria:
EPUU and JTIDS Class 2M: Both equipments shall be capable of transmitting an 80 bit length data message between a sender and a receiver within 4 seconds for selected users.

1/ Production System Verification Demo will occur in May 90. At that time Demo performance data will be available.

c. Previous Change Explanations -

Current Estimates reflect performance characteristics in the NCS-E System Segment Specification and the ADDS ROC dated 8 Sep 86. EPUU/Manpack

c. Previous Change Explanations - (Cont'd)

configuration includes an EPUU, User Read Out, cable assembly, two BA5590 batteries and one Manpack Installation Kit, per the ADDS ROC, dated 8 Sep 86. Weight does not include the Interface Control Panel and interconnecting cables, per the ADDS ROC, dated 8 Sep 86. MTBF for JTIDS Class 2M Current Estimate reflects contractual requirements. MTTR changed to reflect consistency with performance characteristics in the NCS-E System Segment Specification and the ADDS ROC. JTIDS Class 2MVoltage is DC versus AC. Frequency requirements are grouped separately to more accurately reflect technical characteristics. The JTIDS Class 2M terminal size was changed based on 27 May 88 system specification. The power requirement for the NCS-E is 60 Hz. The MTTR for the EPUU is 15 minutes. The JTIDS Class 2M development contract specifies frequency hopping-51 frequencies, 3 MHZ band width and a non-nodal network management capability of 128 net capacity. The user has stated through the Program Deviation Review Panel that a reduction in the NCS MTBF from 186 to 125 hours is acceptable for interim field use.

d. Current Change Explanations --

(CH-1) An NCS-E modernization (downsizing) project is planned to run parallel with P3I to provide for higher reliability and to meet other Required Operational Capability (ROC) requirements that the current NCS-E does not meet. Currently there is no contractual vehicle to support the NCS-E downsized technical requirements.

(CH-2) The width of the EPUU has not changed. The EPUU uses the same housing unit as the PLRS Basic Unit (BUU). The dimensions of the BUU (width 10.5 inches) have not changed since the PLRS contract award in 1983. The ADDS ROC, published in Oct 1986 incorrectly stated the width of the EPUU as 10.2 inches. Actions are underway to correct the ROC.

e. References --

Planning Estimate: SDDM, dated 8 August 1979
Approved Program: Approved DAE Baseline, March 1990.

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Planning Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	$175.3	$ 306.0	$ 306.0
Procurement	1806.2	1771.0	1771.0
NCS	(229.7)	(247.4)	(247.4)
Other Components	(1270.6)	(1349.0)	(1349.0)
Total Flyaway	(1500.3)	(1596.4)	(1596.4)
Other Wpn Sys Cost	(121.3)	(45.6)	(45.6)
Initial Spares	(184.6)	(129.0)	(129.0)
Construction (MILCON)	-	-	-
Total FY 83 Base-Year $	1981.5	2077.0	2077.0

	Planning Estimate	Approved Program	Current Estimate
a. Cost -- (Cont'd)			
Escalation	1056.7	1081.0	1081.0
Development (RDT&E)	(13.7)	(51.0)	(51.0)
Procurement	(1043.0)	(1030.0)	(1030.0)
Construction (MILCON)	-	-	-
Total Program Cost (Then-Year)	3038.2	3158.0	3158.0
b. Quantities --			
Development (RDT&E)	3	3	3
Procurement	85	120	120
Total	88	123	123

c. Foreign Military Sales - - None

d. Nuclear Costs - - None

e. References--
Planning Estimate: SDDM, dated 8 August 1979.
Approved Program: Approved DAE Baseline, March 1990.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

a. Program Acquisition	Current Estimate (Dec 89 SAR)	Current Year UCR Baseline (Dec 88 SAR)	Budget Year UCR Baseline (Dec 89 SAR)
(1) Cost	3158.0	2828.8	3158.0
(2) Quantity 1/	120	120	120
(3) Unit Cost 2/	26.3	23.6	26.3

1/ This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation.

2/ Unit cost data are based on the Army Data Distribution System representative network which uses the Net Control Station-Enhanced PLRS as the unit of measure. One Net Control Station-Enhanced Position Location Reporting System network equates to 150 Enhanced Position Location Reporting System User Units, 3 Joint Tactical Information Distribution System Class 2M terminals and 1 Net Control Station-Enhanced Position Location Reporting System. Reference: Memorandum from the Assistant Secretary of Defense (Comptroller), dated 15 May 1985.

b. Current Procurement 3/ --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	N/A	N/A	22.2M
Less CY Adv Proc	N/A	N/A	N/A
Plus PY Adv Proc	N/A	N/A	N/A
Net Total	N/A	N/A	22.2M
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

3/ Due to the wide variation in the year-to-year hardware mix, current procurement unit cost reporting is not required. Reference: Memorandum from the Assistant Secretary of Defense (Comptroller), dated 15 May 1985.

13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	189.0	2849.2	-	3038.2
Previous Changes:				
Economic	- 6.6	-413.5	-	-420.1
Quantity	-	+185.8	-	+185.8
Schedule	+ 38.0	-	-	+ 38.0
Engineering	+108.1	-518.5	-	-410.4
Estimating	- 7.6	+611.8	-	+604.2
Other	-	-	-	-
Support	-	-208.2	-	-208.2
Subtotal	+131.9	-342.6	-	-210.7
Current Changes:				
Economic	- .1	+166.1	-	+166.0
Quantity	-	-	-	-
Schedule	-	+128.3	-	+128.3
Engineering	+ 31.4	-	-	+ 31.4
Estimating	+ 4.8	-	-	+ 4.8
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+ 36.1	+294.4	-	+330.5
Total Changes	+168.0	- 48.2	-	+119.8
Current Estimate	357.0	2801.0	-	3158.0

13. Cost Variance Analysis (Cont'd):

(FY 1983 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	175.3	1806.2	-	1981.5
Previous Changes:				
Quantity	-	+ 77.9	-	+ 77.9
Schedule	+ 26.0	-	-	+ 26.0
Engineering	+ 85.6	-376.7	-	-291.1
Estimating	- 8.1	+424.3	-	+416.2
Other	-	-	-	-
Support	-	-160.7	-	-160.7
Subtotal	+103.5	- 35.2	-	+ 68.3
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	+ 19.2	-	-	+ 19.2
Estimating	+ 8.0	-	-	+ 8.0
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+ 27.2	-	-	+ 27.2
Total Changes	+130.7	- 35.2	-	+ 95.5
Current Estimate	306.0	1771.0	-	2077.0

b. Previous Change Explanations —

RDT&E

Economic: Revised escalation indices.

Schedule: Schedule stretchout due to Technical Test Extension.

Engineering: New work - 1553 interface, Continuity of Operations, Dedicated JTIDS Relay Unit (DJRU), SYSCON interface, Net Control Station JTIDS (NCS-J), Intermediate Forward Test Equipment and DATABASE Command and Control. ADA software Conversion for NCS-E downsizing, GFE for Standard Integrated Command Post - (SICP) for NCS-J.

Estimating: These dollars were included in both ADDS and JTIDS SAR's. Additional funds needed for Phase 5 contract award.

b. Previous Change Explanations -- (Continued)

Procurement

Economic: Revised escalation indices.

Quantity: Change in NCS quantity from 4 per Division to 5 and from 6 per Corps to 8. Change in EPUU quantity from 24,875 in the previous SAR to 22,103 and in NCS quantity from 146 to 140 as a result of revised O&O Plan. Further quantity reduction of the NCS from 140 to 123, and the EPUU from 22,103 to 14,518.

Engineering: Change due to NCS downsizing and to JTIDS Class 2M being substituted for Class 2 terminal; elimination of PLRS Steerable Null Antenna Processor (PSNAP); removal of the JTIDS CL2 terminal and PSNAP from NCS.

Estimating: Estimating error in calculating the first unit cost in Dec 85 and Sep 86 SARs. Interface Unit was erroneously omitted from Dec 85 SAR. Change in Acquisition strategy for EPUUs to single source. Spares cost increase due to increase in operating tempo from 300 hours to 1300 hours EPUU. Change in acquisition strategy for the JTIDS Class 2M terminal from single source to Leader/Follower. Increase in Post Deployment Software Support due to a change in data base used for the estimating model. Shift in years of procurement of initial spares (support).

Support: Reduction in Initial Spares due to quantity reductions.

MILCON: N/A

c. Current Change Explanations --

(1) RDT&E

	(Dollars in Millions) Base-Year	Then-Year
Revised Dec 89 Escalation indices (Economic)	0	- .1
The NCS-E in its current state will not meet the MTBF in the ROC or air transportability requirement. Downsizing of the NCS is required which will utilize a smaller shelter and current computer technology using the ADA language. (Engineering)	+19.2	+31.4
Adjustment of prior year allocations to reflect actual program. (Estimating)	+ 8.0	+4.8

(2) Procurement

	(Dollars in Millions) Base-Year	Then-Year
Revised Dec 89 inflation indices (Economic)	0	+166.1
Schedule stretchout due to funding decrements. Program extended to meet user's equipment requirements. (Schedule)	0	+128.3
(3) MILCON	N/A	N/A

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Yr Dollars)
Planning Estimate to Current Estimate —

PAUC (Planning Estimate)	Changes (Then-Year Dollars in Millions)								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
35.744	-2.118	-8.877	+1.386	-3.158	+5.075	+0.0	-1.735	- 9.427	26.317

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E

EPLRS System:	Initial Contract Price Target	Ceiling	Qty
Hughes Aircraft Co.	$36.6	N/A	3

Ground Systems Group
Fullerton, CA
DAAB07-82-C-J096, CPFF
Award: March 31, 1982
Definitized: March 31, 1982

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Project Manager
$157.7	$157.7	3	$157.7	$157.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-17.8	-1.3
Cumulative Variances To Date (11/30/89)	- 3.2	- .9
Net Change	+14.6	+ .4

Explanation of Change: All firmware design has been completed and released to system test; however, problems encountered during test have required design modifications. The remainder of the variance is due to a delay in VHSIC EPUU development. The contract is fully funded and is 96% complete.

b. Procurement - N/A.

c. MILCON - N/A.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 52.6% (10 yrs/19 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 17% ($538.4/3158.0)
(Funds Appropriated To Date in Millions/
Total Program Funding in Millions)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY81-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-99)	Total
RDT&E	239.0	19.1	21.7	77.2	357.0
Procurement	280.3	0.0	22.2	2498.5	2801.0
MILCON	-	-	-	-	-
Total	519.3	19.1	43.9	2575.7	3158.0

16. PROGRAM FUNDING SUMMARY (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY83 Dollars		Total Base Year$	Total Then Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
APPROPRIATION: RDT&E								
1981				17.8	15.8	15.8	15.8	11.9
1982				18.1	17.3	17.3	17.3	7.6
1983				34.1	34.1	34.1	34.1	4.9
1984				22.1	22.9	22.9	22.9	3.8
1985				22.3	23.9	23.9	23.9	3.4
1986				32.6	36.0	36.0	34.7	2.8
1987				37.6	42.6	42.6	41.4	2.7
1988				23.0	26.8	26.8	26.3	3.0
1989				16.1	19.6	19.6	10.9	4.2
1990				14.7	19.1			4.0
1991				16.1	21.7			4.2
1992				11.6	16.3			4.0
1993				11.7	17.0			3.7
1994				10.3	15.5			3.4
1995				8.0	12.3			3.1
1996				4.5	7.2			3.1
1997				3.3	5.4			3.1
1998				2.1	3.5			3.1
Subtotal	3			306.0	357.0	239.0	227.3	N/A
APPROPRIATION: Procurement (OPA)								
1986				19.1	21.1	21.1	13.4	2.7
1987				64.9	73.5	73.5	37.8	3.0
1988				93.6	109.3	0.0	0.0	3.0
1989				58.1	76.4	17.5	6.6	4.2
1990				0.0	0.0			4.0
1991				15.7	22.2			4.2
1992				119.1	174.5			4.0
1993				188.7	285.4			3.7
1994				183.3	285.9			3.4
1995				220.7	355.0			3.1
1996				235.2	390.0			3.1
1997				216.1	369.5			3.1
1998				178.2	314.2			3.1
1999				178.3	324.0			3.1
Subtotal	120			1771.0	2801.0	112.1	57.8	N/A
Total	123			2077.0	3158.0	351.1	285.1	N/A

17. Production Rate Data: Because measurement is based on an equivalent network and the year to year mix of components will vary it is not appropriate to report production rate data for ADDS components.

18. Operating and Support Costs - -

a. Assumptions and Ground Rules: The system definition, ADDS, for unit equivalents is 118 units based on the quantity of Net Control Stations-EPLRS (NCS-E) to be deployed for Division/Corps complements. The operating hours for the system is given as 20-24 hrs/day. Uniform costs are assumed over a 20 year period. Cost categories are given in the table 18 b. Personnel reflects the costs to support the operation and maintenance personnel. POL is the consumable portion indicating the petroleum, oil and lubricants cost. The Direct Depot Maintenance includes the interim contractor support and depot labor/material costs. The Spares and Parts reflects the costs of replenishment spares, repair parts and modifications/kits. Other Direct Costs reflects transportation, additional system program management civilians and field maintenance civilian labor. Indirect Costs reflects the permanent change of station, replacement personnel and additional sustaining costs. The source of the cost estimate is the ADDS Baseline Cost Estimate, December 1988.

b. Costs (FY 1983 Constant Dollars in Millions)

COST ELEMENT	AVERAGE ANNUAL COST PER SYSTEM ADDS	ANTECEDENT
Personnel	.294	None
POL	.011	
Direct Depot Maintenance	.078	
Spares & Parts	.507	
Other Direct Costs	.044	
Indirect Costs	.358	
TOTAL	1.292	

c. Contractor Support Costs — N/A.

N-27 MK 50 SAR-89-033

[redacted]

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: MK 50 Torpedo

AS OF DATE: December 31, 1989

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1. [redacted] Designation and Nomenclature (Popular Name): Torpedo, MK 50 (MK 50 Torpedo)

[redacted] DoD Component: NAVY

3. [redacted] Responsible Office and Telephone Number:

MK 50 TORPEDO PROGRAM OFFICE
NAVAL SEA SYSTEMS COMMAND
PMS 406
WASHINGTON, DC 20362-5101

SES T.E. Douglass
Assigned: May 12,1989
AV 222-0636 COMM 202-602-0636

4. [redacted] Program Elements/Procurement Line Items:

RDT&E:
PE 0604610N
PE 0603610N
PROCUREMENT:
APPN 1507 ICN 3118 (Navy)
MILCON:
PE 72096N

5. [redacted] Related Programs: Vertical Launch ASROC; LAMPS MK III; CV HELO; P-3C; SH-2F; ASW Ship In-Service Programs.

90-C-0699

No Security Objection to Open Publication
AS AMENDED
MAR 27 1990
Office of the Chief of Naval Operations
Dept. of the Navy

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(U) Mission and Description: The MK 50 Torpedo will provide the fleet with a lightweight anti-submarine torpedo primarily for air and surface ship delivery. The MK 50 Torpedo will have superior performance characteristics capable of countering the ALFA, OSCAR, TYPHOON, and follow-on submarine classes. The improvements in Soviet submarine performance and countermeasures capability necessitate having the MK-50 torpedo available as a replacement for the lightweight MK-46 Torpedo. The MK 50 Torpedo is made up of several major subsystems which include: a sonar, a command and control unit (b)(1) and a closed cycle, stored chemical energy propulsion system.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- (1) The MK-50 Program started with a technology assessment phase in 1975 to review various conceptual designs from industry. DSARC I was held in July 1979 and Advanced Development commenced with two competitive designs. In January 1981, the competition was terminated and Honeywell was selected as the single remaining D&V contractor. The D&V Phase of the program was completed and a DSARC Milestone II review on January 20, 1984 approved proceeding into Full-Scale Development (FSD).

(2) FSD proceeded with in-water testing and fabrication of the first fleet prototypes. Warhead lethality tests were continued and the warhead design was finalized. In 1987, the program was restructured and the FSD program was extended by 21 months.

(3) Sea run tests involving all launch platforms have demonstrated prototype lot torpedo technical performance and have provided initial technical evaluation. COMOPTEVFOR conducted independent testing (OT-IIA) and concluded that the MK 50 has the potential to be operationally suitable and effective. These findings supported a recommendation for limited production. In FY-88 a second source qualification contract was awarded to Westinghouse Electric Corporation.

b. (U) Significant Developments Since Last Report -- As of December 1989, the program has entered the Low Rate Initial Production (LRIP) phase of production. Subsequent to milestone IIIA approval in May, LRIP I contract options for 140 torpedoes were exercised with Honeywell (76 units) and Westinghouse (64 units). Deliveries are scheduled to start in May of 1990 and continue through August 1991. The weapon was certified ready for TECHEVAL and testing began on 17 August. A total of 59 TECHEVAL firings have been conducted and results are being analyzed. OPEVAL is scheduled to start in April of 1990. A second LRIP contract was awarded to Honeywell for advance procurement of material for 100 torpedoes.

The MK-50 system is expected to satisfy the mission requirement.

c. (U) Changes Since As Of Date -- Agreement was reached with Westinghouse for an additional 100 LRIP units with contract award in January 1990. The Honeywell contract option for delivery of 100 torpedoes was exercised in March.

(U) Threshold Breaches: There are currently no DAE Baseline (12 May 89) breaches.

9. (U) Schedule:

a. (U) Milestones --

	Development Estimate	Approved Program	Current Estimate
Milestone I (DSARC I)	JUL 79	JUL 79	JUL 79
D&V Contract Award	N/A	AUG 79	AUG 79
DT/OT-I Completed	N/A	JUL 83	JUL 83
Milestone II (DSARC II)	DEC 83	JAN 84	JAN 84
FDS Contract Award	AUG 83	SEP 83	SEP 83
Critical Design Review	APR 86	MAY 88	MAY 88
Milestone IIIA (DAB)	OCT 86	FEB 89	MAR 89
LRIP 2nd Year Approval	N/A	FEB 90	MAR 89
OT II Completed	DEC 88	JUL 90	DEC 90(Ch-1)
Milestone IIIB (DAB)	APR 89	JAN 91	APR 91(Ch-1)
IOC (MK 50 Deployment on fleet (C) ASW platform)	(b)(1)		

b. (U) Previous Change Explanations --

Honeywell's performance in the areas of cost and schedule indicated that the Navy Memorandum of Agreement (MOA) with Honeywell, signed in November 1986 allowing completion of FSD within the 'should cost,' was not executable. ASN (RE&S) directed that the program be reexamined and that a comprehensive FSD statement of work under a firm price ceiling be incorporated into the FSD contract. Honeywell and the Navy reached an agreement on 17 July 1987 resulting in a restructured FSD program. This restructure allows an increase in development testing to ensure that a vigorously tested, reliably designed torpedo exists before entering production.

c. (U) Current Change Explanations --

CH-1: Current estimate changed from July 90 to Dec 90 for completion of OT-II due to delay in completion of testing caused by Congressional reduction of $8.4M in FY 90 R&D funding. Delay in completion of OT-II causes subsequent slip in MS IIIB and (b)(1)

(b)(1)

d. (U) References --

Development Estimate: SDDM, dated March 15,1984, subject 'MK 50 Torpedo (Full-Scale Development Approval).'

Approved Program: DAE Baseline, approved 12 May 1989.

(U) Technical/Operational Characteristics:

a. (U) Technical --	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
I. Acoustic Acq. Range (50% Prob of Acq.)				
Note: For A & B below- Water Depth / Target Depth: >600 ft / >200 ft				
A. High Doppler (Active) Cntrmeasure dep. (yd)				
B. Low Doppler (Active) Cntrmeasure dep. (yd)				
C. Water Depth / Target Depth: <600 / >200				
High Doppler (Active)				
Low Doppler (Active)				
D. Passive Mode				
Water Depth / Target Depth: <600 ft / <200 ft				
>600 ft / Surface				
II. Terminal-Homing (short and/or medium pulse)				
a. 90% longitudinal hit placement accuracy.				
b. 90% longitudinal plane angle of impact re normal incidence				
c. 90% vertical plane angle of impact re normal incidence				

(b)(1) [redacted]

(b)(1) [redacted]

([redacted]) Technical/Operational Characteristics (Cont'd):

a. ([redacted]) Technical --	Dev Est	Approved Program Goal/Threshold		Demon-strated Perf	Current Estimate
III. Warhead	(b)(1) [redacted]				
IV. Depth (ft)					
1. Min. water depth					
2. Min. homing depth					
3. Max. warshot depth					
V. Propulsion					
1. Max. speed (kt)					
2. Min. endurance @ max. speed (yd)					
VI. Dimensions					
1. Max. length*	111.5	111.5	111.5	111.5	111.5
2. Max. weight	798	798	798	748	798 CH-6
3. Max. diameter	12.75	12.75	12.75	12.75	12.75
*without air launch accessories.					

b. [redacted] Operational --

PROBABILITY OF A HIT

1. U.S. Subs & Target	(b)(1) [redacted]
[redacted] Nominal Env	
No CM: Undirected	
Directed	
With CM: Undirected	
Directed	
2. U.S. Subs & Targets Adverse conditions.	
No CM: Undirected	
Directed	
With CM: Undirected	
Directed	
3. Soviet submarines and artificial	

(U) Technical/Operational Characteristics (Cont'd):

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
b. (U) Operational --				
targets, nominal environment.				
No CM: Undirected				
Directed				
With CM: Undirected				
Directed				
4. Soviet submarines, Adverse conditions.				
No CM: Undirected				
Directed				
With CM: Undirected				
Directed				
READINESS/ SUPPORTABILITY				
1. Reliability				
a. Mission reliability	(b)(1)			
b. In-water reliability				
c. Acceptance rate for storeage breakout	.90	.90	.90	.90 CH-8
d. Auxillary equip. (MTBF) (hr)	175	175	175	175
2. Maintainability				
a. Organizational				
No internal access. Attachment and removal of accessories only.				
b. IMA torpedo turn-around time, max. (hr)	16	24	24	24
(with man-hrs)	100	50	50	50
INDUSTRIAL BASE				
1. Lead time to produce (months)	n/a	24	24	24
2. Production buildup rate (units/month)	n/a	7	7	7

(U) Technical/Operational Characteristics (Cont'd):

b.(U)Operational --	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
3. Optimum production rate (units/month)	n/a	26	26	26
4. Surge capability (per month)	n/a	50	50	50

c.(U)Previous Change Explanations --

Current estimate based on actual performance by 200A series prototype hardware.

d.(U)Current Change Explanations --

CH-1: Reflects revised current estimate as contained in approved program baseline.

CH-2: This item was included in the previous SAR and has subsequently been removed from the approved baseline.

CH-3: Reflects revised parameter as shown in the approved program baseline. Items a,b and c are no longer included in the baseline.

CH-4: Reflects same basic criteria with revised wording as contained in the approved program baseline.

CH-5: Reflects revised current estimate as included in the approved
program baseline.

CH-6: Reflects revised current estimate for this parameter as contained in the approved program baseline.

CH-7: Figure shown is the revised current estimate from the program baseline.

CH-8: Corrects threshold and current estimate values to those contained in thr approved program baseline.

e.(U)References --

Development Estimate: SDDM, dated March 15,1984, subject "MK 50 Torpedo (Full-Scale Development Approval)."

[redacted]. ([redacted]) Technical/Operational Characteristics (Cont'd):

Approved Program: DAE Baseline, approved 12 May 1989.

11. ([redacted]) Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. ([redacted]) Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	1117.7	1436.6	1452.2
Procurement	3609.1	3784.1	3823.9
Swimaway	(2976.6)	(3082.1)	(3114.5)
Total Sailaway	(2976.6)	(3082.1)	(3114.5)
Other Wpn Sys Cost	(386.8)	(544.9)	(550.7)
Peculiar Support	(0.0)	(0.0)	(0.0)
Initial Spares	(245.7)	(157.1)	(158.7)
Construction	8.9	26.6	26.6
Ops. and Maint. (O&M)	0.0	0.0	0.0
Total FY 84 Base-Year $	4735.7	5247.3	5302.7
Escalation	1918.0	1967.9	1988.5
Development (RDT&E)	(49.2)	(19.9)	(20.1)
Procurement	(1868.8)	(1938.7)	(1959.1)
Construction (MILCON)	(0.0)	(9.3)	(9.3)
Ops. and Maint. (O&M)	(0.0)	(0.0)	(0.0)
Total Then-Year $	6653.7	7215.2	7291.2

b. ([redacted]) Quantities --

Development (RDT&E)	108	108	108
Procurement	[redacted](b)(1)		
Construction (MILCON)	0	0	0
Ops. and Maint. (O&M)	0	0	0
Total			

Paragraph 11 Comments:
None.

c. ([redacted]) Foreign Military Sales -- None.

d. ([redacted]) Nuclear Costs -- None.

e. ([redacted]) References --

Development Estimate: SDDM, dated March 15, 1984 subject "MK 50 Torpedo (Full-Scale Development Approval)."

Approved Program: DAE approved baseline dated 12 May 1989.

. [redacted] Program Acquisition/Current Procurement Unit Cost Summary:
urrent (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. [redacted] Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1) Cost	7291.2	6741.1	7291.2
(2) Quantity	(b)(1) [redacted]		
(3) Unit Cost			
b. [redacted] Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	274.0	274.0	333.4
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	36.5	36.5	0.0
Net Total	310.5	310.5	333.4
(2) Quantity	200.0	200.0	265.0
(3) Unit Cost	1.553	1.553	1.258

Paragraph 12 Comments:
Quantity includes R&D prototype torpedoes in inventory objective. These units will remain the property of the Navy but will not be available for fleet use.

(U) Cost Variance Analysis:

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1166.9	5477.9	8.9	6653.7
Previous Changes:				
Economic	-7.4	-760.2	-	-767.6
Quantity	+26.5	-	+21.2	+47.7
Schedule	+162.9	+789.3	-	+952.2
Engineering	+31.0	-	-	+31.0
Estimating	-1.0	-94.6	-	-95.6
Other	-	-	-	-
Support	+68.8	-152.5	+3.4	-80.3
Subtotal	+280.8	-218.0	+24.6	+87.4
Current Changes:				
Economic	+1.3	+446.7	+2.4	+450.4
Quantity	-	-	-	-
Schedule	-	+3.6	-	+3.6
Engineering	-	-	-	-
Estimating	+23.3	+72.8	-	+96.1
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+24.6	+523.1	+2.4	+550.1
Total Changes	+305.4	+305.1	+27.0	+637.5
Current Estimate	1472.3	5783.0	35.9	7291.2

Cost Variance Analysis (Cont'd):

(FY 1984 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1117.7	3609.1	8.9	4735.7
Previous Changes:				
Quantity	+23.1	-	+14.7	+37.8
Schedule	+138.8	+407.1	-	+545.9
Engineering	+28.1	-	-	+28.1
Estimating	+72.2	-120.2	+0.2	-47.8
Other	-	-	-	-
Support	+55.1	-108.9	+2.8	-51.0
Subtotal	+317.3	+178.0	+17.7	+513.0
Current Changes:				
Quantity	-	-	-	-
Schedule	-	+1.7	-	+1.7
Engineering	-	-	-	-
Estimating	+17.2	+35.1	-	+52.3
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+17.2	+36.8	-	+54.0
Total Changes	+334.5	+214.8	+17.7	+567.0
Current Estimate	1452.2	3823.9	26.6	5302.7

17.594

b. (U) Previous Change Explanations --

RDT&E

Economic:	Revised Escalation Indices.
Quantity:	Reduction and subsequent restoration of 41 prototype torpedoes to accommodate testing requirements.
Schedule:	Thirty-three month delay. Twenty-one due to program restructure and twelve due to previous slippage in RDT&E.
Engineering:	Increased Reliability and Test Equipment Effort. Establishment of Engineering Qualification Test Program to allow increased reliability testing. Correction of afterbody anomalies.
Estimating:	Change to 'True' FY 84 Constant $ and general reduction by House Appropriations Committee. Addition of P3I Program for Advanced Warhead, subsequently deleted until threat defined.
	FY 88 Appropriation Act Reductions.
	Projected Honeywell Over Target Cost.
	Projected Government Cost Increases.
Support:	Navy Industrial Fund Adjustment/CSS Reduction.
	Navy laboratory support of increase testing program.

b. [redacted] Previous Change Explanations -- (Cont'd)

PROCUREMENT

Economic:	Revised Escalation Rates.
Schedule:	Stretch out of approximately 6 years due to reduced annual procurement quantity from 1,260 to 800 and slowed production ramp up. A subsequent revision to the program increased production ramp up and annual production quantity from 800 to 1000. This resulted in shortening the production schedule by one year.
Estimating:	Change in First Unit (TI) Cost and Learning Curve assumptions and rate effects based on actual data from Prime Contractor and proposed data from Second Source.
	Started competition earlier resulting in more torpedoes produced under full competition with resultant savings.
	Changes based on negotiated values of torpedo and support equipment in the Honeywell and Westinghouse LRIP Contracts.
Support:	Navy Industrial Fund/CSS Reduction and reduction of initial spares requirements based on required initial outfitting requirements for IMA.
	Shift of Spares requirements from FY 88/89 to out years.

MILCON

Quantity:	Change of 5 IMA facilities for MK 50 from dual use to system specific.
Estimating:	Change to 'True' FY 84 Constant $.
Support:	Addition of Intermediate Maintenence Activity at Charlestown, S.C.

c. [redacted] Current Change Explanations --

		(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E			
Economic:	Revised Escalation Indices	-	1.3
Estimating:	Projected Honeywell Over Target Cost; addition of funds compensates for prior reduction	17.2	23.3
(2) PROCUREMENT			
Economic:	Revised Escalation Rates.	-	446.7
Schedule:	Movement of 119 torpedoes to out	36.8	76.4

c. [redacted] Current Change Explanations -- (Cont'd)

	(Dollars in Millions) Base-Year	Then-Year
years resulting from decreased procurement quantities in FY91-FY94 due to increased escalation.		
Estimating: To correct the distribution of the change on the previous SAR the following entries have been included in calculating the tables above:		
Schedule	-35.1	-72.8
Estimating	35.1	72.8
(3) MILCON Economic: Revised Escalation Indices.	-	2.4
(4) O & M		

14. [redacted] Program Acquisition Unit Cost (PAUC) History: (Then-Year Dollars in Millions)

MK 50 Torpedo

[redacted] Initial Baseline Estimate to Current Estimate - -

PAUC (Initial Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
(b)(1)	-0.040	+0.006	+0.122	+0.004	+0.000	--	-0.010	+0.081	(b)(1)

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5. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E

MK 50 Torpedo:
Honeywell, USD
Hopkins, MN
N00024-83-C-6254, CPIF
Award: August 1, 1983
Definitized: April 25, 1984

Initial Contract Price		
Target	Ceiling	Qty
$491.1	N/A	90.0

Current Contract Price		
Target	Ceiling	Qty
$697.8	$730.0	90.0

Estimated Price At Completion	
Contractor	Program Manager
$696.0	$700.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-5.7	$-12.6
Cumulative Variances To Date (11/30/89)	$-22.8	$-12.2
Net Change	$-17.1	$0.4

Explanation of Change: The MK 50 Torpedo FSD Program was restructured per SECNAV direction. This restructure was negotiated between Honeywell and the Navy and a contract to CPIF with a firm ceiling price. The restructure has restored RDT&E torpedo quantities to the original baseline of 90. The current cost and schedule variance reflects Honeywell's performance since August 1987. The primary cost drivers have been problems experienced with building the MK-50 ATE and difficulty in resolving technical issues with the torpedo. This resulted in added engineering effort which lead to cost growth in the FSD program.

b. (U) Procurement

MK 50 Torpedo:
Honeywell, USD
Hopkins, MN
N00024-89-C-6040, FPI
Award: October 6, 1988
Definitized: October 6, 1988

Initial Contract Price		
Target	Ceiling	Qty
$173.2	$189.1	76.0

Current Contract Price		
Target	Ceiling	Qty
$173.2	$189.1	76.0

Estimated Price At Completion	
Contractor	Program Manager
$154.0	$154.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date (11/30/89)	$0.9	$-3.7
Net Change	$0.9	$-3.7

Explanation of Change: Variances not significant.

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15. [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

MK 50 Torpedo:	Initial Contract Price		
	Target	Ceiling	Qty
Westinghouse, Inc. Baltimore, MD N00024-87-C-6378, FPI Award: December 15, 1988 Definitized: December 15, 1988	$125.5	$142.3	74.0

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$125.5	$142.3	74.0	$106.6	$115.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date (11/30/89)	$-0.9	$-11.7
Net Change	$-0.9	$-11.7

Explanation of Change: Schedule variance, driven by late receipt of material, can be recovered without significant impact on contract cost.

16. [redacted] Program Funding Summary:

a. ([redacted]) Program Status --

(1) Percent Program Completed: 55.6% (15 yrs/27 yrs)

(2) Percent Program Cost Appropriated: 24.2% ($1767.4 / $7291.2)

b. ([redacted]) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY75-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-01)	Total
RDT&E	1370.0	59.1	39.0	4.2	1472.3
Procurement	385.1	274.0	333.5	4790.4	5783.0
MILCON	12.3	-	-	23.6	35.9
O&M	-	-	-	-	-
Total	1767.4	333.1	372.5	4818.2	7291.2

MK 50 Torpedo, December 31, 1989

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Years	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: 1319 Research, Development, Test & Eval, Navy								
1975				3.3	1.8	1.8	1.9	10.9
1976				16.3	9.5	9.5	9.5	6.6
197T				5.1	3.1	3.1	3.1	2.9
1977				28.5	17.8	17.8	17.8	2.6
1978				36.2	24.3	24.3	24.3	6.8
1979				59.6	44.1	44.2	44.2	
1980				73.1	59.9	59.9	59.9	10.6
1981				110.4	98.8	98.8	98.8	10.6
1982				110.5	104.0	104.0	104.0	7.6
1983				116.9	114.9	114.9	114.9	4.9
1984				140.4	143.1	143.1	143.1	3.8
1985				140.2	147.5	147.5	147.5	3.4
1986				140.4	151.8	151.8	150.4	2.8
1987				155.4	173.0	173.0	172.1	
1988				121.5	140.0	139.9	139.9	3.0
1989				113.8	136.4	134.0	129.2	4.2
1990				47.4	59.1	39.8	4.5	4.0
1991				30.1	39.0			4.2
1992				3.1	4.2			4.0

c. (b)(1) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY84 Dollars Nonrec	Flyaway FY84 Dollars Rec	Total Base Years$	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: 1319 Research, Development, Test & Eval, Navy (Cont'd)								
Subtot	108			1452.2	1472.3	1407.4	1365.1	
Appropriation: 1507 Weapons Procurement, Navy								
1987		7.5	1.8	57.2	66.2	65.6	32.5	2.7
1988	(b)(1)	14.7	31.2	97.8	117.3	108.8	56.3	3.0
1989		4.3	125.3	162.7	201.6	199.8	54.2	4.2
1990		30.0	167.8	213.5	274.0	4.2	0.6	4.0
1991		10.0	188.6	245.9	333.5			4.2
1992			245.2	326.8	456.6			4.0
1993		10.0	295.2	366.6	530.7			3.7
1994		5.0	335.3	396.0	591.2			3.4
1995			346.0	411.2	632.9			3.1
1996			322.5	383.5	608.6			3.1
1997			311.8	376.9	616.9			3.1
1998			306.8	357.7	603.6			3.1
1999			284.2	333.8	580.6			3.1
2000			61.2	75.2	134.9			3.1
2001			9.6	19.1	34.4			3.1
Subtot		81.5	3032.5	3823.9	5783.0	378.4	143.6	

c. (U) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Years	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: 1205 Military Construction, Navy								
1982				9.1	8.9	8.9	8.9	7.6
1989				2.8	3.4	1.0		4.2
1992				1.6	2.2			4.0
1995				4.5	6.9			3.1
1997				4.3	7.0			3.1
1999				4.3	7.5			3.1
Subtot	0			26.6	35.9	9.9	8.9	
Total	(b)(1)	81.5	3032.5	5302.7	7291.2	1795.7	1517.6	

Paragraph 16 Comments:
* Westinghouse Production Qualification Units (Refers to WPN quantity for FY 1988.

17. (U) Production Rate Data:
a. (U) Annualized Production Rates --

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1987	(b)(1)	0	0	0
1988		0	(b)(1)	0
1989		0		0

[redacted]. [redacted] Production Rate Data (Cont'd):

Fiscal Year Buy	Production Rates (Quantity/Year) Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1990	(b)(1)	0	(b)(1)	0
1991		0		0
1992		0		0
1993		0		0
1994		0		0
1995		0		0
1996	0	0		0
1997	0	0		0
1998	0	0		0
1999	0	0		0
2000	0	0	0	0

b. [redacted] Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Acq. Cost (BY $)	N/A	N/A	5302.7	+5302.7	0.0
(TY $)	N/A	N/A	7291.2	+7291.2	0.0
PAUC Cost (BY $)	N/A	N/A	0.675	+0.675	0.000
(TY $)	N/A	N/A	(b)(1)		0.000

c. (U) Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	OCT 88	N/A	N/A
Duration (in mon)	N/A	N/A	+153	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	JUL 01	N/A	N/A

d. (U) Deliveries (Plan/Actual) --

	To Date
RDT&E	46/42
Procurement	0/0
MILCON	0/0
O & M	0/0

e. (U) Approved Design-to-Cost Goal --

	Development Estimate	Current Estimate	Latest Approved Threshold
	(Average Unit Flyaway Cost)		
@ Qty 1000 - @ Peak Rate: 83/mo			
FY 84 Base-Year $	0.4	0.4	0.4
Then Year $	0.5	0.5	0.5
@ Qty 0 (1st three years) - @ Peak Rate: 0/mo			
FY 84 Base-Year $	0.0	0.0	0.0
Then Year $	0.0	0.0	0.0

Paragraph 17 Comments:
(NOTE: Funded Delivery Period is 6 months for FY 88 Current Estimate only. All other FDPs are 12 months.)(Refers to 17a)

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules --

These appropriations include MPN, O&MN, WPN and OPN. Costs contained herein were developed using the MK-50 Torpedo Life Cycle Cost Model with the most current data available. This is the same method used to develop the O&S costs previously briefed to the OSD Cost Analysis Improvement Group (CAIG) in February of 1989.

b. Costs -- (FY 1984 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per MK-50 Inventory	Avg Annual Cost Per (Antecedent)
Operations	15.6	0.0
IMA Maintenance	11.4	0.0
Depot Maintenance	2.5	0.0
Sustaining Investment	7.9	0.0
Depot Supply Support	4.9	0.0
Total	42.3	0.0

c. Contractor Support Costs -- (Current (Then-Year) Dollars in Millions)

Funding	FY1989 & Prior	FY1990	FY1991	Balance To Complete	Total
O&M	0.4	0.2	0.2	4.2	5.0
Industrial Fund	---	---	---	---	---
Total	0.4	0.2	0.2	4.2	5.0

ADDENDUM [redacted]

19. ([redacted]) Cost-Quantity Information:

a. ([redacted])Baseline (Type) - - Development Estimate, FY 1984 BY $

b. ([redacted])End Item - - MK 50 Torpedo

c. ([redacted])Cost Quantity Relationship (Type) - - Log-Linear Unit

d. ([redacted])First Unit Cost - - $0.0 million

e. ([redacted])Slope - - 0.0%, B =

f. ([redacted])Tabular Data - - None.

N-5 ASPJ

SAR-89-014

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: AIRBORNE SELF-PROTECTION JAMMER (ASPJ)

RDT&E SAR ONLY AS OF DATE: DECEMBER 31,1989

MAR 21 1990

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90 C0636

1. Designation and Nomenclature (Popular Name): AN/ALQ-165(V) Defensive Electronic Countermeasures System, Airborne (Airborne Self-Protection Jammer (ASPJ)).

2. DoD Component: U.S. Navy, U.S. Air Force

3. Responsible Office and Telephone Number:
Advanced Tactical Aircraft Protection Systems (ATAPS) Program Office, PMA-272
Naval Air Systems Command
Washington, DC 20361

Capt S. M. Small
Assigned: 2 August 1988
AV 222-5480;
COMM (202) 692-5172

4. Program Elements/Procurement Line Items:
RDT&E PE 0604270N (PU W0619, W0638)
PE 0604270F (PU 2712, 2719)
PROCUREMENT: N/A
MILCON: N/A

5. Related Program: None

~~Classified by: OPNAVINST 5513.8(31) (THIS PAGE IS UNCLASSIFIED)~~
~~Declassify on: OADR~~

~~SECRET~~

6. (U) Mission and Description: The Airborne Self-Protection Jammer (ASPJ) Program, AN/ALQ-165(V), is dedicated to providing an effective, state-of-the-art Defensive Electronic Countermeasure (DECM) system for the self-protection of tactical aircraft. The system is designed to meet tactical aircraft DECM needs into the 21st century. ASPJ will be fully compatible with aircraft avionic and weapon systems (RWRs, HARM, AMRAAM, etc.). Compatibility with other RWR systems may be required as variations in installation plans are derived. The system is modularly designed with reprogrammable software. Modular construction and software controlled system management allows airframe users to install the level of capability required depending upon the radar cross-section of the platform to be protected, the airframe installation and/or tactical need. Computer programs developed for the ASPJ system are fully modular in design and will be segmented to cover separate operational functions or control separate hardware elements.

Currently, there are three ASPJ Configurations: (1) Basic System, (2) Common System, and (3) Pod System. All applications use combinations of the same Weapon Replaceable Assembly (WRA). The only equipment unique to each aircraft is the rack that houses the standard WRAs to interface with the aircraft. An ASPJ PrePlanned Product Improvement (P^3I) Program will upgrade the system with the capability to counter projected new threats and improve its capability against known threats.

7. (U) Program Highlights:

a. Significant Historical Developments -- The program was started in 1969 as a traveling wave tube component development effort. In 1976, Director of Defense Research and Engineering (DDRE) directed that this program (renamed ASPJ) and the Air Force lightweight, low cost countermeasure program be combined. Navy was designated the lead service. The joint effort was to develop a common, internal ASPJ system, capable of integration with the Navy ALR-67 and the Air Force ALR-56M radar warning receivers (RWR). The Navy wanted the system to be installed internally in the F/A-18, F-14 and A-6, and in a pod on the AV-8B. In January 1980, the Air Force confirmed the requirement for the ASPJ in the F-16. Major design changes were funded by the Air Force and inserted to meet Air Force requirements, thereby achieving the Office of the Secretary of Defense (OSD) guidance of 100 percent common Navy and Air Force systems. All twelve ASPJ Full-Scale Development (FSD) prototype models have been delivered and fielded for testing. F-16A and F/A-18A integration is complete. The Under Secretary of Defense for Acquisition Joint Requirements and Management Board (JRMB) decision memorandum dated 10 December 1986 approved an ASPJ Acquisition to include a Production Verification (PV) phase of six units with an option for 24 additional units contingent upon test results and a Joint Service Review. The ASPJ Basic PV contract for 6 units was

awarded 31 August 1987, the PV option for an additional 14 systems was exercised 31 August 1988. The ASPJ completed Phase II of the Full-Scale Development (FSD) DT&E with the completion of DT-IIC on 2 June 1988. Operational testing to support MS IIIA decision began at the Naval Weapons Center on 18 July 1988. Air Force Operational Test and Evaluation Center (AFOTEC) began an initial operation lab test (OT-IIB) at the Air Force Electronic Warfare Evaluation Simulator in mid-September 1988. OT-IIB was completed 28 October 1988. OPTEVFOR completed the F/A-18A portion of OT-IIC flight testing 16 November 1988.

b. Significant Developments Since Last Report -- Operational flight testing (F/A-18A, F-16A) and laboratory testing for OPTEVFOR and AFOTEC commenced 18 July 1988 and was completed on 3 March 1989. This testing supported the Milestone (MS) IIIA Defense Acquisition Board of 12 June 1989. System integration, laboratory and flight tests for support of the MS IIIA decision were conducted on both the F/A-18A and F-16C aircraft using FSD systems. The two FY 89 Low Rate Initial Production contracts (Lot 1) for a total of 100 systems were awarded on 6 October 1989. Program Budget Decision (PBD) 807C of 15 December 1989 removed all Air Force funding for ASPJ beginning in FY 91. Integration testing on the F/A-18C aircraft with FSD systems and contractor qualification testing of the Production Verification (PV) systems will be used to support MS IIIA' in FY 90 and MS IIIA" in FY 91 for the award of two LRIP contracts in FY 91 and FY 92 respectively. ASPJ is expected to satisfy mission requirements. Operational flight testing of the PV systems will occur in FY 91 in support of the MS IIIB full rate decision in FY 92. PV system 1 was accepted by the government on 7 December 1989.

c. Change Since "As of" Date -- None

8. (U) Threshold Breaches: There is currently no DAE baseline.

9. (U) Schedule:

a. Milestones --	Dev. Est	Apprvd Pgrm	Cur Est	
(U) Complete Phase I	Aug 81	N/A	Feb 81	
(U) Contract Award, Phase II	Dec 81	N/A	Aug 81	
(U) Combined DT-IIC/OT-IIA (Start)	Apr 86	N/A	Mar 88	
(U) Combined DT-IIC/OT-IIA (Comp)	N/A	N/A	Jul 88	
(U) DAB III (A)	Aug 86	N/A	Jun 89	(Ch-1
(U) Limited Production Contract	Nov 86	N/A	Oct 89	(Ch-1

(b)(1)

b. Previous Change Explanations --

(Ch-1) DAB III, contract award and IOC delayed due to technical problems encountered during development/ operational testing; problems have been resolved and system fixes are in place.

c. Current Change Explanations --

(Ch-1) From May 89 to Jun 89, Administrative Delays
(Ch-2) From Aug 89 to Oct 89, Administrative Delays

d. References --

Development Estimate: Deputy Secretary of Defense Decision Memorandum (DSDDM), 24 February 1982 and Under Secretary of Defense (USD) (C^3I) Decision Memorandum (DM), 20 March 1984.

Approved Program: N/A

10. (U) Technical/Operations Characteristics:

	Dev Est	Approved Program Goal/ Threshold	Demon-strated Perf	Cur Est
a. Technical --				
(S) Frequency Coverage (GHz)	(b)(1)			
(S) Threat Capacity				
(S) Pulse Density (pps)				
(S) Output Peak Power (dBm)				
(S) Output CW Noise (dBm)				
(S) Throughput Time (nSEC)				

* Maximum pulse density generated at AFEWES; ASPJ systems showed no sign of degradation at this density.

b. Operational--				
(S) Operational Availability (%)	(b)(1)			
(S) Mission Reliability (%)				
(S) Logistics Demand (MFHBR)]				
(S) Maint. Demand Hours (MFHBMA)	8.6	N/A	N/A**	6.8
(S) DMMH/MA (Basic: Augmented)	0.95:1.2	N/A	N/A**	2.18:2.65

** Limitations in scope of operational testing completed 2/Q FY 89, did not allow for satisfactory performance. Capability demonstration of the FSD systems. The operational characteristic of the system will be assessed during OT IIE testing of the PV systems.

c. Previous Change Explanation --

(b)(1) [redacted]

Revised estimate (GH_z) based upon demonstrated system performance

d. Current Change Explanation -- N/A

e. References --

Development Estimate: Deputy Secretary of Defense Decision Memorandum (DSDDM), 24 February 1982 and Under Secretary of Defense (USD) (C^3I) Decision Memorandum (DM), 20 March 1984.

Approved Program: N/A

11. ~~(U)~~ Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. Cost --	Development Est	DAE Est	Cur Est
Development (RDT&E)	227.7	N/A	527.0
Procurement	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total FY84 Base Year $	227.7	N/A	527.0
Escalation	8.7	N/A	+34.6
Development (RDT&E)	(8.7)	N/A	+34.6
Procurement	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total Then-Year $	236.4	N/A	561.6

b. Quantities --

Development RDT&E	12	N/A	12
Procurement*	N/A	N/A	N/A
Total	12	N/A	12

* Procurement costs are included in the host aircraft procurement budgets.

c. Foreign Military Sales -- To be determined

e. References --

Development Estimates: Deputy Secretary of Defense Decision Memorandum (DSSM), 24 February 1982 and Under Secretary of Defense (USD) (C^3I) Decision Memorandum (DM), 20 March 1984.

Approved Program: N/A

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: N/A

13. (U) Cost Variance Analysis:

a. Summary -- (Current [Then Year] Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	236.4	--	--	236.4
Previous Changes:				
Economic	-1.4	--	--	-1.4
Quantity	--	--	--	--
Schedule	+25.4	--	--	+25.4
Engineering	+52.1	--	--	+52.1
Estimating	+291.4	--	--	+291.4
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+367.5	--	--	+367.5
Current Changes:				
Economic	-0.2	--	--	-0.2
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-42.1	--	--	-42.1
Other	--	--	--	--
Support	--	--	--	--
Subtotal	-42.3	--	--	-42.3
Total Changes	+325.2	--	--	+325.2
Current Estimate	561.6	--	--	561.6

13. Cost Variance Analysis (Continued):
(FY 1984 Constant [Base Year] Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	227.7	--	--	227.7
Previous Changes:				
Quantity	--	--	--	--
Schedule	+21.8	--	--	+21.8
Engineering	+40.8	--	--	+40.8
Estimating	+271.1	--	--	+271.1
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+333.7	--	--	+333.7
Current Changes:				
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-34.4	--	--	-34.4
Other	--	--	--	--
Support	--	--	--	--
Subtotal	-34.4	--	--	-34.4
Total Changes	+299.3	--	--	+299.3
Current Estimates	527.0	--	--	527.0

b. Previous Change Explanations --

RDT&E

Economic	Revised Jan 89 Escalation Rates (Economic)
Estimating	Allocation adjustments (FY88 and Prior)
	APB FY88/89 Adjustment
	Nov 86 JRMB Directed Change (FY86)
	Disapproved ATR (FY87)
	JRMB Directed Operational Test (FY89)
	Cancellation of AF P^3I (FY88)
	Delays in completion of F-16 Testing (FY88/89)
	Operational Testing to support 1992 IIIB Decision (FY90/91)
	Restructure of the Pre-Planned Product Improvement (P^3I) Plan (FY90-94)
	Outyear FYDP Adjustment (FY92)

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Jan 90		-0.2
Escalation rates (Economic)		
Re-allocation of prior year (FY 88 and Prior) unobligated balances (Estimating)	-3.4	-3.9
Restructure of the Pre-Planned Program Improvement (P^3I) Plan (FY90 -1.6, FY91 -0.9, FY92 -8.7, FY93 -8.0, FY94 -6.0) (Estimating)	-20.9	-25.2
Removal of Air Force Funds (estimating)	-10.1	-13.0

14. (U) Program Acquisition Unit Cost (PAUC) History: N/A

15. (U) Contract Information: (Then Year Dollars in Millions)

a. RDT&E --

ASPJ	Initial Contract Price Target	Ceiling	Quantity
Joint Venture, ITT/WEC Nutley NJ/Baltimore, MD N00019-81-C-0369, CPAF Definitized: August 27, 1981	80.8	N/A	12

Current Contract Price Target	Ceiling	Estimate Price at Completion Qty	Contractor	Prog Mgr
176.6	140.0	12	176.6	258.0

Variance	Cost Variance	Schedule
Previous Cumulative Variances	N/A	N/A
Cumulative Variance to Date (30 Nov 88)	N/A	N/A
Net Change	N/A	N/A

Explanation of Change: FSD contract cap was negotiated in November 1984, which established a maximum government liability of 140M. As a part of the contract cap agreement, Contractor Performance Reports (CPR's) were no longer required; therefore Cost and Schedule Variance information is not available for reporting.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status -- (for R&D only)
(1) Percent Program Completed: 70.5% (12 years/17 years)

(2) Percent Program Cost Appropriated: 86.8%
(487.4/561.6)

b. Appropriation Summary --
(Then Year Dollars in Millions)

Appropriation	Prior Yrs (FY78-89)	Bugt Yr (FY-90)	Bugt Yr (FY91)	Bal to Comp (FY92-94)	Total
RDT&E	487.4	13.7	11.5	49.0	561.6

c. Annual Summary -- (Navy and Air Force Total)

Fiscal Year	Qty	Flyaway FY84 Dollars Nonrec	Flyaway FY84 Dollars Rec	Total Base Year $	Total Then-Year Prog	Total Then-Year Oblig	Total Then-Year Expended	Esc Rate %
		APPROPRIATION: RDT&E SUMMARY						
1978				2.6	2.6	2.6	2.6	
1979				20.4	20.4	20.4	20.4	
1980				22.3	22.3	22.3	22.3	
1981				40.3	40.3	40.0	39.9	
1982				78.4	78.4	78.3	78.2	
1983				82.6	82.6	81.6	81.5	
1984				80.9	82.0	82.0	81.7	3.80
1985				55.0	57.8	57.7	56.6	3.40
1986				28.2	30.4	30.4	28.6	2.80
1987				19.1	21.3	19.7	16.9	2.70
1988				27.1	31.2	30.7	24.2	3.00
1989				15.1	18.1	15.8	6.7	4.20
1990				11.0	13.7	2.0	0.8	4.00
1991				8.9	11.5	0.0	0.0	4.20
1992				11.1	15.0	0.0	0.0	4.00
1993				10.8	15.0	0.0	0.0	3.70
1994				13.2	19.0	0.0	0.0	3.40
TOTAL				527.0	561.6	483.5	460.4	

c. Annual Summary -- (Navy and Air Force Total Cont'd)

Fiscal Year	Qty	Flyaway FY84 Dollars Nonrec	Flyaway FY84 Dollars Rec	Total Base Year $	Total Then-Year Prog	Total Then-Year Oblig	Total Then-Year Expended	Esc Rate (%)
APPROPRIATION: RDT&E NAVY								
1978				2.6	2.6	2.6	2.6	
1979				15.6	15.6	15.6	15.6	
1980				13.2	13.2	13.2	13.2	
1981				28.1	28.1	27.8	27.7	
1982				24.0	24.0	23.9	23.8	
1983				32.8	32.8	31.8	31.7	
1984				40.0	40.3	40.3	40.0	3.80
1985				31.9	33.5	33.4	32.3	3.40
1986				20.3	21.9	21.9	20.1	2.80
1987				8.5	9.5	9.5	7.2	2.70
1988				13.9	16.0	16.0	15.1	3.00
1989				6.8	8.1	7.9	5.7	4.20
1990				6.3	7.9	2.0	0.8	4.00
1991				8.9	11.5	0.0	0.0	4.20
1992				11.1	15.0	0.0	0.0	4.00
1993				10.8	15.0	0.0	0.0	3.70
1994				13.2	19.0	0.0	0.0	3.40
TOTAL				288.0	314.0	245.9	235.8	

Fiscal Year	Qty	Flyaway FY84 Dollars Nonrec	Flyaway FY84 Dollars Rec	Total Base Year $	Total Then-Year Prog	Total Then-Year Oblig	Total Then-Year Expended	Esc Rate %
APPROPRIATION: RDT&E AIR FORCE								
1979				4.8	4.8	4.8	4.8	
1980				9.1	9.1	9.1	9.1	
1981				12.2	12.2	12.2	12.2	
1982				54.4	54.4	54.4	54.4	
1983				49.8	49.8	49.8	49.8	
1984				40.9	41.7	41.7	41.7	3.80
1985				23.1	24.3	24.3	24.3	3.40
1986				7.9	8.5	8.5	8.5	2.80
1987				10.6	11.8	10.2	9.7	2.70
1988				13.2	15.2	14.7	9.1	3.00
1989				8.3	10.0	7.9	1.0	4.20
1990				4.7	5.8	0.0	0.0	4.00
1991				0.0	0.0	0.0	0.0	4.20
1992				0.0	0.0	0.0	0.0	4.00
1993				0.0	0.0	0.0	0.0	3.70
1994				0.0	0.0	0.0	0.0	3.40
TOTAL				239.0	247.6	237.6	224.6	

17. (U) Production Rate Data: N/A

18. (U) Operating and Support Costs:

a. Assumptions and Ground Rules -- N/A

b. Costs -- N/A

c. Contractor Support Costs --

Claimant: NAVAIRSYSCOM

(Then-Year Dollars in Millions)

	FY1988 Act	FY1989 Est	FY1990 Est	FY1991 Est
Weapon System: ASPJ Total			0.1	3.5
Interim Contractor Support (ICS) (O&M,N)				1.9
Contractor Logistics Support (CLS) (O&M,N)				1.1
Depot Maintenance (O&M,N)			0.1	0.5

Narrative Explanation:

Interim Contractor Support (O&M,N) - Increase in FY 1991 is due to support of a new avionics system.

Contractor Logistics Support (O&M,N) - The FY 1991 increase is due to the ASPJ transitioning from "prototype" production thereby requiring fleet support.

Depot Maintenance (O&M,N) - The FY 1990 and 1991 increases are due to initial ASPJ support.

N-33 SEA LANCE

SAR-89-039

~~CONFIDENTIAL~~

90 C0648

SELECTED ACQUISITION REPORT (RCS:DD-COMP(QSA)823)

PROGRAM: SEA LANCE (ASW Standoff Weapon)

AS OF DATE: December 31, 1989

AS AMENDED

MAR 21 1990

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1. (U) **Designation and Nomenclature (Popular Name):**
UUM-125A/SEA LANCE

2. (U) **DoD Component:** U.S. Navy

3. (U) **Responsible Office and Telephone Number:**

PMS414 Program Office
Naval Sea Systems Command
Washington, DC 20362

PM: CAPT George A. Kent
Assigned: September 26, 1988
AUTOVON: 332-7997
COMMERCIAL: (703) 602-7997

4. ~~(U)~~ **Program Elements/Procurement Line Items:**

RDT&E: PE 0603367N (FY86 & Prior)
PE 0604309N

PROCUREMENT: APPN 1507 ICN 4110

MILCON: PE 24896N

5. ~~(U)~~ **Related Programs:** MK 50 Advanced Lightweight Torpedo; CCS MK 1, CCS MK2, AN/BSY-1, and AN/BSY-2 Submarine Fire Control Systems and Surface Ship MK116 ASWCS Fire Control System.

Classified by: OPNAVINST S5513.~~5B~~
Encl (~~4~~) dtd 5/16/89

DeClassify on: OADR

~~CONFIDENTIAL~~

6. (U) **Mission and Description:** The SEA LANCE Weapon System would have provided surface ships and submarines with a quick reaction, conventional, anti-submarine warfare (ASW) tactical weapon. It was being developed to counter both current and projected submarine threats as specified in the System Threat Assessment Report (STAR), ASW Weapon Systems, NISC TA #010-89 of August 1989. SEA LANCE was designed to increase overall system effectiveness and reduce counterattack vulnerability by limiting the period of engagement with the enemy. SEA LANCE would have complemented the Light Airborne Multipurpose System (LAMPS) and other ASW systems on surface ships, as well as submarine launched heavyweight torpedoes, such as the MK 48 ADCAP. This synergistic mix of weapons would have provided surface ships and submarines with a tactically robust ASW capability aimed at increasing overall ASW effectiveness.

The SEA LANCE system consisted of a common flight vehicle/missile and two launch adaptors. The submarine launch adaptor would have provided physical compatibility with the submarine, environmental protection for the missile, and buoyancy to bring the weapon to the surface. The surface launch adaptor would have consisted of the missile adaptor and associated hardware for integration with the VLS canister. The VLS canister and missile adaptor would have provided physical compatibility with the surface ship MK 41 VLS and environmental protection for the missile.

7. (U) **Program Highlights:**

a. Significant Historical Developments --

- The SEA LANCE Mission Element Need Statement (MENS) was approved 4 Jan 1980.
- Four Concept Formulation Study (CFS) Phase contracts were awarded 1 Feb 1980 leading to the selection of a single contractor, Boeing Aerospace Company, to proceed into the Demonstration and Validation (D&V) Phase.
- A successful DSARC I was conducted on 1 Dec 1982.
- SEA LANCE received DSARC II approval in April 1986. The SAR submitted for the quarter ending 30 Sept 1986 reflected program rebaselining from a planning to a development estimate.
- A Full Scale Development contract was awarded in July 1986.

- On 26 Aug 1986, the Secretary of the Navy directed the SEA LANCE Program to develop the conventional variant first, deferring the Milestone II decision on the Nuclear Depth Bomb (NDB) variant until after Milestone III of the SEA LANCE conventional variant.

- In April 1988, the SEA LANCE Program was directed to convert to a combined SEA LANCE Anti-Submarine Warfare Standoff Weapon (ASWSOW) capable of being launched from both attack submarines and VLS equipped surface ships, with the initial capability to be from surface ships. Direction for this program change was received via a Chief of Naval Operations Memorandum for the Deputy Chief of Naval Operations (Submarine Warfare) and Deputy Chief of Naval Operations (Surface Warfare) (U), 12 Feb 1988, and a Secretary of the Navy Memorandum for the Secretary of Defense (U), 26 April 1988.

- The corresponding program baseline was approved on 4 Aug 1989. The program schedule and surface combatant parameters were reviewed by the Conventional Systems Committee in the fall of 1988.

b. Significant Developments Since Last Report -- In 1989 the Navy identified additional surface combatant integration testing, the FSD testing schedule was reviewed and determined to be overly aggressive, the long lead material provision was considered not to be realistic, and the prime contractor's proposal was received reflecting a higher cost based on actual hardware fabrication. Evaluation of the proposal indicated it was credible. As a result of these changes, the initial operational capability was delayed by two years. Because of these changes, and the addition of end-of-life disposal costs, total 35 year program life cycle costs increased by $935M. On 29 Dec 89 the Secretary of the Navy directed COMNAVSEASYSCOM to terminate the SEA LANCE Program.

c. Changes Since "As Of" Date -- None.

8. [redacted] Threshold Breaches: N/A. This program has been terminated.

9. [redacted] Schedules:

a. Milestones --	Development Estimate	Approved Program	Current Estimate
Milestone I (DSARC I)	Dec 82	Dec 82	Dec 82
Milestone II (DSARC II)	Apr 86	Apr 86	Apr 86
FSD Contract Award	Jun 86	Jul 86	Jul 86
Start Technical Evaluation (NDB)	Jul 89	N/A	N/A
Surface PDR	N/A	N/A	Aug 89
Combined System PDR	N/A	N/A	N/A (CH-1)
Critical Design Review (CDR)	N/A	N/A	N/A (CH-1)
Milestone IIIA	Jul 89	Jun 92	N/A (CH-1)
Production Contract Award	Oct 89	N/A	N/A (CH-1)
Start Operational Evaluation (NDB)	Jan 90	N/A	N/A
Milestone IIIB	Jul 90	Jan 94	N/A (CH-1)
SEA LANCE (NDB) IOC	(b)(1)	N/A	N/A
Start TECHEVAL (MK 50) Surface	N/A	Jun 92	N/A (CH-1)
Start TECHEVAL (MK 50) Submarine	Oct 91	Nov 92	N/A (CH-1)
Start OPEVAL (MK 50) Surface	N/A	Sep 92	N/A (CH-1)
Start OPEVAL (MK 50) Submarine	Jan 92	Feb 93	N/A (CH-1)
Milestone IIIC (MK 50)	Jul 92	N/A	N/A
IOC (Surface)	N/A	(b)(1)	N/A (CH-1)
IOC (Submarine)	(b)(1)		N/A (CH-1)
Milestone IVA	N/A	[illegible]	N/A (CH-1)
Milestone IVB	N/A	Feb 96	N/A (CH-1)

b. Previous Change Explanations --

The FSD contract was delayed one month from June 1986 to July 1986. Following FSD contract award, the milestones were changed to reflect the 26 Aug 86 Secretary of the Navy direction to develop the SEA LANCE MK 50 conventional variant first, with the Milestone II decision on the nuclear variant deferred until after Milestone III approval of the SEA LANCE conventional variant.

31 Dec 1988 SAR reflected inclusion of additional milestones from 31 Dec 1987 SAR submission. Schedule changes were due to program restructuring to a combined surface and submarine launched ASWSOW program.

c. Current Change Explanations --
(CH-1) This program has been terminated.

d. References --
Development Estimate: SDDM, dated 28 May 1986, subject "SEA LANCE Antisubmarine Warfare Standoff Weapon Milestone II Decision Memorandum."

Approved Program: DAE baseline approved 4 Aug 1989.

10. ~~(C)~~ **Technical/Operational Characteristics:**

Technical	Development Estimate	Approved Program	Demonstrated Performance	Current Estimate
Max Loading/ Handling Wt				
(Sub)	3100 lbs	3100 lbs	N/A	N/A (CH-1)
(Surf)	N/A	5300 lbs	N/A	N/A (CH-1)
(Note 1)				
Shock Resistance				
Rack (Sub)	(b)(1)	(b)(1)	N/A	N/A (CH-1)
Tube (Sub)			N/A	N/A (CH-1)
Launcher (Surf)	N/A		N/A	N/A (CH-1)
Maximum Range				
(Sub)	(b)(1)	(b)(1)	N/A	N/A (CH-1)
(Surf)	N/A		N/A	N/A (CH-1)
Minimum Range				
(Sub)	N/A		N/A	N/A (CH-1)
(Surf)	N/A		N/A	N/A (CH-1)
Alert to Launch Time				
(Sub)	(b)(1)	(b)(1)	N/A	N/A (CH-1)
(Surf)	N/A		N/A	N/A (CH-1)
	N/A		N/A	N/A (CH-1)
Missile Ignition to Splash Time	(b)(1)		N/A	N/A (CH-1)
			N/A	N/A (CH-1)
Weapon Accuracy (CEP of Payload Splash Relative to Aim Point)	(b)(1)		N/A	N/A (CH-1)
			N/A	N/A (CH-1)
Maximum Relative Wind Speed				
(Surf)	N/A	75 kts	N/A	N/A (CH-1)
Reliability	(b)(1)		N/A	N/A (CH-1)
Flight (Following Successful BIT)				
Mission			N/A	N/A (CH-1)

10. ~~(S)~~ Technical/Operational Characteristics: (Cont'd)

	Development Estimate	Approved Program	Demonstrated Performance	Current Estimate
Maintainability				
Asset Readiness Factor	(b)(1)		N/A	N/A (CH-1)
Test Thoroughness	0.90	0.90	N/A	N/A (CH-1)
BIT False Alarm Rate	0.08	0.08	N/A	N/A (CH-1)

Note: (1) Does not include packing, handling, shipping, and transportation (PHST) equipment

b. Operational Performance Thresholds

Availability A_{od} (As defined in TEMP 578-1)	(b)(1)		N/A	N/A (CH-1)
System Effectiveness E_t (As defined in TEMP 578-1)	0.4	0.4	N/A	N/A (CH-1)
Launch Depth (Sub)	(b)(1)		N/A	N/A (CH-1)
Launch Speed (Sub)			N/A	N/A (CH-1)
Maintenance Cycle	5 yrs	5 yrs	N/A	N/A (CH-1)

c. Previous Change Explanations --
Changes were due to a restructuring to a combined surface and submarine launched ASWSOW program and inclusion of an additional milestone.

d. Current Change Explanations --
(CH-1) This program has been terminated.

e. References --
Development Estimate: SDDM, of 28 May 1986, subject "SEA LANCE Antisubmarine Warfare Standoff Weapon Milestone II Decision Memorandum."

Approved Program: DAE Baseline approved 4 Aug 1989.

11. ~~(C)~~ Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	733.7	948.0	563.1
Procurement	1,132.0	1,604.8	0.0
Total Flyaway	(964.6)	(1,374.6)	0.0
Other Weapon System Cost	(129.7)	(95.9)	0.0
Second Source Costs		(77.9)	0.0
Initial Spares	(37.7)	(56.4)	0.0
Construction (MILCON)	17.5	26.1	0.0
Total FY85 Base-Year $	1,883.2	2,578.9	563.1
Escalation	457.8	767.6	36.5
Development (RDT&E)	(77.4)	(135.1)	(36.5)
Procurement	(376.6)	(625.0)	0.0
Construction (MILCON)	(3.8)	(7.5)	0.0
Total Then-Year $	2,341.0	3,346.5	599.6

b. Quantities --

Development (RDT&E)	53	58	2
Procurement	(b)(1)		0
(Submarine)			0
(Surface)			0
Total			2

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --
Development Estimate: SDDM, dated 28 May 1986, subject "SEA LANCE Antisubmarine Warfare Standoff Weapon Milestone II Decision Memorandum."

Approved Program: DAE Baseline approved Aug 4 1989.

12. ~~(C)~~ Program Acquisition/Current Procurement Unit Cost Summary:

	Current Year		Budget Year
	Current Est (DEC 89 SAR)	UCR Baseline (DEC 88 SAR)	UCR Baseline (DEC 89 SAR)
a. Program Acquisition --		(b)(1)	
(1) Cost	599.6		599.6
(2) Quantity	0		0
(3) Unit Cost	*	(Note 1)	*
	(FY 1990)	(FY 1989) APPN	(FY 1990)
b. Current Procurement --			
(1) Cost	N/A	N/A	N/A
Less CY Adv Proc	N/A	N/A	N/A
Plus PY Adv Proc	N/A	N/A	N/A
Net Total	N/A	N/A	N/A
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

* This program has been terminated.

(Note 1) This value has been revised to exclude R&D units that were not planned to be part of the inventory objective. Such R&D units were not considered to be fully-configured end items for the purposes of the calculation.

13. ~~(C)~~ Cost Variance Analysis:

a. Summary -- (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	811.1	1508.6	21.3	2341.0
Previous Changes:				
Economic	-9.6	-44.2	-0.4	-54.2
Quantity	-13.2	1409.9	-	1396.7
Schedule	263.5	184.3	1.9	449.7
Engineering	108.2	-	-	108.2
Estimating	-76.9	-828.8	0.2	-905.5
Other	-	-	-	-
Support	-	-	8.1	8.1
Subtotal	272.0	721.2	9.8	1003.0
Current Changes:				
Economic	-	-	-	-
Quantity	-	-2019.9	-	-2019.9
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-483.5	-	-31.1	-514.6
Support	-	-209.9	-	-209.9
Subtotal	-483.5	-2229.8	-31.1	-2744.4
Total Changes	-211.5	-1508.6	-21.3	-1741.4
Current Estimate	599.6	0.0	0.0	599.6

13. (U) Cost Variance Analysis (Cont'd):

a. Summary -- (FY 1985 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	733.7	1132.0	17.5	1883.2
Previous Changes:				
Quantity	-12.3	993.0	-	980.7
Schedule	216.2	119.1	1.0	336.3
Engineering	77.3	-	-	77.3
Estimating	-66.9	-639.3	-0.2	-706.4
Other	-	-	-	-
Support	-	-	5.8	5.8
Subtotal	214.3	472.8	6.6	693.7
Current Changes:				
Quantity	-	-1452.3	-	-1452.3
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-384.9	-	-24.1	-409.0
Support	-	-152.5	-	-152.5
Subtotal	-384.9	-1604.8	-24.1	-2013.8
Total Changes	-170.6	-1132.0	-17.5	-1320.1
Current Estimate	563.1	0.0	0.0	563.1

Previous Change Explanations --

RDT&E

Quantity: FSD missile quantity increased
Economic: revised escalation indices
Schedule: delays due to program restructuring
Engineering: reflects increased engineering costs associated with the surface variant.
Estimating: miscellaneous shared budget reductions

Procurement

Quantity: reflects procurement of the surface variant (b)(1)
Economic: revised escalation indices
Schedule: delays due to program restructuring
Estimating: reflects offset caused by new escalation indices and increased economies associated with an increased procurement quantity and lower average unit cost for the surface variant.

MILCON

Economic: revised escalation indices
Schedule: delays due to program restructuring
Estimating: offset to revision caused by new escalation indices
Support: reflects increased facilities requirement for the increased inventory objective.

c. Current Change Explanations --

	(Dollars in Millions) Base Year	Then Year
(1) RDT&E		
rmination of SEA LANCE Program (Other)	-384.9	-483.5

13. (U) Cost Variance Analysis (Cont'd):

	(Dollars in Millions) Base Year	Then Year
(2) Procurement		
Termination of SEA LANCE Program		
(Quantity)	-1,452.3	-2,019.9
(Support)	- 152.5	- 209.9
(3) MILCON		
Termination of SEA LANCE Program (Other)	-24.1	-31.1

14. (U) Program Acquisition Unit Cost (PAUC) History: (Then Year Dollars in Millions)

a. Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes (Then Year Dollars in Millions)								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
(b)(1)									

b. Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	Changes (Then Year Dollars in Millions)								PAUC (Cur Est)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
1.677									*

* This program has been terminated.

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. RDT&E --

Missile:	Initial Contract Price Target	Ceiling	Qty
Boeing Aerospace and Electronics., Kent, WA N00024-86-C-6053, CPAF, Work start date: 30 June 1986 Definitized: 31 July 1986	$380.0	N/A	N/A

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Manager
$557.8	N/A	N/A	$624.7	$639.8 (Note 1)

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-9.0	-4.0
Cumulative Variances To Date (10/31/89)	-18.6	-5.3
Net Change	-9.6	-1.3

(Note 1) Contract Price and Estimated Price at Completion are prior to program termination. PM EAC for the partially terminated contract is $305M. SEA LANCE program funding was removed in FY91 and out. The contract was partially terminated on 4 Jan 90.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --
(1) Percent Program Completed: 100.0% (11 yrs/11 yrs)
(2) Percent Program Cost Appropriated: 100.0% ($599.6/$599.6)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Budget Year (FY92)	Balance to Complete (FY93-03)	Total
RDT&E	518.1	81.5	0.0	0.0	0.0	599.6
Procurement	0.0	0.0	0.0	0.0	0.0	0.0
MILCON	0.0	0.0	0.0	0.0	0.0	0.0
Total	518.1	81.5	0.0	0.0	0.0	599.6

c. Annual Summary --

Fiscal Year	Qty	FY 85 Base-Year Dollars: Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars: Program	Oblig.	Expen.	Escl Rate (%)
Appropriation: RDT&E								
1980				8.8	7.0	7.0	7.0	10.59%
1981				22.0	19.0	19.1	19.1	10.61%
1982				38.9	35.4	35.5	35.5	7.60%
1983				23.7	22.5	22.5	22.5	4.90%
1984				27.8	27.4	27.4	27.4	3.80%
1985				50.1	50.9	50.6	50.6	3.40%
1986				64.2	67.1	67.1	65.5	2.80%
1987	2			98.1	105.6	105.5	102.6	2.70%
1988				94.5	105.1	102.6	100.2	3.00%
1989				67.4	78.1	78.0	74.7	4.20%
1990				67.6	81.5	42.9	1.1	4.00%
Subtot.	2			563.1	599.6	558.2	506.2	

NOTE: FY88 does not reflect below threshold reprogramming. Actual program funding available was $102.8 with $102.7 obligated.

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary (Cont'd) --

Fiscal Year	Qty	FY 85 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Program	Oblig.	Expen.	
		Nonrec	Rec					
Appropriation: Procurement								
	0	0.0	0.0	0.0	0.0			
Subtot.	0	0.0	0.0	0.0	0.0			
Appropriation: MILCON								
				0.0	0.0			
Subtot.				0.0	0.0			
Total	2			563.1	599.6	558.2	506.2	

17. ~~(C)~~ Production Rate Data:

a. Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1991	(b)(1)	N/A	0	N/A
1992		N/A	0	N/A
1993		N/A	0	N/A
1994		N/A	0	N/A
1995		N/A	0	N/A
1996		N/A	0	N/A
1997		N/A	0	N/A
1998		N/A	0	N/A

b. Cost Variance -- Dollars in Millions

Item		Product Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(85 $)	N/A	N/A	563.1	N/A	N/A
	(TY $)	N/A	N/A	599.6	N/A	N/A
PAUC	(85 $)	N/A	N/A	N/A	N/A	N/A
	(TY $)	N/A	N/A	N/A	N/A	N/A

c. Schedule Variance --

Item	Product Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A
Duration (in Months)	N/A	N/A	N/A	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A

17. ~~(U)~~ Production Rate Data (Cont'd):

d. Deliveries (Plan/Actual)

	To Date
RDT&E	2/2
Procurement	0/0

e. Approved Design-to-Cost Goal -- N/A

18. ~~(U)~~ Operating and Support Costs:

a. Assumptions and Ground Rules -- The O & S costs were for the government and contractor efforts required for the IMA operations, ISEA functions, and fleet technical support. This included projected maintenance turnarounds and repairs based on a 5 year maintenance cycle.

b. Costs -- (FY 1985 Constant (Base-Year) Dollars in millions)

Cost Element	Costs
Total O & S Costs	0.0

c. Contractor Support Costs --

	(Then-Year Dollars in Millions)				
	FY1989 & Prior	FY1990	FY1991	Balance To Complete	Total
O & MN	0.0	0.0	0.0	0.0	0.0

AF-6 · C-17A
(2)

SAR-89-067

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SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)

PROGRAM: C-17A

AS OF DATE: December 31, 1989

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FEB 28 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE
24

1. Designation and Nomenclature (Popular Name):

C-17A/Direct Delivery Airlift Aircraft

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

C-17A Systems Program Office
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433

B/Gen Michael J. Butchko Jr.
Assigned: August 10, 1987
AV: 785-1545 COMM: (513)255-1545

4. Program Elements/Procurement Line Items:

RDT&E: PE 0604231F
PE 0604227F (Shared funding)
PE 0604609F (Shared funding)

PROCUREMENT: PE 0401130F APPN 3010 ICN C017AD

MILCON: PE 0401130F APPN 3300

5. Related Programs: None

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SAF/PAS
90-099 -T
#25

6. Mission and Description:

The purpose of the C-17 aircraft is to modernize the airlift fleet and improve the overall capability of the U.S. to rapidly project, reinforce and sustain combat forces worldwide. The aircraft will augment the C-5 and C-141 in intertheater deployment and the C-130 with intratheater operations. Because the C-17 will be capable of carrying outsize cargo over intertheater ranges into austere airfields, it introduces a direct deployment capability that will significantly improve airlift responsiveness. This improved responsiveness will, in turn, dramatically improve the mobility of our general purpose forces.

Significant features of the multi-engine C-17A include: supercritical wing design and winglets to reduce drag and increase fuel efficiency and range; receiver inflight refueling capability to increase range; externally blown flap configuration, direct lift control spoilers and high impact landing gear system, all of which contribute to the aircraft's capability to operate into and out of small austere airfields; forward and upward directed thrust reverser system that provides backup capability, reduces the aircraft ramp space requirements, and minimizes the interference of dust and debris on the activities of ground personnel; cargo door, ramp, airdrop and cargo restraint systems that are operable by a single loadmaster and permit immediate equipment offload without special handling equipment; two man cockpit with cathode ray tube (CRT) displays that reduce complexity and improve reliability; maximum use of built-in test (BIT) features to reduce maintenance and troubleshooting times; and walk-in avionics bays that improve accessibility. The end result is significantly reduced maintenance manhours per flight hour.

7. Program Highlights:

a. Significant Historical Developments -

A SECDEF decision during the FY81 budget review directed funding for a new aircraft which places increased emphasis on strategic airlift capability. The initial C-X Program Management Directive (PMD) was issued on 10 Dec 1979. The requirements for the C-17A aircraft were formalized by the C-X Mission Element Need Statement (MENS), dated 28 Nov 1980. In August 1981, SECAF announced Douglas Aircraft Company as the winner of the C-X source selection.

On 23 July 1982, the FSED contract that had been negotiated during the C-X source selection was awarded to Douglas with a restructure clause inserted to limit the scope of the contract to a 15 month modestly paced program.

7. Program Highlights (Cont'd):

a. Significant Historical Developments (Cont'd) -

A revised PMD was issued in July 1983 which directed the continuation of C-17 design effort and the initiation of activities leading to an FSD start by FY85, a production start by FY88, and an initial operational capability of 12 aircraft in FY92.

In 1984, the C-17 program continued to operate as a moderately paced engineering effort. During this period, major wind tunnel testing was completed, structural design criteria were developed, and design analyses and vendor studies were completed.

On 15 February 1985, the Secretary of Defense approved FSED contingent on second source certification. The program office and Douglas Aircraft Company completed negotiations on the C-17 contract restructure on 31 October 1985. Secretary of the Air Force, the Honorable Mr. Rourke, signed the C-17 second source certification to Congress on 30 December 1985, and the restructured contract was issued the following day.

The first Production Readiness Review was conducted at Douglas Aircraft Company from 21 April to 1 May 1986. The Air Force reviewed seven major functional areas (management, engineering, logistics, test/safety, material/subcontracts, manufacturing, and quality assurance) and determined that Douglas was proceeding on schedule in transitioning from full scale development to production.

During 1986, the On-Board Inert Gas Generating System (OBIGGS) ECP was negotiated , and contract modification was finalized. The Air Force Contract Management Division (AFCMD) conducted a Contractor Operations Review (COR) at Douglas Aircraft Company from 15 September - 25 September 1986 and rated Douglas' product integrity "best yet" of any aircraft manufacturer reviewed. The SPO exercised a $2.3B option for five years of follow-on FSED. The SPO also briefed the Program Review to OSD on 18 November 1986. Testing was completed at Pratt & Whitney's West Palm Beach facility to evaluate the engine nacelle/thrust reverser design compatibility with the C-17 engine.

Long lead funds for the first two production aircraft were released in Jan 87. Douglas Aircraft Company's (DAC) wing competition resulted in a May 87 award to Lockheed-California Co. The second C-17 Production Readiness Review was conducted in Jul 87 and assessed the C-17 as "Ready for Production". The C-17 Final assembly building (Bldg 54) at DAC's Long Beach facility was dedicated Aug 87. The PW 2040 (commercial version of the C-17's F117-PW-100 engine) began service with United Parcel Service in Sep 87.

7. Program Highlights (Cont'd)

a. Significant Historical Developments (Cont'd) -

A significant portion of the aircraft structural testing was completed and DAC fabricated the first parts of the test aircraft. On 10 Dec 87, OSD approved release of funds for the first two production aircraft and long lead funds for the second production lot contingent upon passage of the FY88 Appropriation Bill.

In Jan 88, the first competitively-priced production option for two aircraft was exercised, along with long lead for the second production option for four aircraft. The first F117 engine was delivered in May 88. It will be used for ground test. Air Vehicle CDR was accomplished in Aug 88. Production Readiness Review #3, completed in Aug 88, indicated that the transition to production was proceeding with no "show stoppers". Assembly start for the first test aircraft occurred at DAC, Long Beach, on 24 Aug 88. A DAB review for Milestone IIIA approval for low rate initial production (FY89-92) was held on 5 Dec 88. Another DAB program review will be scheduled prior to release of FY91 and 92 production funds, after the test and first production aircraft fly.

The Dec 88 SAR and the funding therein reflected a Multiyear Procurement Strategy for FY 93-96.

b. Significant Developments Since Last Report.

Milestone IIIA approval was received on 18 January 1989 for the next two lots of C-17's (4 in FY89 and 6 in FY90) plus advance procurement for 10 aircraft planned in FY91. Congressional cuts in FY90 and 91 procurement (4 versus 6 and 6 versus 10 aircraft) have resulted in a restructure of the buy profile.

Honeywell terminated as Electronic Flight Control System (EFCS) subcontractor on 28 July 1989. General Electric Aircraft Control Systems in Binghamton, New York is the new EFCS subcontractor.

In July 1989, Douglas Aircraft Company (DAC) signed a Memorandum of Agreement (MOA) with DELCO, the Mission Computer subcontractor, making DAC responsible for Mission Computer software management. DELCO continues to perform software development/integration with DAC as the overall manager. Action taken to streamline the development process.

C-17 completed a Conventional Systems Committee (CSC) and Defense Acquisition Board (DAB) program review on 30 October 1989. The review covered impacts of program schedule slippage and Congressional action to slow low-rate initial production. Both the CSC and DAB approved proceeding with the program.

The C-17 is expected to satisfy mission requirements as revalidated by the Air Force Chief of Staff-directed requirements review in Dec 89.

7. Program Highlights (Cont'd)

c. Changes Since "As Of" Date - None.

8. Thresholds Breaches: DAE Baseline dated December 31, 1988.

9. Schedule:

a. Milestones	Planning Estimate	Approved Program	Current/Production Estimate
(1) Source Selection Decision	Aug 81	N/A	Aug 81
(2) Contract Award	Jul 82	N/A	Jul 82
(3) Start FSED	Oct 84	N/A	Feb 85
(4) Milestone II	Nov 87	Feb 85	Feb 85
(5) First Full Funded Production Lot	Dec 87	N/A	Jan 88
(6) Milestone III	Feb 91	N/A	N/A
(7) Milestone III A	Nov 87	Dec 88	Jan 89
(8) First Flight	N/A	Aug 90	Jun 91 (CH-1)
(9) IOC (Delivery of 12th acft)*	Jan 92	Sep 92	Jun 93 (CH-1)
(10) Complete DT&E/IOT&E	N/A	Mar 92	Jun 93 (CH-1)
(11) Milestone III B	Feb 91	Sep 92	Sep 93 (CH-1)
(12) FOC	N/A	Jan 00	FY 01 (CH-1)

* Delivery of 12th production aircraft to initial squadron.

9. Schedule (Cont'd)

b. Previous Change Explanations -

The authority to award the July 1982 contract directed a program review before beginning full scale development (FSD). In June 1984 the Air Force was informed DSARC II (JRMB) would be required to initiate FSD. This resulted in a schedule change for Milestone II (JRMB) from November 1987 to October 1984.

DSARC II (JRMB) was conducted in November 1984. Approval to enter FSED program was held in abeyence pending completion of a "bottoms up" cost estimate. The estimate was completed and briefed to OSD CAIG on January 31, 1985. SEC DEF signed FSED approval memo on February 15, 1985.

Milestone III (DAB) was separated into a low-rate production decision (IIIA) and a full-rate production decision (IIIB). IOC delayed to April 1992 due to revised initial production rate buys.

Start of FSED was delayed by DSARC request for RDT&E independent cost estimate (From: Oct 84; To: Feb 85).

Milestone II (JRMB) was delayed by DSARC request for RDT&E independent cost estimate (From: Nov 84; To: Feb 85).

HQ USAF has rescheduled Milestone IIIA (DAB) from September 1986 to October 1987 and substituted a program review in October 1986 to gain approval to release FY 1987 long lead funds.

IOC has been delayed from April 1992 to September 1992 due to funding levels in the FY1987 President's Budget, Gramm-Rudman-Hollings Act, and other funding reductions.

The Milestone IIIA (DAB) was rescheduled from Sep 86 to Oct 88 to allow for completion of Critical Design Review (CDR) prior to IIIA (DAB) review.

The Milestone IIIB (DAB) was rescheduled from Aug 91 to Jul 92 to allow completion of IOT&E and preparation of test reports to support the IIIB (DAB) review.

The First Full Funded Production Lot reflects date of accomplishment from Dec 87 to Jan 88.

First Flight and FOC were added to reflect USD(A) baseline approval, 9 Feb 1988.

Milestone IIIB, incorrectly shown in the current estimate as Jul 92 in the December 1986 SAR, should have been October 1992.

9. Schedule (Cont'd)

b. Previous Change Explanations (Cont'd)

Milestone IIIA reflects date of accomplishment. Changed from Oct 88 to Jan 89.

Milestone IIIB rescheduled from Oct 92 to Mar 93 to include ORE results.

Milestone Complete DT&E/IOT&E added to reflect DAE Acquisition Program Baseline.

Reflects initial forecast of Full Operational Capability from TBD to Jan 2000.

c. Current Change Explanations -

(CH-1) Milestones IIIB, IOC, First Flight, FOC, and Complete DT&E/IOT&E rescheduled to reflect overall delay caused by problems experienced in T-1 assembly and avionics development. Specifically, the schedule problems were in Mission Computer and Electronic Flight Control System development. The schedule also reflects the impact of the Congressional reduction in FY90 and 91 procurement quantity (with subsequent production buy/delivery reschedule). Milestone FOC reflects same date (FY instead of month and year) as approved by the DAB.

d. References -

Planning Estimate: PMD 0020(14) dated 25 Jul 83.

Approved Program: Dec 31, 1988 DAE Baseline.

10. Technical/Operational Characteristics:

a. Technical	Planning Estimate	Approved Program Goal/Threshold*	Demonstrated Performance	Current/ Production Estimate
(1) Mission Completion Success Probability 1/	.93	N/A / N/A	N/A	.94
(2) Maintenance Manhours Per Flying Hour (Air Vehicle) 1/	18.6	18.6/18.6	N/A	14.6 (CH-1)
(3) Maximum TOGW (LBS) 2/	N/A	580,000 /580,000	N/A	580,000
(4) Mean time between maintenance inherent (HRS) (MTBMI) 1/	N/A	1.61 /1.61	N/A	1.69 (CH-1)
(5) Mean Time between Maintenance corrective (HRS) (MTBMC) 1/	N/A	.78 /.78	N/A	.83 (CH-1)
(6) Mean Time between removal (HRS) (MTBR) 1/	N/A	2.80 /2.80	N/A	5.37 (CH-1)
(7) Mean Man hours to repair (HRS) 1/	N/A	7.35 /7.35	N/A	4.51 (CH-1)

10. Technical/Operational Characteristics (Cont'd):

b. Operational	Planning Estimate	Approved Program Goal/Threshold*	Demonstrated Performance	Current/ Production Estimate
(1) Payload/Range				
Payload (LBS)	172,000	172,000/172,000	N/A	167,006(CH-2&3)
Range (NM)	2,400	2,400/2,400	N/A	2,372(CH-2&3)
(2) Landing Distance (Ft) 4/	1550	2650 /2650	N/A	2541 (CH-3)
(3) Takeoff Distance (Ft) 5/	6510	7600 /7600	N/A	7370 (CH-3)
(4) Cruise Speed 6/ KTAS	450	450 /450	N/A	450
(5) Backup Capability (Percent Grade) 7/	2	2 /2	N/A	2

* The C-17 program has requirements and goals, not thresholds. Requirements and goals are established in the specifications. We will reflect formal HAC Thresholds (when received) in the future. Requirements are shown in the "Threshold" column. All goals are added per Dec 3, 1989 SAC Baseline, currently under review prior to DAE approval.

1/ Reliability and maintainability based on 100,000 fleet flying hours.

2/ Current design capability, not specification requirement.

3/ Unrefueled, 2.25G maneuver load factor, standard day which includes C-17 reserve fuel requirements (enroute, alternate, holding approach and landing reserves).

4/ Maximum Effort Landing Field Length, with 3 engine idle reverse, 124,018 lb payload, fuel to fly a 500 NM mission with zero payload, sea level, 90 degree F day.

5/ Takeoff critical field length at gross weight to carry a payload of 167,006 lbs for a range of 2400 NM, sea level, 90 degree F day.

6/ Cruise Speed of 450 KTAS is equivalent to 0.77 MACH.

7/ Backup capability with a 167,006 lb payload and fuel to fly 1000 NM, sea level 90 degree F day.

10. Technical/Operational Characteristics (Cont'd)

c. Previous Change Explanations -

Program office current estimate of payload and takeoff/landing distance was adjusted as a result of the DSARC II added requirements for two additional pallets on the ramp and provided for full combat offload from the logistics rail system.

The approved program values and current estimate for payload carried 2400 NM has been reduced by 5,235 lbs to account for government changes to the design of the C-17 airlift aircraft. These changes include four pallet ramp/combat offload, wing load alleviation deletion, commercial pallet adapters, and incorporating the Onboard Inert Gas Generating System (OBIGGS). The aircraft is still designed to carry a maximum 2.25G payload of 172,200 lbs. The reduction corresponds to the C-17 contract specifications.

The payloads associated with the landing distance, takeoff distance, and backup capability characteristics have been adjusted as well.

The approved program values and current estimate for landing and takeoff distance have been amended to reflect runway length requirements rather than landing and takeoff ground run distances. The C-17 contract specification which defines system requirements uses runway length and this change is to be consistent with program/testing requirements and criteria. The previously reported planning estimates for landing (1550 ft) and takeoff (6510 ft) distances remain correct for the conditions stated in paragraph b (4/ and 5/) above.

The Planning Estimate/Approved Program changed to reflect OSD(A) baseline approval, 9 Feb 1988.

The operational payloads have been increased by 41 lbs to account for government directed changes to the design of the C-17 aircraft.

d. Current Change Explanations -

(CH-1) The current estimates for these parameters have been changed to account for the latest analyses and aircraft design.

(CH-2) Payload/range is anticipated to be (167,006) to show that the payload for the approved program has been decreased to account for gov't directed changes to the design of the C-17 aircraft.

(CH-3) The current estimate for the payload/range, landing and takeoff distance have been adjusted to account for the latest projected operating weight. The reported payload/range is 28 nautical miles short of specification requirements using the specification ground rules. The contractor has been notified of this deficiency and has been requested to submit a corrective action plan.

e. References -

Planning Estimate: PMD 0020(14) dated 25 Jul 83 as amended by PMD 0020(15), January 1984; MENS for C-X, November 28, 1980; PSOC for C-X, January 22, 1980.

Approved Program: Dec 31, 1988 DAE Baseline.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars):

a. Cost -	Planning Estimate	Approved Program	Current/ Production Estimate
Development (RDT&E)	2704.1	3797.8	3755.5
Procurement	16793.2	17969.6	18425.7
Airframe	(11229.3)	(11221.7)	(11862.3)
Engine	(2371.6)	(2937.3)	(2932.7)
Avionics	(687.1)	(571.4)	(625.7)
Total Flyaway	(14288.0)	(14730.4)	(15420.7)
Peculiar Support	(314.2)	(1417.8)	(1213.6)
Other Weapon System Cost	(1139.4)	(64.8)	(0)*
Initial Spares	(1051.6)	(1756.6)	(1791.4)
Construction (MILCON)	47.3	187.7	214.1
Total FY81 Base-Year $	19544.6	21955.1	22395.3
Escalation	20209.2	15499.5	19416.6
Development (RDT&E)	(1242.9)	(1563.5)	(1585.4)
Procurement	(18939.6)	(13817.8)	(17667.2)
Construction (MILCON)	(26.7)	(118.2)	(164.0)
Total Then-Year $	39753.8	37454.6	41811.9
b. Quantities			
Development (RDT&E)	1	1	1
Procurement	210	210	210
Total	211	211	211

c. Foreign Military Sales - None

d. Nuclear Costs - None

e. References --

Planning Estimate: FY85 President's Budget, January 1984.
Approved Program: Dec 31, 1988 DAE Baseline.

* Realignment of Advance Buy Value ($64.8) from Other Weapon System Cost to Airframe to establish a new production baseline estimate.

12. Program Acquisition/Current Procurement Unit Cost Summary:
[Current (Then-Year) Dollars in Millions]

a. Program Acquisition --

		Current Estimate (Dec 89 SAR)	Current Year UCR Baseline* (Dec 88 SAR)	Budget Year UCR Baseline (Dec 89 SAR)
(1)	Cost	41811.9	37454.6	41811.9
(2)	Quantity	210	210	210
(3)	Unit Cost	199.104	178.355	199.104

b. Current Procurement --

		(FY1990)	(FY1990)**	(FY1991)
(1)	Cost	1429.4	1431.7	2146.1
	Less CY Adv Proc	-99.7	-99.7	-204.3
	Plus PY Adv Proc	+99.9	+99.9	+99.7
	Net Total	1429.6	1431.9	2041.5
(2)	Quantity	4	4	6
(3)	Unit Cost	357.400	357.975	340.250

* This value has been revised to exclude R&D units that are not planned to be a part of the inventory objective. Such R&D units are not considered fully configured end items for the purposes of this calculation.

** Adjusted to reflect FY89 Appropriation Act in accordance with Congressional change to SAR law.

13. Cost Variance Analysis:

a. Summary (Current (Then-Year) Dollars in Millions) -

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	3947.0	35732.8	74.0	39753.8
Previous Changes:				
Economic	-191.8	-6166.3	-7.1	-6365.2
Quantity	0.0	0.0	0.0	0.0
Schedule	+334.9	+212.0	0.0	+546.9
Engineering	+103.2	+278.6	0.0	+381.8
Estimating	+930.6	+457.6	+239.0	+1627.2
Other	0.0	0.0	0.0	0.0
Support	+237.4	+1272.7	0.0	+1510.1
Subtotal	+1414.3	-3945.4	+231.9	-2299.2
Current Changes:				
Economic	+40.4	+2811.8	+22.1	+2874.3
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	+512.1	0.0	+512.1
Engineering	0.0	0.0	0.0	0.0
Estimating	+52.8	+1160.9	+50.1	+1263.8
Other	0.0	0.0	0.0	0.0
Support	-113.6	-179.3	0.0	-292.9
Subtotal	-20.4	+4305.5	+72.2	+4357.3
Total Changes	+1393.9	+360.1	+304.1	+2058.1
Current/Production Estimate	5340.9	36092.9	378.1	41811.9

13. Cost Variance Analysis (Cont'd):

FY 1981 [Constant (Base-Year) Dollars in Millions]

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	2704.1	16793.2	47.3	19544.6
Previous Changes:				
Quantity	0.0	0.0	0.0	0.0
Schedule	+175.8	+10.8	0.0	+186.6
Engineering	+70.7	+151.3	0.0	+222.0
Estimating	+681.5	+280.3	+140.4	+1102.2
Other	0.0	0.0	0.0	0.0
Support	+165.7	+734.0	0.0	+899.7
Subtotal	+1093.7	+1176.4	+140.4	+2410.5
Current Changes:				
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	+38.2	+625.5	+26.4	+690.1
Other	0.0	0.0	0.0	0.0
Support	-80.5	-169.4	0.0	-249.9
Subtotal	-42.3	+456.1	+26.4	+440.2
Total Changes	+1051.4	+1632.5	+166.8	+2850.7
Current/Prod Estimate	3755.5	18425.7	214.1	22395.3

13. Cost Variance Analysis (Cont'd)

b. Previous Change Explanations -

RDT&E

Economic:	Revised economic escalation indices.
Schedule:	Revised schedule due to budget cuts and constraints.
Estimating:	Refinement of FY83/84 requirements; reestimate based on the impact of revised economic escalation indices in prior years; reestimate of flyaway costs based on an independent cost analysis (ICA); reestimate based on bottoms up approach; Congressional direction to move initial tooling from procurement to RDT&E; Adjustment for FY90 through FY92 escalation. Revised projection of engineering manhours. Reestimate of contract cost identified in comprehensive annual estimate.
Support:	Reestimate of support requirement based on ICA; Redefinition of requirements due to decrease in simulators. Increase to Training and decreases in Data and PSE requirements.
Engineering:	Addition of DoD standard avionics racks and On Board Inert Gas Generating System, and Live Fire Test requirements/capability enhancements.

Procurement

Economic:	Revised economic escalation indices.
Schedule:	Schedule slip in early years of procurement (beginning in FY 1990) and an increase in peak buy quantity from 25 to 29; Revised schedule due to budget cuts/constraints for IMIP and ECO.
Engineering:	Addition of 4-pallet ramp, combat offload rail system, DoD standard avionics racks, and added capability enhancements.

13. Cost Variance Analysis (Cont'd)

b. Previous Change Explanations (Cont'd) -

Procurement

Estimating: Realignment of procurement funding to the program estimate; reestimate of flyaway cost based on an ICA; one time change results from a correction to the methodology for computing inflation on programs with advance procurement funding. Reestimate based on bottoms-up; reestimate based on engineering's assessment of cost weight. Congressional direction to move initial tooling from procurement to RDT&E. Adjustment for flyaway current and prior year escalation change. Correction for erroneous categorization; Adjustment for FY90-92 to Flyaway for escalation changes; Realignment of requirements between support and flyaway. Change in estimate due to addition of multiyear strategy for FY93-96. Increase in Rec A/F based on revised manufacturing learning curve projections. Decrease to engine based on lower projected negotiated costs. Reestimate of flyaway cost based on higher recurring flyaway and avionics.

Support: Deletion of initial spares for FY88 and FY89 based on decision to use interim contractor support for the first two years of operation; restructure of support requirements based on an ICA; further definition of peculiar support and detailed spares build-up. USAF redefinition of acceptance spares; deletion of common support; addition of enroute support equipment; adjustment for support current and prior year change. Adjustment for FY90-92 support escalation; correction of erroneous categorization; adjustment in spares to include APU and QECK; Realignment of requirements between support and flyaway and revised schedule due to budget cuts/constraints. Increase in support requirements due to additional Auxilliary Power Units (APUs), Quick Engine Change Kits (QECKs) and Training System spares.

13. Cost Variance Analysis (Cont'd)

b. Previous Changes Explanations (Cont'd)

MILCON

Economic: Revised economic escalation indices.

Estimating: Improved definition of support facility requirements during bottoms-up exercise. Correction of erroneous computation of economic change. Adjustments for current and prior year escalation change. Reestimate of construction costs based on updated site surveys and estimating factors.

c. Current Change Explanations -

	(Dollars in Millions) Base Year	Then Year
RDT&E		
Revised economic escalation Indices (Economic)	N/A	+40.4
Adjustments for current and prior year escalation change (Estimating)	-3.4	- 5.5
Decreases to Training, Data and PSE requirements (Support)	-80.5	-113.6
Reestimate of Air Vehicle, Test, and Systems Engineering/Program Management Costs (Estimating)	+41.6	+58.3
PROCUREMENT		
Revised economic escalation Indices (Economic)	N/A	+2811.8
Adjustment for current and prior year recurring flyaway escalation change (Estimating)	-47.1	-78.6
Adjustment for current and prior year support escalation change (Support)	-19.0	-32.1
Buy Profile change for incorporation of a slower build up rate.	+488.2	+1526.2
- Schedule changes applicable to stretchout of program (Schedule)	(0.0)	(+512.1)
- Estimating changes applicable to stretchout of program (Estimating)	(+498.9)	(+919.4)
- Support changes applicable to stretchout of program (Support)	(-10.7)	(+94.7)

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13. Cost Variance Analysis (Cont'd)

c. Current Change Explanations (Cont'd) -

Procurement	(Dollars in Millions) Base Year	Then Year
Increase in Industrial Modernization Program funds in FY87 (Estimating)	+6.7	+10.0
Increase in Initial Spares Funding in FY88 and 89 (Support)	+11.6	+18.4
Decrease in Peculiar Support due to reduced funding in FY90 (Support)	-29.4	-50.1
Decrease in ECO due to reduced funding in FY90 (Estimating)	-1.3	-2.3
Inclusion of total program revised inflation to Air Vehicle (Estimating)	+46.4	+102.2
Increase in airframe and Avionics due to refinements of requirement (Estimating)	+121.9	+210.2
Decrease in PSE, Training and Data due to refinement of requirements (Support)	-121.9	-210.2
MILCON		
Revised economic escalation Indices (Economic)	N/A	+22.1
Adjustments for current and prior year escalation change (Estimating)	-.1	-.1
Revised profile reflecting the addition of one more year of requirements (Estimating)	+26.5	+50.2

14. Program Acquisition Unit Cost (PAUC) History (Millions of Then-Year Dollars):

a. Initial SAR/Planning Estimate to Current Baseline Estimate -

PAUC* (Plan. Estimate)	Changes								PAUC (Prod/ Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
189.304	-16.623	0	5.043	1.818	13.766	5.796	0	+9.800	199.104

15. Contract Information (Then-Year Dollars in Millions):

a. RDT&E

McDonnell Douglas Corp.	Initial Contract Price Target	Ceiling	QTY
Douglas Aircraft Co. Long Beach, CA F33657-81-C-2108 FPIF AWARD: 23 Jul 1982 Definitized: 31 Dec 1985	$31.6	$31.6	0

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
4244.0	4912.5**	1	4848.9	4848.4

** 130% of target cost

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-203.7	$-158.5
Cumulative Variances to Date (26 Nov 89)	$-582.2	$-222.3
Net Change	$-378.5	$-63.8
Cumulative Variance Change Percent	-185.8%	-40.3%

Explanation of Change:

Cost Variance: The net change in the cost variance is due to greater than expected design changes, primarily for weight savings that have required manpower usage at 14% over the plan to minimize schedule delays.

* Revised to exclude RDT&E unit in calculation of PAUC.

[redacted]

15. Contract Information (Then-Year Dollars in Millions):

a. RDT&E (Cont'd)

Schedule Variance: The net change in schedule variance started with late engineering, flowed into tooling, and most recently, has been in manufacturing and subcontracts. This condition has been further aggravated by continuing design changes due to such things as weight control efforts, procurement delays, and avionics hardware/software detailed requirements definition.

Impact: Current RDT&E EAC status is equal to the program's budgeted amount. In addition to ongoing contractor/SPO cost control planning and expanded Cost Red Team Activities, the SPO has been working with DAC to construct direct containment of financial risk on the present contract. DAC has been evaluating the cost risk containment since Jan 89 with discussions continuing. The SPO/DAC Schedule Integration Red Team was completed in July 1989. Progress on avionics and progress on production of the aircraft support June 1991 first flight.

b. Procurement - Lot I* Initial Contract Price

McDonnell Douglas Corp	Target	Ceiling	QTY
Douglas Aircraft Co. Long Beach, CA F33657-81-C-2108 FPIF Award: 20 Jan 1988 Definitized: N/A	$656.3	$757.8**	2

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
656.3	757.8**	2	698.7	697.2

** 130% of target cost

* This contract is included in the SAR for the first time.

[redacted]

15. Contract Information (Then-Year Dollars in Millions):

a. Procurement (Cont'd)

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (26 Nov 89)	$-.5	$-52.2
Net Change	N/A	N/A
Cumulative Variance Change Percent	N/A	N/A

Cost Variance: The negative cost variance is due to supplier change proposals from subcontractors related to the propulsion subsystem, wing and stabilizers. These changes have been driven by engineering design changes in FSED.

Schedule Variance: The following conditions are impacting the schedule: (1) Manufacturing continues to experience fabrication problems associated with aluminum machining; (2) The additional variance in Procurement is in the area of Raw Material/Purchased Parts. This relationship reflects the behind schedule position in manufacturing.

Impact: The Lot I production EAC exceeds the budget (and 1988 Annual Estimate) by .2% assuming that all management reserve is used. Initial production deliveries support the June 93 IOC.

c. MILCON - N/A

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status -

(1) Percent Program Completed: 10 years/ 19 years = 52.6%

(2) Percent Program Cost Appropriated: $7453.8/$41811.9 = 17.8%

b. Appropriation Summary --

Appropriation	Prior Years (FY 81-89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance To Complete (FY 92-99)	Total
RDT&E	3255.5	917.0	546.6	621.8	5340.9
Procurement	1843.0	1429.4	2146.1	30674.4	36092.9
MILCON	4.2	4.7	29.6	339.6	378.1
Total	5102.7	2351.1	2722.3	31635.8	41811.9

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

FY 81 Base-Year Dollars					Total Then-Year Dollars			Esc. Rate
		Flyaway						
Fiscal Year	Qty	Non Rec	Rec	Total	Program	Obligated*	Expended*	%
APPROPRIATION: RDT&E								
1981				32.0	33.4	33.4	33.4	11.9
1982				0.0	0.0	0.0	0.0	9.2
1983				51.0	59.6	59.6	59.6	4.9
1984				22.1	26.8	26.8	26.8	3.8
1985				96.7	121.0	121.0	120.9	3.4
1986				272.7	350.4	350.4	350.0	2.8
1987				472.5	626.1	625.5	625.3	2.7
1988				804.9	1104.4	1103.7	1091.9	3.1
1989				652.6	933.8	928.6	673.4	4.2
1990				615.4	917.0	288.2	1.0	4.0
1991				352.6	546.6			4.2
1992				295.5	475.5			4.0
1993				79.3	132.2			3.7
1994				8.2	14.1			3.4
Subtotal	1	N/A	N/A	3755.5	5340.9	3537.2	2982.3	
APPROPRIATION: PROCUREMENT								
1987		16.2	23.1	39.3	59.1	59.0	58.1	2.7
1988	2	31.5	387.3	434.8	679.2	674.8	100.2	3.1
1989	4	10.8	551.7	672.8	1104.7	961.4	114.9	4.2
1990	4	17.6	599.6	837.9	1429.4	21.6	0.0	4.0
1991	6	17.3	945.0	1213.2	2146.1			4.2
1992	12	88.3	1271.1	1821.4	3333.1			4.0
1993	24	29.6	2229.8	2699.8	5099.9			3.7
1994	29		2113.5	2277.7	4437.0			3.4
1995	29		1746.7	2292.3	4603.0			3.1
1996	29		1538.2	1815.2	3759.2			3.1
1997	29		1526.6	1766.9	3772.3			3.1
1998	29		1618.8	1853.6	4079.8			3.1
1999	13		658.0	700.8	1590.1			3.1
Subtotal	210	211.3	15209.4	18425.7	36092.9	1716.8	273.2	

* Reflects Program Office Records as of 31 DEC 89.

16. Program Funding Summary (Cont'd) (Current Estimate in Millions of Dollars):

FY 81 Base-Year Dollars					Total Then-Year Dollars			Esc. Rate
Fiscal Year	Qty	Flyaway Non Rec	Flyaway Rec	Total	Program	Obligated	Expended	%
APPROPRIATION - MILCON*								
1989				2.8	4.2	3.3	1.3	4.2
1990				3.1	4.7			4.0
1991				18.5	29.6			4.2
1992				9.0	14.9			4.0
1993				50.2	85.9			3.7
1994				39.5	69.8			3.4
1995				57.9	105.5			3.1
1996				9.0	16.9			3.1
1997				24.1	46.6			3.1
Subtotal				214.1	378.1	3.3	1.3	
Total	211	211.3	15209.4	22395.3	41811.9	5257.3	3256.8	

*These values represent active duty requirements through FY 96. Outyear requirements are still under evaluation and will be reported in a future SAR as required.

17. Production Rate Data:

a. Annualized Production Rates-- The equivalent annual production rates shown below differ from the annual funded quantities because the funded delivery period for the production and current estimate is as follows: FY88-2, FY89-5, FY90-5, FY91-8, FY92-11, FY93-13, FY94-13, FY95-13, FY96-13, FY97-13, FY98-13, FY99-6. The Maximum Economic Buy Profile is 2-4-4-6-12-24-36-36-36-36-14. The funded delivery period is as follows: FY88-2, FY89-5, FY90-5, FY91-8, FY92-11, FY93-13, FY94-13, FY95-13, FY96-13, FY97-13, FY98-6.

Production Rates (Quantity/Year)				
Fiscal Year Buy	Planning Estimate	Production Estimate	Current Estimate	Maximum Economic
88	2	12.0	12.0	12.0
89	4	9.6	9.6	9.6
90	10	9.6	9.6	9.6
91	20	9.0	9.0	9.0
92	25	13.1	13.1	13.1
93	25	22.2	22.2	22.2
94	25	26.8	26.8	33.2
95	25	26.8	26.8	33.2
96	25	26.8	26.8	33.2
97	25	26.8	26.8	33.2
98	24	26.8	26.8	28.0
99		26.0	26.0	
TOTAL	210			

17. Production Rate Data (Cont'd):

b. Cost Variance - Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current/ Production Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY$)22395.3 (TY$)41811.9	0.0 0.0	22395.3 41811.9	416.1 1005.1	21979.2 40806.8
PAUC*	(BY$)106.644 (TY$)199.104	0.0 0.0	106.644 199.104	1.981 4.786	104.663 194.318

c. Schedule Variance -

Item	Production Estimate	Variance (CE less PdE)	Current/ Production Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	9/91	0	9/91	0	9/91
Duration (in Months)	110	0	110	12	98
End Date (Mo/Yr)	10/01	0	10/01	12	10/00

d. Deliveries (Plan/Actual) -

	To Date
RDT&E	0/0
Procurement	0/0

e. Approved Design to Cost Goal - N/A

18. Operating and Support Costs:

a. Assumptions and Ground Rules -- The concept of operations is 15 airlift squadrons (Active Organic, ARC Organic and Active/Reserve Associate), flying each airlifter an average of 1343 hours per year, providing the capability to direct deliver US combat forces and outsize/oversize cargo to Main Operating Bases and Forward Operating Locations. The system will be based at five MAC bases including one training base and four ARC bases. Aircraft maintenance will be done under a modified three-level concept. The estimate is based on a 10 year phase-in period and 25 years steady state. The estimated costs are as follows:

Direct Costs - Primary mission personnel and O&S consumable costs for operating the aircraft. Depot costs include interim contractor support, airframe and engine overhaul, repair of component parts, modification kit installation, airframe inspection and software support. Sustaining investment costs are primarily replenishment spares and repair parts, support equipment replacement and Class IV modification kits.

* Revised to exclude RDT&E unit in calculation of PAUC.

[redacted]

18. Operating and Support Costs (Cont'd):

a. Assumptions and Ground Rules (Cont'd)

Indirect Costs - Installation support personnel costs include base operating support, real property maintenance and medical. Indirect personnel support category includes medical O&M non-pay, permanent change of station and miscellaneous O&M costs. Depot non-maintenance summarizes general depot support costs and second destination transportation charges.

Personnel Acquisition and Training Category Costs - Include personnel acquisition, maintenance trainer contract support, aircrew training system contracted support, individual and specialty training.

b. Costs -- (FY 1981 Constant (Base Year) Dollars in Millions)

Cost Element	Average Annual Cost Per C-17 Squadron*
Unit Mission Personnel	14.9
O&S Consumables	41.3
Depot Level Maintenance	6.1
Sustaining Investment	11.1
Installation Support Personnel	2.1
Indirect Personnel Support	3.9
Depot Non-Maintenance	2.6
Personnel Acquisition and Training	2.1
Total	84.1

* Costs are based on 1988 O&S Annual Estimate dated October 1988.

c. Contractor and Support Costs** --

(Then-Year Dollars in Millions)

	FY 1989 & Prior	FY 1990 Year	FY 1991 Year	Balance To Complete	Total
O&M (AF)	0	5.1	1.6	TBD	6.7
Industrial Fund	0	0	0	TBD	0.0
Total	0	5.1	1.6	TBD	6.7

** Represents Ops 18 Budget exhibit prepared by SAF/FMBOI.

AF-8 DMSP (1)

~~SECRET~~

SAF-89-076

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: DMSP BLOCK 5D-2 IMPROVED/5D-3 ~~(U)~~

SAF/PAS
90-099 -T
#16

AS OF DATE: December 31, 1989

CLEARED
FOR OPEN PUBLICATION
AS AMENDED
MAR 1 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

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1. (U) Designation and Nomenclature (Popular Name): DMSP Block 5D-2 Improved/5D-3/Defense Meteorological Satellite Program (DMSP)

2. (U) DoD Component: U.S. Air Force

3. (U) Responsible Office and Telephone Number:

DMSP Office
Space Systems Division
P.O. Box 92960
Los Angeles AFB, CA 90009-2960

Col Juri Randmaa
Assigned: December 22, 1987
AV: 833-4333; COMM (213) 336-4333

4. ~~(U)~~ Program Elements/Procurement Line Items:

RDT&E: PE 0305160F

PROCUREMENT: APPN 3020 PE 0305160F ICN MS0554
APPN 3080 PE 0305160F ICN 833340

MILCON: PE 0305160F

5. ~~(U)~~ Related Programs: None.

~~CLASSIFIED BY : DMSP SCG 1 Feb 87~~
~~DECLASSIFY ON:~~

~~When page 6 is withdrawn, the classification of this document is unclassified.~~

~~SECRET~~

6. ~~(U)~~ Mission and Description: The mission of DMSP is to provide an enduring and survivable capability, through all levels of conflict consistent with the survivability of the supported forces, to collect and disseminate global visible and infrared cloud data and other specialized meteorological, oceanographic, and solar-geophysical data required to support worldwide DoD operations and high-priority programs. Timely data are supplied to Air Force Global Weather Central, the Navy Fleet Numerical Oceanography Center, and to deployed tactical receiving terminals worldwide. The DMSP system is the only DoD meteorological satellite system. It consists of two three-axis stabilized satellites in 450 nautical mile sun-synchronous polar orbits (98.7 degrees inclination), command readout stations, command and control facilities, strategic data processing facilities, worldwide fixed and mobile tactical terminals, and communication satellite links. The DMSP Block 5D-2 Improved (S11-14)/5D-3 (S15-20) systems replace the Block 5D-2 system which has completed production and is operational.

7. ~~(U)~~ Program Highlights:

a. ~~(U)~~ Significant Historical Developments -- The Defense Meteorological Satellite Program is a Joint-Service program in accordance with the Memorandum of Agreement on Joint Service Management and Operations, dated 15 December 1976. The program supports all military services. This is a continuing program. RDT&E funding will allow evolutionary development of spacecraft and sensors as necessary to support new requirements of the special strategic missions, the Joint-Service mission, and the Joint Chiefs of Staff. In Sep 83, DMSP awarded a multiyear procurement contract for four 5D-2 Improved spacecraft S11-14 (S11-12 procured in FY 83 and S13-14 procured in FY 85) and awarded a second multiyear procurement contract for the four primary sensors 5D-3 Operational Linescan Systems (OLS) in Jan 84, with the same procurement/FY profile. Satellite S-11 was delivered in Dec 88; thermal and acoustic testing of S-12 and delivery of the four OLSs were completed in May 89. Headquarters Air Force directed that an additional 5D-3 spacecraft (S-20) be procured in FY 91. A contract was awarded for 5D-3 development spacecraft (S-15) in Jul 86; CDR was completed in Dec 87. In Sep 88 a contract for five 5D-3 Operational Linescan Systems was awarded; System Design Review (SDR) for OLS-17 and OLS-18 was completed in Jan 89. Congressional approval for the multiyear procurement of five 5D-3 spacecraft was received in Sep 88. Congress approved transition from Atlas to Titan II surplus ICBMs as space launch vehicles with Titan II initial launch capacity in Oct 1990. Modification of the Flight Vehicle Simulation Facility (FVSF) was placed on contract in Apr 88. A contract for two microwave sounder/temperature water vapor profile sensors was awarded in Feb 88 and validation of the microwave imager sensor data was completed in Sep 88. Three microwave/imager sensors and one magnetometer were delivered in CY 89. In Mar 89 a contract for the Special Sensor Microwave/Imager Sounder (SSM/IS) was awarded. In Jan 86, the Fairchild Satellite Operations Center (FSOC) contract was awarded; construction began and the FSOC building was accepted by the Corps of Engineers in Dec 86; certification for the start of IOT&E occurred in Mar 89. Six Air Force Mark IV tactical terminals were delivered. The Satellite Data Handling System (SDHS) was turned over to the Air Force Global Weather Central (AFGWC) in FY 86; a contract for shared processing for the SDHS was awarded in Sep 88; SDHS Site III turnover was accomplished in May 89. C^3 Sites I, II, and V were turned over to AFSPACECOM.

7. (U) Program Highlights (Cont'd):

a. (U) Program Highlights (Cont'd) --

Program Management Responsibility Transfer (PMRT) of Mark IIa and IIIs occurred in Jul 87; PMRT of the C^3 system occurred in Oct 88. The Multi-Purpose Satellite Operations Center (MPSOC) upgrade was placed on contract in Sep 88. New flight software independent validation and verification (IV&V) contract awarded in Feb 87. The Mark IV was turned over to MAC in Mar 88 and PMRT of the Mark IV Tacterms occurred in Apr 88. The contract for Mark IVB Tactical Terminals was awarded in Oct 88; SDR occurred in Mar 89.

b. (U) Significant Developments Since Last Report --

The 5D-3 Multiyear Procurement Contract for spacecraft S16-20 was awarded on 30 Jun 89 with acquisition savings in excess of $90 million. Spacecraft S-12 was delivered on 23 Oct 89, one month ahead of the baseline schedule. Critical Design Review (CDR) for survivability on the 5D-3 spacecraft S-15 occurred on 6 Dec 89. Preliminary Design Review (PDR) for Operational Linescan System (OLS) sensors 17 and 18 was completed in Jul 89. The production of Microwave Imagers (SSM/I) was completed with the delivery of sensors in May 89, Sep 89, Oct 89 and Nov 89. System Design Review for the Special Sensor Microwave Imager Sounder (SSM/IS) was completed in Jun 89. A water vapor sounder (SSM/T-2) was delivered on 22 Nov 89. PDR for the Mark IVB Tactical Terminals was successfully completed in Jul 89; CDR was completed on 17 Nov 89. In Aug 89, the Multi-Purpose Satellite Operations Center (MPSOC) Retrofit CDR was completed. Fairchild Satellite Operations Center (FSOC) Operational turnover occurred on 3 Aug 89; AFSPACECOM declared IOC on 29 Aug 89; PMRT to AFLC occurred on 1 Oct 89. The New Hampshire Command Readout Station (NHS/BOSS) modification to the remote tracking station to allow receipt and relay of DMSP data and bent-pipe commanding of DMSP satellites through this site was negotiated in Aug 89; CDR was completed 8 Nov 89. PMRT to MAC of the Satellite Data Handling System (SDHS) and the Data Reconstruction Site occurred on 15 Nov 89. This completed the turnover and transfer of all operational assets to the operating and supporting commands and thus makes DMSP the first "normalized" major space program.

The DMSP expects to meet its directed operational force structure and all mission requirements.

c. (U) Changes Since "As Of" Date -- None.

8. (U) Threshold Breaches: There are currently no breaches against the DAE baseline dated June 30, 1989.

9. (U) Schedule:

a. (U) Milestones--	Production Estimate	Approved Program	Current Estimate
Spacecraft (S11-14) Production Contract Awd	Sep 83	Sep 83	Sep 83
Required Availability:1/			
S-11	N/A	N/A	3 Qtr 90(Ch-1)
S-12	N/A	N/A	2 Qtr 91(Ch-1)
S-13	N/A	N/A	1 Qtr 92(Ch-1)
S-14	N/A	N/A	2 Qtr 93(Ch-1)
S-15	N/A	N/A	3 Qtr 94(Ch-1)
Satellite Deliveries:			
S-11	Jul 87	Dec 88	Dec 88
S-12	N/A	Nov 89	Oct 89(Ch-2)
S-13	N/A	Aug 90	Aug 90
S-14	N/A	Nov 90	Nov 90
S-15	N/A	Sep 91	Sep 91
IOC - Block 5D-2 Improved (F-11) 2/	TBD	TBD	TBD
Initial Titan II Capability	N/A	N/A	Oct 90
Primary Sensor (S12-15) Prod Contract Awd	Jan 84	N/A	Jan 84(Ch-3)
Primary Sensor (S16-S20) Prod Contract Awd	N/A	N/A	Sep 88
S-16 Primary Sensor Delivery	N/A	N/A	FY 92
Spacecraft (S15) Design Contract Awd	Nov 85	N/A	Jul 86
IOC - Block 5D-3 (F-15) 2/	TBD	TBD	TBD
Primary Sensor (S11) Design Contract Awd	Sep 82	N/A	Sep 82
Block 5D-3 MY Procurement Contract Award	N/A	N/A	Jun 89
Fairchild Satellite Operations Center (FSOC) Operational	Sep 87	N/A	Aug 89(Ch-4)
Thule Command Readout Station (CRS)			
(1) Operational	Sep 87	N/A	Feb 88
(2) Deactivate Loring CRS	Sep 88	N/A	Jun 90
Mark IVB Contract Award	N/A	N/A	Oct 88
Begin Mark IVB IOT&E	N/A	N/A	Dec 90(Ch-5)
Mark IVB Production Start	N/A	N/A	Feb 91
Mark IVB Retrofit Start	N/A	N/A	Feb 91
Final Mark IVB Delivery	N/A	N/A	Sep 95
DMSP Milestone V	N/A	N/A	FY 93

1/ Dates are by Government Fiscal Year quarter.
2/ IOC will occur 30 days after launch (completion of on-orbit checkout). As DMSP launches on demand, no firm estimate is currently available.

9. (U) Schedule (Cont'd):

b. (U) Previous Change Explanations --

Fairchild Satellite Operations Center IOC slipped from Sep 88 to May 89 due to delay in contract award, the requirement of a second proposal to address all AFSPACECOM requirements, increased scope of training, and the fact that the original definition of IOC did not account for time required for IOT&E. Spacecraft (S15) design contract award slipped from May 86 to Jul 86 when additional technical evaluation of the proposal was required. S-11 delivery slipped from Jul 87 to Dec 88 due to materials problems, late delivery of piece-parts, diversion of manpower to support two launches, and late delivery of Government furnished equipment. Thule Command Readout Station (CRS) slipped from Sep 87 to Feb 88 due to FMFM S-Band Downlink Capability modification extending the contract period of performance. Deactivation of Loring CRS slipped from Sep 88 to Jun 90 by determination of AFSPACECOM. Milestones added to reflect DAE Baseline. Delivery dates for Spacecraft S12-15 adjusted due to increased satellite on-orbit lifetime. FSOC Operational slipped from May 89 to Jul 89 due to the non-availability of critical spares. Award of the 5D-3 multiyear contract slipped from Mar 89 to Jun 89 due to protracted negotiations.

c. (U) Current Change Explanations --

(Ch-1) Required Availability updated to latest Generalized Availability Program (GAP) dates. Change due to increased satellite on-orbit life.

(Ch-2) Satellite S-12 delivered a month ahead of estimate due to efficient test cycle.

(Ch-3) Current estimate erroneously changed and reported as Oct 90

(Ch-4) Slipped from Jul 89 to Aug 89 due to the non-availability of 100% of the critical spare parts on site.

(Ch-5) Slipped from Sep 90 to Dec 90 due to anticipated PMD amendment which will add Mission 22 capability.

d. (U) References --

Production Estimate:
PMD R-S 3015 (20), dated May 31, 1983, subject "DMSP"

Approved Program: DAE Baseline approved June 30, 1989.

0. (U) Technical/Operational Characteristics:

a. (U) Technical	Prod Est	Approved 1/ Program Goal/Threshold	Demonstrated Perf	Current Estimate
Altitude (Nautical miles)2/	450	450 / 450	N/A	450 4/
Inclination (Degrees)3/	98.7	98.7 / 98.7	N/A	98.7 4/
Primary Sensor:				
Global Resolution (Km)	2.78	2.78 / 2.78	N/A	2.78 4/
Theater Resolution (Km)	0.56	0.56 / 0.56	N/A	0.56 4/
b. (U) Operational				
Early Orbit Checkout (Days):				
5D-2 Improved	30	30 / 30	N/A	30
5D-3	30/120	30 / 30	N/A	30
Mean Mission Duration (Months):				
5D-2 Improved	33	33 / 33	N/A	33 4/
5D-3	42	42 / 42	N/A	42 4/
Mark IVB Transportable Tactical Terminals:				
Mean Time Between Corrective Maintenance Actions (MTBCMA)(Hours)				
Parallel Model	720	N/A / N/A	N/A	720 (Ch-1)
Series Model	N/A	N/A / N/A	N/A	350 (Ch-1)
Mean Time to Repair (MTTR)(Hours)	1	N/A / N/A	N/A	1
Mean Time Between False Alarms (MTBFA)(Hours)	20000	N/A / N/A	N/A	20000
Mean Time Between Critical Failures (MTBCF)(Hours)				
Non-simultaneous reception/processing	2000	N/A / N/A	N/A	2000(Ch-1)
Simultaneous reception/ processing	N/A	N/A / N/A	N/A	1150(Ch-1)
Maintenance Manhours per Operating Hour (MMH/OH)	0.0233	N/A / N/A	N/A	0.0233
Inherent Availability				
Parallel Model	0.9995	N/A / N/A	N/A	0.9995(Ch-1)
Series Model	N/A	N/A / N/A	N/A	0.9991(Ch-1)
Fraction of Failures Isolated by Built-in Test	90%	N/A / N/A	N/A	90%
Survivability				
(b)(1)				
Autonomous Operation (Days)	N/A	N/A / N/A	N/A	7

1/ DMSP Block 5D-2/5D-3 is a mature operational system which has demonstrated thresholds and no goals except for survivability.

2/ With a difference between apogee and perigee of no more than 30 nautical miles

3/ $\pm$ .15°

4/ Anticipated (based on current on-orbit satellite performance).

10. (U) Technical/Operational Characteristics (Cont'd):

c. (U) Previous Change Explanations --

Previous entry for Early Orbit Checkout allowed up to 90 days in a transfer orbit for Space Shuttle launches. No longer required due to transition to Titan II ELV. Demonstrated performance for the altitude, inclination, and primary sensor was deleted. This performance was based on older DMSP satellites not included in Dec 86 SAR. Footnotes changed to more accurately reflect current satellite performance. Survivability parameters are included to reflect DAE Baseline. Operational and technical characteristics were adjusted to agree with the DAE Baseline. Mark IVB data replaced Mark IV data.

d. (U) Current Change Explanations --

(Ch-1) Changes due to further definitization of Mark IVB requirements.

e. (U) References:

Production Estimate:
PMD R-S 3015 (20), dated May 31, 1983, subject "DMSP"

Approved Program: DAE Baseline approved June 30, 1989.

11. (U) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. (U) Cost --

	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	$ 224.5	$ 223.9	$ 228.7
Procurement	491.6	499.9	464.6
Launch Vehicle	(26.0)	(7.2)	(7.2)
Spacecraft	(201.3)	(206.5)	(196.2)
Primary Sensor	(79.6)	(79.7)	(76.7)
Mission Sensors	(57.1)	(63.6)	(55.7)
Support	(48.9)	(50.4)	(51.4)
Total Flyaway	(412.9)	(407.4)	(387.2)
Ground System	(58.0)	(71.1)	(67.4)
Field Level Support	(19.8)	(0.0)*	(0.0)*
Initial Spares	(0.9)	(21.4)	(10.0)
Total Non-Flyaway	(78.7)	(92.5)	(77.4)
Construction (MILCON)	2.6	3.0	2.7
Total FY75 Base-Year $	718.7	726.8	696.0
Escalation	1160.3	1088.7	1075.5
Development (RDT&E)	(318.1)	(298.5)	(321.9)
Procurement	(839.1)	(786.9)	(750.6)
Construction (MILCON)	(3.1)	(3.3)	(3.0)
Total Then-Year $	$1879.0	$1815.5	$1771.5

* Current Estimate now included in Initial Spares Line.

11. (U) Program Acquisition Cost (Cont'd):

	Production Estimate	Approved Program	Current Estimate
b. (U) Quantities --			
Development (RDT&E)	1	1	1
Procurement	8	9	9
Total	9	10	10

c. (U) Foreign Military Sales -- None.

d. (U) Nuclear Costs -- None.

e. (U) References --

Production Estimate:
PMD R-S 3015 (20), dated May 31, 1983, subject "DMSP"

Approved Program: DAE Baseline, 30 June, 1989.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. (U) Program Acquisition	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	1771.5	1818.1	1771.5
(2) Quantity	10	10	10
(3) Unit Cost	177.150	181.810	177.150
b. (U) Current Procurement --	(FY 1990)	(FY 1990 APPN)*	(FY 1991)
(1) Cost	118.4	118.4	166.2
Less CY Adv Proc	-57.0	-57.0	-63.6
Plus PY Adv Proc	+47.8	+47.8	+68.6
Net Total	109.2	109.2	171.2
(2) Quantity	1	1	1
(3) Unit Cost	109.200	109.200	171.200

* Differs from the Dec 88 SAR to reflect the FY 90 Appropriations Act.

13. (U) Cost Variance Analysis:

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	542.6	1330.7	5.7	1879.0
Previous Changes:				
Economic	-32.9	-135.1	-0.3	-168.3
Quantity	-	+190.2	-	+190.2
Schedule	-	+1.9	-	+1.9
Engineering	-13.6	-52.0	-	-65.6
Estimating	+0.1	-102.4	-	-102.3
Other	-	-	-	-
Support	+26.2	+53.5	+0.9	+80.6
Subtotal	-20.2	-43.9	+0.6	-63.5
Current Changes:				
Economic	+13.3	+39.8	+0.1	+53.2
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-18.4	-	-18.4
Estimating	+14.5	-43.3	-	-28.8
Other	-	-	-	-
Support	+0.4	-49.7	-0.7	-50.0
Subtotal	+28.2	-71.6	-0.6	-44.0
Total Changes	+8.0	-115.5	0.0	-107.5
Current Estimate	550.6	1215.2	5.7	1771.5

(FY 1975 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	224.5	491.6	2.6	718.7
Previous Changes:				
Quantity	-	+61.2	-	+61.2
Schedule	-	-	-	-
Engineering	-5.2	-18.4	-	-23.6
Estimating	-5.3	-48.3	-	-53.6
Other	-	-	-	-
Support	+9.9	+13.8	+0.4	+24.1
Subtotal	-0.6	+8.3	+0.4	+8.1
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-6.4	-	-6.4
Estimating	+4.5	-13.8	-	-9.3
Other	-	-	-	-
Support	+0.3	-15.1	-0.3	-15.1
Subtotal	+4.8	-35.3	-0.3	-30.8
Total Changes	+4.2	-27.0	+0.1	-22.7
Current Estimate	228.7	464.6	2.7	696.0

13. (U) Cost Variance Analysis (Cont'd):

b. (U) Previous Change Explanations --

RDT&E

Economic: revised escalation indices.

Engineering: developed satellite autonomy capability; added new wind sensor technology effort but requirement later withdrawn; de-scoped survivability of 5D-3 spacecraft (S-15); increased vacuum ultraviolet (SSUV) sensor development authorized, but authority later withdrawn.

Estimating: adjustments to correct current & prior year escalation; adjustments to current & prior years to reflect actuals; funding reallocated to complete spacecrafts S8-10, which are not included in SAR; definitized Titan II ELV contract as 5D-3 booster; definitized 5D-3 development spacecraft (S-15) contract; re-estimate of 5D-3 development effort and performance incentives; additional development for wind measuring sensor; increased program management and technical support; decrease in requirement for primary and mission sensors and ground systems contingency; reduction resulting in delay of spacecraft (S-15) and primary and mission sensors and decrease in technical support; added funding for Titan II launch vehicle integration; reduction of estimate for 5D-3 development; increased cost for spacecraft and sensor support and service effort; decreased estimate of program managment and technical support; decrease in spacecraft and sensor studies; increased costs for spacecraft and sensor support and service effort.

Support: decrease to design of tactical terminal modifications; increase in Automated Weather Product Driver System application; deleted Shuttle-Launch Base requirement; upgrade of deployed DMSP tactical terminals and development of a new combat tactical terminal added; increase to C^3 and DMSP tactical terminal upgrade requirements; reduction in development of new combat tactical terminal; increased cost for launch and on-orbit checkout for spacecraft S-15 and related launch and on-orbit costs; decrease to C^3 requirements; decrease due to definitization of DMSP tactical terminal requirements; re-estimate of development of new combat tactical terminal.

Procurement

Economic: revised escalation indices.

Quantity: add one 5D-3 satellite (S-20) due to extension of 5D-3 program.

Schedule: Restructure of multiyear procurement of Block 5D-3 spacecraft 16-20.

Engineering: descoped survivability and added classified sensor to S16-20 spacecraft; deletion of upgrade of production units and test model for primary sensor (OLS 13-21); added requirement for solar x-ray imager sensor (SXI).

13. (U) Cost Variance Analysis (Cont'd):

b. (U) Previous Change Explanations (Cont'd) --

Procurement (Cont'd)

Estimating: adjustments to correct current and prior year escalation; adjustments to current & prior years to reflect actuals; funding reallocated to complete spacecrafts S8-10, which are not included in SAR; extension of 5D-3 program; transition to Titan II ELV as 5D-3 booster; funding for Titan II launch vehicles refurbishment for DMSP S16-20 transferred to Space Boosters Program (PE 35119F); fully funded buy of S16-20 and associated primary sensors restructured as a multiyear procurement; revised estimate of OLS and spacecraft (for S16-20) using Jun 85 cost data; upgraded production/test equipment model for primary sensor (OLS13-21); integration funding for this added in FY 87; descoped merger of two mission sensors and re-estimated mission sensor mix in Jun 85 for S16-20; acceleration of water vapor profiling capability; loss of advance material buy funding for primary sensor; restructure of primary sensor buy from multiyear procurement to fully funded annual buy; revised estimate for multiyear procurement of spacecraft S16-20; adjustments to technical support and mission sensor contingency; refinement of estimate for restructuring multiyear procurement of Block 5D-3 spacecraft 16-20; definitization of procurement of primary sensor OLS 17-21; re-estimate of special sensor buy as a competitive procurement; refinement of estimate for procurement of space sensors.

Support: adjustments to correct current and prior year escalation; adjustments to current and prior years to reflect actuals; revised estimate of spares and equipment allocation; decrease in Mark IV Production; replaced outdated and unsupportable Control Readout Station (CRS) antenna and Satellite Operations Center (SOC) computers; refinement of Multi-Purpose Satellite Operations Center Upgrade (MPSOC) requirement; increased deployed DMSP tactical terminal upgrade requirements; reduction in production of new combat tactical terminals; revised estimate of initial spares requirement; increased cost for replacement of out-dated site equipment; definitization of DMSP tactical terminal upgrade requirements; re-estimate for DMSP connectivity to New Hampshire tracking station.

MILCON:

Economic: revised escalation indices.

Support: adjustments to correct current and prior year escalation; increase to backup satellite operations facility at Fairchild AFB.

13. (U) Cost Variance Analysis (Cont'd):

c. (U) Current Change Explanations--

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Economic escalation indices. (Economic)	N/A	+13.3
Adjustments to current and prior years escalation. (Estimating)	-0.2	-0.4
Adjustments to spacecraft and sensor studies and technical support in current and prior years. (Estimating)	-1.4	-3.7
Revised estimate of S-15 development (Estimating)	+5.5	+14.0
Decreased costs for spacecraft, primary sensor, and mission sensor support and service effort. (Estimating)	-3.3	-9.9
Revised estimate of 5D-3 spacecraft (S-15) performance incentives. (Estimating)	-0.1	-0.2
Revised estimate of program management and technical support. (Estimating)	-1.5	-3.3
Extend support and service activities one year due to delay of follow-on program. (Estimating)	+5.5	+18.0
Decrease to command, control, and communications (C^3) requirements. (Support)	-1.7	-5.1
Adjustment to Mark IVB development effort. (Support)	-0.6	-1.6
Revised estimate for development of combat tactical terminal. (Support)	+1.1	+3.1
Launch facility improvements due to space policy security requirements. (Support)	+0.4	+1.0
Reprioritization of Tactical Data Processing requirements by user. (Support)	+1.1	+3.0
(2) Procurement		
Revised economic escalation indices. (Economic)	N/A	+39.8

13. (U) Cost Variance Analysis (Cont'd):

c. (U) Current Change Explanations (Cont'd)--

	(Dollars in Millions) Base-Year	Then-Year
(2) Procurement (Cont'd)		
Withdrawl of funding for solar x-ray imager (SXI). (Engineering)	-6.4	-18.4
Adjustments to current and prior year escalation. (Estimating)	-2.5	-7.2
Adjustments to current and prior years to reflect funding reductions. (Estimating)	-1.0	-2.7
Definitization of multiyear procurement of spacecraft S16-S20. (Estimating)	-4.7	-14.4
Adjustment to technical support and mission sensor contingency. (Estimating)	-0.4	-3.8
Refinement of estimate for procurement of environmental sensors. (Estimating)	-3.0	-8.8
Revised estimate for procurement of primary sensors (OLS 20-21). (Estimating)	-2.2	-6.4
Adjustments to current and prior years escalation. (Support)	-0.2	-0.5
Adjustments to current and prior years for ground system and initial spares procurement to reflect actuals. (Support)	0.0	-0.1
Revised estimate for replacement of site equipment using off-the-shelf equipment. (Support)	-3.7	-12.9
Definitization of DMSP connectivity to New Hampshire tracking station. (Support)	+0.1	+0.2
Refined estimate for Mark IVB site prep/ shelter procurement. (Support)	+0.2	+0.6
Revised estimate of initial spares and reprogramming of spares funding. (Support)	-11.5	-37.0

	(Dollars in Millions) Base-Year	Then-Year

13. (U) Cost Variance Analysis (Cont'd):

c. (U) Current Change Explanations (Cont'd)--

	(Dollars in Millions) Base-Year	Then-Year
(3) MILCON (Cont'd)		
Revised economic escalation indices. (Economic)	N/A	+0.1
Adjustments to current and prior years escalation. (Support)	0.0	-0.1
Adjustment to current and prior years to reflect actuals. (Support)	-0.3	-0.6

14. (U) Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

a. (U) Initial SAR/Production Estimate to Current Baseline Estimate

PAUC (Initial SAR/Pd Estimate)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
208.778	-11.510	-1.858	+0.190	-8.400	-13.110	--	+3.060	-31.628	177.150

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E--

5D-3 Spacecraft
General Electric Co, Princeton, NJ
F04701-86-C-0038, FPIF, AF, PI
Award: July 7, 1986
Definitized: July 7, 1986

Initial Contract Price		
Target	Ceiling	Qty
$75.2	$82.4	1

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$73.8	$80.8	1	$71.3	$73.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ +1.2	$-14.7
Cumulative Variances To Date (11/26/89)	$ -0.4	$-13.9
Net Change	$ -1.6	$ +0.8
Cumulative Variance Change Percent	-133.3%	+5.4%

Explanation of Change: Cost variance due to noncompletion of milestone and hardware problems. Schedule variance improvement due to an increase in material disbursement, box build-up and test activity in integration and test. Other material delays causing cumulative variance. Due to longer lifetime of on-orbit satellites, a schedule extension with adequate Government consideration is being negotiated. Schedule slip will have no cost impact. No program impact is anticipated because two spacecraft are in storage.

Special Sensor Microwave Imager/Sounder
Aerojet ElectroSystems Co, Azusa, CA
F04701-89-C-0036, CPAF/FPIF
Award: March 17, 1989
Definitized: March 17, 1989

Initial Contract Price		
Target	Ceiling	Qty
$62.1	$66.3	3

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$63.5	$67.7	3	$62.1	$64.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -0.3	-0-
Cumulative Variances To Date (11/25/89)	$ -0.3	$ -2.1
Net Change	$ -0-	$ -2.1
Cumulative Variance Change Percent	0.0%	N/A

Explanation of Change: Cost variance due to redesign processes required to meet sensor limitations, additional resources for coordination of schedule development and replanning efforts. Schedule variance due to delays in development of system specifications, staffing delays, software replanning and delay in Preliminary Design Review (PDR). No program impact is anticipated.

15. (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

b. (U) Procurement--

5D-2 Improved Spacecraft
General Electric Co, Princeton, NJ
F04701-83-C-0030, FPIF, CPFF, PI
Award: September 2, 1983
Definitized: September 2, 1983

Initial Contract Price		
Target	Ceiling	Qty
$161.7	$171.9	4

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$199.7	$211.0	4	$184.5	$184.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+11.0	$-16.3
Cumulative Variances To Date (11/26/89)	$+11.1	$-14.4
Net Change	$ +0.1	$ +1.9
Cumulative Variance Change Percent	+0.9%	+11.7%

Explanation of Change: Cost variance due to increased efficiencies and underspending in program management and systems engineering. Schedule variance due to milestone completion and progress in integration and test. The program office is proceeding with negotiation of a revised delivery schedule with adequate consideration for the Government. Since the contract has a large underrun to date, the schedule slip will have no cost impact. Cost variance is attributed to efficient utilization of labor in systems engineering and program management. There is no program impact because there are two spacecraft in storage.

5D-3 Spacecraft Production
General Electric Co, Princeton, NJ,
F04701-89-C-0029, FPIF, FFP, AF
Award: June 30, 1989
Definitized: June 30, 1989

Initial Contract Price		
Target	Ceiling	Qty
$228.2	$250.2	5

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$228.2	$250.2	5	$228.2	$228.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ N/A	$ N/A
Cumulative Variances To Date (11/26/89)	$ +0.2	$ -0.1
Net Change	$ +0.2	$ -0.1
Cumulative Variance Change Percent	N/A	N/A

First time reported in SAR. Contractor is in the early stages of baselining. Variances attributed to slow program startup. Incorporation of budget baseline into cost report will be complete by month end January 1990.

15. (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

b. (U) Procurement (Cont'd)

5D-3 Operational Linescan System (Follow-on)

Westinghouse Corp., Baltimore, MD,
F04701-88-C-0118, FPIF, AF, PI
Award: September 19, 1988
Definitized: September 19, 1988

Initial Contract Price		
Target	Ceiling	Qty
$55.0	$61.1	2

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$74.0	$82.4	3	$55.4	$73.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ +0.7	$ -0.2
Cumulative Variances To Date (11/30/89)	$ +1.6	$ -0.5
Net Change	$ +0.9	$ -0.3
Cumulative Variance Change Percent	+128.6%	-150.0%

Explanation of Change: Cost variance change due to delivery of material being slower than planned for bench test model and a lack of intermediate milestones in printed circuit board layout. Schedule variance due to electrical design changes and delays in the flight software. No program impact is anticipated.

Microwave Temperature Sounder/Water Vapor Profiler

Aerojet ElectroSystems Co, Azusa, CA
F04701-83-C-0038, FPIF
Award: April 15, 1983
Definitized: April 15, 1983

Initial Contract Price		
Target	Ceiling	Qty
$9.5	$10.1	4

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$41.5	$44.0	6	$41.7	$41.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -4.3	$ -2.0
Cumulative Variances To Date (11/24/89)	$ -5.0	$ -1.8
Net Change	$ -0.7	$ +0.2
Cumulative Variance Change Percent	-16.3%	+10.0%

Explanation of Change: Schedule variance improvement due to delivery of B3 unit. Remaining schedule variance due to late receipt of piece parts, replan of material due to buy decision of machined parts versus making in-house, and delays in receipt and injection of materials to work-in-process which is impacting fabrication. Cost variance due to unrecoverable overruns due to late parts procurement, additional effort and higher costs for reprocurement of parts, workarounds to meet delivery dates, and qualification test failures, upgrades and retest. No program impact is anticipated.

15. (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

c. (U) MILCON - N/A

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status --

(1) Percent Program Completed: 50.0% (9 yrs/18 yrs)

(2) Percent Program Cost Appropriated: 64.6% ($1144.7/$1771.5)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-99)	Total
RDT&E	281.1	45.0	34.7	189.8	550.6
Procurement - Missile	603.9	116.6	147.7	149.2	1017.4
Procurement - Other	90.6	1.8	18.5	86.9	197.8
MILCON	5.7	-	-	-	5.7
Total	981.3	163.4	200.9	425.9	1771.5

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary -- 1/

Fiscal Year	Qty	Flyaway FY 75 Dollars		Total Base Year $	Total Then-Year $ 2/			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1982				8.4	15.5	15.5	15.5	9.2
1983				8.7	16.8	16.8	16.1	4.9
1984				9.8	19.6	19.6	19.3	3.8
1985				18.4	37.9	37.9	36.2	3.4
1986				24.1	50.9	50.8	45.6	2.8
1987				27.0	58.8	58.8	48.0	2.7
1988				16.1	36.3	36.2	24.7	3.1
1989				19.2	45.3	44.1	19.4	4.2
1990				18.4	45.0	11.0	0.2	4.0
1991				13.6	34.7			4.2
1992				9.9	26.2			4.0
1993				8.7	23.8			3.7
1994				11.4	32.1			3.4
1995				8.1	23.5			3.1
1996				8.0	24.0			3.1
1997				7.9	24.5			3.1
1998				5.5	17.7			3.1
1999				5.5	18.0			3.1
Subtotal	1			228.7	550.6	290.7	225.0	

1/ Funding does not match the budget documentation because the SAR is limited to DMSP Blocks 5D-2 Improved and 5D-3.

2/ Obligation and Expenditure information reflects program office records as of 31 Dec 1989.

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary -- 1/

Fiscal Year	Qty	Flyaway FY 75 Dollars		Total Base Year $	Total Then-Year $ 2/			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: Procurement - Missile								
1982		0.0		7.0	14.4	14.4	16.9**	9.6
1983	2	3.8	58.9	69.1	151.2	151.2	126.9	9.0
1984		3.7		12.2	27.8	27.8	26.4	8.0
1985	2	4.3	73.6	54.5	127.5	127.2	82.7	3.4
1986		4.1	13.3*	16.3	39.5	39.5	23.7	2.8
1987		3.6		6.9	17.5	17.5	11.4	2.7
1988		2.8		26.2	68.7	65.6	10.1	3.1
1989	1	2.6	47.6	57.1	157.3	146.2	6.2	4.2
1990	1	5.1	33.2	40.7	116.6	53.5	0.0	4.0
1991	1	4.6	38.2	49.7	147.7			4.2
1992	2	4.4	70.9	35.0	107.3			4.0
1993		2.6		2.7	8.4			3.7
1994		2.7		2.7	8.7			3.4
1995		2.4		2.4	8.1			3.1
1996		2.4		2.4	8.3			3.1
1997		2.4		2.3	8.4			3.1
1998		0.0		0.0	0.0			3.1
1999		0.0		0.0	0.0			3.1
Subtotal	9	51.5	335.7	387.2	1017.4	642.9	304.3	

* Primary and mission sensors for development spacecraft (S15).

** DCASR billing error.

1/ Funding does not match the budget documentation because the SAR is limited to DMSP Blocks 5D-2 Improved and 5D-3.

2/ Obligation and Expenditure information reflects program office records as of 31 Dec 1989.

16. ~~(U)~~ Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. ~~(U)~~ Annual Summary (Cont'd) -- 1/

Fiscal Year	Qty	Flyaway FY 75 Dollars		Total Base Year $	Total Then-Year $ 2/			Escl Rate (%)
		Nonrec	Rec		3/ Program	Obli-gated	Ex-pended	
Appropriation: Procurement - Other								
1983				3.7	7.5	7.5	7.1	4.9
1984				6.3	13.1	12.6	12.6	3.8
1985				13.3	28.7	25.7	24.3	3.4
1986				4.2	9.3	4.9	12.5*	2.8
1987				3.0	6.9	5.2	2.9	2.7
1988				3.8	9.0	6.9	3.4	3.1
1989				6.4	16.1	14.7	3.0	4.2
1990				0.7	1.8	0.8	0.0	4.0
1991				6.8	18.5			4.2
1992				9.4	26.4			4.0
1993				3.1	9.1			3.7
1994				5.8	17.3			3.4
1995				5.5	16.9			3.1
1996				5.4	17.2			3.1
1997				0.0	0.0			3.1
1998				0.0	0.0			3.1
1999				0.0	0.0			3.1
Subtotal				77.4	197.8	78.3	65.8	
Appropriation: MILCON								
1985				2.7	5.7	5.7	5.7	3.4
Subtotal				2.7	5.7			
Total	10	51.5	335.7	696.0	1771.5	1017.6	600.8	

1/ Funding does not match the budget documentation because the SAR is limited to DMSP Blocks 5D-2 Improved and 5D-3.

2/ Obligation and Expenditure information reflects program office records as of 31 Dec 1989. Only DMSP/AFSC obligations/expenditures are shown.

3/ Total Program dollars include SM-ALC/AFLC Programmed and Contractual funds in PE0305160F.

* DCASR billing error.

17. (U) Production Rate Data: No report. Production less than 6 per year.

18. (U) Operating and Support Costs:

a. Assumptions and Ground Rules -- NOT AVAILABLE.

b. Cost -- NOT AVAILABLE.

c. Contractor Support Cost -- N/A

~~SECRET~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823 ~~(U)~~
PROGRAM: Defense Support Program (DSP) ~~(U)~~

AF-10 DSP

AS OF DATE: December 31, 1989

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AS AMENDED
MAR 1 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)

1. ~~(U)~~ Designation and Nomenclature (Popular Name): Defense Support Program Strategic Surveillance and Warning Satellite System (DSP).

2. ( ) DOD Component: U.S. Air Force

3. ( ) Responsible Office and Telephone Number:

Director, Defense Support Systems
Space Systems Division
Los Angeles AFB, CA 90009

PM: Col John R. Kidd
Assigned: August 1,1989
AUTOVON 833-1150
Commercial: (213) 643-1150

4. ( ) Program Element:
RDT&E: PE 0102431F
PROCUREMENT: APPN 3020 ICN MS0647
APPN 3080 ICN 833100
MILCON: PE 0102431F

5. ( ) Related Programs: Jam Resistant Secure Communications Terminals (JRSCT); AFSATCOM Modulation Compatibility (AMC) Terminal; MILSTAR; Defense Satellite Communication System (DSCS); Boost Surveillance and Tracking System (BSTS), Survivable Communications Integrated System (SCIS).

6. ~~(U)~~ Mission and Description: The Defense Support Program is a highly available and reliable satellite-borne surveillance system. DSP performs the following missions: Primary Mission A - missile launch detection, (b)(1) Secondary Mission B - nuclear detonation (NUDET) detection, (b)(1) Both Missions A and B are reported in near real-time to the National Command Authorities (NCA) and other designated users. (b)(1) (b)(1)

As directed by the PMD, the system currently consists of (b)(1) (b)(1) in geosychronous orbit, although AFSPACECOM uses all 4 satellites in operations. Additionally, there are three fixed ground stations, one multi-purpose facility, six mobile ground systems, and a ground communications network. The system does not replace any existing system.

7. (U) Program Highlights:

a. (U) Significant Historical Developments --

(U) The Defense Support Program (DSP) was developed as an outgrowth of the ballistic missile infrared technology of Program 461. Full operational deployment of the DSP was completed during June 1973. DSP satellites contain infrared sensors, visible light detectors, and particle and radiation sensors. The system, as part of the Tactical Warning and Attack Assessment system, provides near real-time warning of ICBMs and SLBMs nuclear detonation reporting. (b)(1) (b)(1) (b)(1)

(U) DSP has initiated procurement of 22 satellites. The last five satellites (18-22) were approved by Congress to be procured using a Multi-Year Procurement (MYP) approach which saved the Government $455 million over an annual buy approach. To date, the program office has successfully launched (b)(1) DSP has been responsible for constructing three fixed sites, a multi-purpose training facility, one transportable data processing facility, six mobile ground systems, and provided user displays and software.

(U) The sensor has undergone Sensor Evolutionary Development (SED) improvements which are intended to prolong the useful life of each satellite, to make the satellite more survivable in hostile environments, to increase the viewing area of each satellite, and to increase the accuracy of the data provided. (b)(1) (b)(1)

(U) Directed survivability enhancements currently being incorporated into the system include the following: (1) Mobile Ground System (MGS) to enhance DSP data processing survivability through mobility and proliferation; (2) a DSP satellite-to-satellite laser crosslink (b)(1) (b)(1) (3) a Mission Data Message rebroadcast capability allowing survivable communication from the Mobile Ground Terminals (MGTs) to users via DSP satellites; (4) a Second Color sensor focal plane (b)(1) (b)(1) and (5) increased system autonomy, allowing the satellite(s) to remain operational with minimum ground commanding. These enhanced satellites are identified as DSP-1 satellites and begin with Satellite 14. The Laser Crosslink will be incorporated starting with Satellite 18.

~~(U)~~ AFOTEC conducted Initial Operational Test and Evaluation (IOT&E) of the MGS (b)(1) The SPO turned over to AFSPACECOM (b)(1) all six MGSs.

~~(U)~~ The fixed ground stations have been modified with the Large Processing Stations Upgrade (LPSU) main computer replacement and the Peripheral Upgrade Program (PUP). They are undergoing the Periphal Upgrade Program (PUP) and the Ground Stations Upgrade for Satellite 14 (GS-14) to make them compatible with the second generation of satellites (Satellites 14-22). The CGS accepted the PUP equipment in April 1987 and the OGS in September 1987.

~~(U)~~ In 1986, Satellite 5R was demated from the Titan 34D booster due to the booster investigations caused by the previous booster disasters. This was the first time any satellite had been demated from its booster.

b. ~~(U)~~ Significant Developments Since Last Report -

(~~S~~) (b)(1)

(b)(1)

(b)(1)

~~(U)~~ The Simplied Processing Station Replacement (SPSR) was completed. This facility is now designated the European Ground Station (EGS).

~~(U)~~ The Laser Crosslink Subsystem (LCS) program was rebaselined due to difficulties in producibility and manufacturing. SAF/HQ approved the recovery plan in Oct 89. The first LCS will fly on Satellite 18 as opposed to 15.

c. ~~(U)~~ Changes Since "As Of" Date -- None.

8. ~~(U)~~ Threshold Breaches: -- There are currently no DAE Baseline (dated 31 Dec 88) threshold breaches.

9. ~~(S)~~ Schedule:

a. ~~(S)~~ Milestones --

	Development Estimate	Approved Program	Current Estimate
( ) First Operational Satellite Deployed	(b)(1)		
( ) Initial Operational Capability (IOC) of (b)(1) Ground Segment			
( ) IOC of (b)(1) Ground Segment			
( ) (b)(1) Satellite			
( ) Delivery of Dual Satellite Software	Feb 74	N/A	Feb 74
( ) Delivery of Simplified Processing Station (SPS)	Dec 78	N/A	Dec 78
( ) Satellite 14-17 DSARC	N/A	Dec 79	Dec 79
( ) Production Contract Award Mobile Ground Terminal	Apr 81	N/A	Apr 81
( ) Satellite 12 Delivery	Jun 81	N/A	Jun 81
( ) Satellite 14-17 Design and Development (Start)			
( ) Sensor	Jul 81	N/A	Jul 81
( ) Spacecraft	Nov 81	N/A	Nov 81
( ) Long Lead Material Support (Sat 14-17)	Nov 81	N/A	Nov 81
( ) Satellite 5R Delivery (Flight 13)	Sep 82	Aug 85	Aug 85
( ) Completion of Computer Replacement Large Processing Station Upgrade (LPSU)	Jun 83	N/A	Jun 83
( ) Production Contract Award (Sat 14-17)			
( ) Sensor	Jan 83	N/A	Jan 83
( ) Spacecraft	Oct 83	N/A	Oct 83
( ) (b)(1)	(b)(1)		
( ) Completion of AFOTEC IOT&E of the MGS			
( ) Turnover of MGS to AFSPACECOM			
( ) (b)(1) (b)(1) Satellite 5R			
( ) Satellites 18-22 MYP Contract Award	Dec 86	Aug 87	Aug 87
( ) Satellites 14-17 Delivery Start	Jan 87	Aug 88	Dec 88
( ) IOC of Mobile Ground System Upgrade	(b)(1)		
( ) (b)(1) (b)(1)			
( ) Satellites 18-22 Delivery Start	Jan 91	N/A	Jun 92
( ) FOC of MGS Sat 14 Compatibility	Feb 91	N/A	Dec 91(Chg 2)
( ) Delivery of System 1 Software	N/A	N/A	(b)(1)
( ) Satellite Readout Station Upgrade I&C	Nov 93	N/A	Nov 93
( ) (b)(1)	(b)(1)		
( ) PMRT DSP Ground Systems			

b. (U) Previous Change Explanations -- Multi-year procurement strategy approved by HQ Air Force for Satellites 18-22 replaced the Satellite 18-19 annual buy profile. The delay in the MYP award for Satellites 18-22 was due to a decision made by the program office and approved by Air Staff to offset cost growth in laser crosslink production. An additional delay in the MYP contract award from Dec 86 to Aug 87 was due to lengthy negotiations. The delay in Satellites 18-22 Delivery Start was the result of problems experienced in awarding the MYP contracts. The delay in Satellite 5R delivery from Jul 85 to Aug 85 was due to the deceleration of Satellite 5R, and further launch delay resulting from problems with the booster and accelerating the launches of Satellites 12 and 6R. The change in the IOC of the MGS was due to the inclusion of early link 1/2 receivers in two of the MGTs to provide a capability to process mission data with Satellites 14 and on. The delay in the launch of Flight 14 was due to Titan IV/IUS/lightning strike problems.

c. (U) Current Change Explanations -- Change 1. Current estimate has been changed to reflect actual delivery/launch. Change 2. Current estimate reflects delays due to program slips. One milestone was deleted to match document with the Acquisition Program Baseline.

d. (U) References --

Development Estimate:

PMD No. R-S 4047 (24), October 18, 1983;
FY85 RDT&E Descriptive Summaries, January 1984.

Approved Program: DAE Baseline approved 31 Dec 88.

10. (U) Technical/Operational Characteristics:

a. (U) Technical --

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf4	Current Estimate
(b)(1)				

b. (S) Operational --

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf4	Current Estimate 5
(b)(1)				

(b)(1)

1 (U) SED - Sensor Evolutionary Development
2 (S) (b)(1)
3 (S)
4 (U) Mean Values
5 (U) Requires System 1 Software with Stereo Processing

c. (S) Previous Change Explanations -- Caveats were added to better define what the numbers really mean. (b)(1)

(b)(1) Current estimate was changed to reflect specs on contract for System 1 and simulation testing. Demonstrated performance was updated to reflect the results of ongoing analysis.

d. (U) Current Change Explanations:

None.

e. (U) References --

Development Estimates:
PMD No. R-S 4047 (24), October 18, 1983;
Specification No. DSP 80-01, Revision A, May 1, 1984

Approved Program: DAE Baseline approved 31 Dec 88.

DSP, December 31, 1989

11. (U) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	$1304.3	$1618.3	$1588.2
Procurement	3094.6	$4095.2	$4049.9
Total Flyaway	(2364.4)	($3202.7)	($3170.3)
Other System Costs	(730.2)	($ 892.5)	($ 879.6)
Construction (MILCON)	25.7	25.5	$25.5
Total FY 78 Base Year $	4424.6	$5739.0	$5663.6
Escalation	1123.0	2570.9	2650.5
Development (RDT&E)	(-30.4)	(263.6)	(246.2)
Procurement	(+1151.6)	(2305.3)	(2402.3)
Construction (MILCON)	(+1.8)	(+2.0)	(+2.0)
Total Then-Year $	$5547.6	$8309.9	8314.1
b. Quantities --			
Development (RDT&E)	4	4	4
Procurement	15	22	21
Total	19	26	25

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Development Estimate: PMD # NO.R-S 4047 (24) Oct 18, 1983; FY 85 RDT&E Descriptive Summaries, January, 1984.

Approved Program: 31 Dec 88 DAE Baseline.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est (Dec 89 SAR)	UCR Baseline (Dec 88 SAR)	UCR Baseline (Dec 89 SAR)
a. Program Acquisition --			
(1) Cost	8314.1	8309.9	8314.1
(2) Quantity	25	26	25
(3) Unit Cost	332.564	319.612	332.564
b. Current Procurement --	(FY 1990)	(FY 1990)*	(FY 1991)
(1) Cost	414.0	414.0	404.4
Less CY Adv Proc	-11.2	-11.2	0.0
Plus PY Adv Proc	+72.4	+72.4	+72.3
Net Total	475.2	475.2	476.7
(2) Quantity	1	1	1
(3) Unit Cost	475.200	475.200	476.700

* Adjusted to reflect FY90 Appropriations Act in accordance with Congressional change to SAR law.

13. [redacted] Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1273.9	4246.2	27.5	5547.6
Previous Changes:				
Economic	-15.9	-154.1	-0.1	-170.1
Quantity	-	+2731.3	-	+2731.3
Schedule	+0.4	+70.1	-	+70.5
Engineering	-	-	-	-
Estimating	+334.1	-834.9	+0.1	-500.7
Other	-	-	-	-
Support	+289.4	+341.9	-	+631.3
Subtotal	+608.0	+2154.3	0.0	+2762.3
Current Changes:				
Economic	+13.7	+125.6	-	+139.3
Quantity	-	-463.7	-	-463.7
Schedule	-	+41.8	-	+41.8
Engineering	-	-	-	-
Estimating	-61.2	+377.5	-	+316.3
Other	-	-	-	-
Support	-	-29.5	-	-29.5
Subtotal	-47.5	+51.7	0.0	+4.2
Total Changes	+560.5	+2206.0	0.0	2766.5
Current Estimate	1834.4	6452.2	+27.5	8314.1

(FY 1978 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	+1304.3	+3094.6	+25.7	+4424.6
Previous Changes:				
Quantity	-	+1211.5	-	+1211.5
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+164.9	-373.2	-0.2	-208.5
Other	-	-	-	-
Support	+149.1	+162.3	-	+311.4
Subtotal	+314.0	+1000.6	-0.2	+1314.4
Current Changes:				
Quantity	-	-177.7	-	-177.7
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-30.1	+145.3	-	+115.2
Other	-	-	-	-
Support	-	-12.9	-	-12.9
Subtotal	-30.1	-45.3	0.0	-75.4
Total Changes	+283.9	+955.3	-0.2	+1239.0
Current Estimate	1588.2	4049.9	25.5	5663.6

13. (U) Cost Variance Analysis (Cont'd):

b. Previous Change Explanations --

RDT&E

Economic: revised economic escalation indices.
Schedule: delay in integration effort due to launch standdown.
Estimating: revised current and prior year escalation indices and appropriated costs, revised prior-year approved costs, estimating changes associated with the acquisition of software upgrades to support Satellites 14-17 and on, change in acquisition strategy for Laser Crosslink subsystem, estimating changes associated with Satellite Readout Station Upgrade (SRSU), development delays in Mobile Ground Terminal commanding software, extend development effort into FY 94, GRH reductions and to reflect PB funding, increased funds for DSP Upgrade Studies and Launch Vehicle Integration efforts, recategorized SRSU from estimating to support per OSD direction.
Support: integration and other program level efforts to support the acquisition of an added satellite in FY 90 and 91. Hardware and software upgrades of ground stations to support SAT 14, and reduction of Mobile Communications Terminals, recategorized SRSU to support from estimating, increased funds for Ground System Upgrade (GSU).

Procurement

Economic: revised economic escalation indices.
Quantity: acquisition of additional satellites in FY89, FY90, FY 91, FY92, and FY93.
Schedule: one year delay of start of procurement for Satellite 18 and two years for Satellite 19, production of satellites 23-26 delayed one year.
Estimating: new satellite procurement strategy (two in FY 88 versus one each in years FY 87 and FY 88); revised current and prior year approved cost, escalation indices, and appropriate costs. New Acquisition Strategy (Multi-year Procurement) for Satellites. Revised FY89, FY 90 and FY 91 cost based on ICA, GRH and Congressional reductions. Addition of space launch recovery funding. Additional funding for schedule recovery due to launch vehicle shutdown, reprofiles satellites 14-17 deferred testing and shipping preps, ZBT FY90 funds for GSU, funded classified unfunded requirement, delayed production of DCS, additional FY94 funds for annual buy of satellites 23-25, reprogramming of satellites 23-25 from annual buy to multi-year procurement.
Support: inclusion of previously deleted logistics items to support ground systems, support of additional satellite in FY 90 and FY 91, FY 92 and FY 93. Ground Station hardware, acquisition. Addition of Satellite Readout Station Upgrade Project, GRH and Congressional reductions. Revised prior year actual costs. Decrease to reflect PB funding, ZBT FY90 funds for GSU, reestimate of initial spares costs, contingent liabilities in FY85, reduction of FY86 funds for logistic support, delay logistic support for GSU, additional ground support in FY94.

13. Cost Variance Analysis (Cont'd):

b. Previous Change Explanations --

MILCON

Economic: Revised economic escalation indices.
Estimating: Adjustment to current and prior year inflation indices.

c. Current Change Explanations --

	(Dollars in Millions) Base Year	Then Year
(1) RDT&E		
Revised economic escalation indices. (Economic)	-	+13.7
Current and prior year inflation offset (Estimating)	-0.5	-1.0
Reestimation of the following efforts: (Estimating)	-29.6	-60.2
Increase of FY86-88 Funds for Proposal Preparation Costs	(+1.6)	(+2.6)
Increase FY89 funds for MGT-14 overrun	(+1.7)	(+3.3)
Reprogramming of FY90-92 funds for slip of System 1	(-32.2)	(-64.6)
Decrease of FY93-94 funds for Automated Data Processing cut	(-0.7)	(-1.5)
(2) Procurement		
Revised economic escalation indices. (Economic)	-	+125.6
Current and prior year inflation offset		
(Estimating)	-8.3	-18.7
(Support)	-1.7	-3.2
Decrease of 1 Satellite	-15.4	-46.6
(Quantity)	(-177.7)	(-463.7)
(Estimating)	(+162.3)	(+417.1)
Schedule change for Satellites 23-25 buy slipped from FY91 to FY92 (Schedule)	-	+41.8

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanations --

	(Dollars in Millions) Base Year	Then Year
Increase in FY83-84 funds for Satellites 14-17 contingent liabilities (Estimating)	+1.3	+2.2
Increase in FY82-83 funds for MGT-14 Contingent Liabilities (Support)	+3.6	+5.7
Increase in FY85 funds for MGT-14 effort (Support)	+0.3	+0.5
Increase in FY86 funds for Link 1/2 production effort (Support)	+0.4	+0.8
Increase in FY89 funds due to SPO funds not yet withdrawn (Estimating)	+0.9	+1.9
Decrease in FY90 funds due to Congressional reduction for Total Quality Management (Estimating)	-10.9	-25.0
Negotiated value of Satellite Readout Station Upgrade (SRSU) lower than anticipated (Support)	-11.5	-24.0
Reestimation of initial spares costs (Support)	-1.1	-2.4
Decreased technical support for ground systems (Support)	-0.4	-0.9
FY93-94 delay of logistic support for SRSU (Support)	-2.5	-6.0

(3) MILCON

None.

14. (U) Program Acquisition Unit Cost (PAUC) History:
(Millions of Then-Year Dollars)

A. Initial SAR Estimate to Current Estimate --

PAUC (Initial SAR/ Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
291.979	-1.232	+20.629	+4.492	-	-7.376	-	+24.072	40.585	332.564

15. ~~(U)~~ Contract Information: (Then-Year Dollars in Millions)

a. RDT&E -

System 1
IBM Systems Integration Division
Boulder, CO,
F04701-87-C-0011,CPAF
Award: 1 May 87
Definitized: 10 Jul 87

Initial Contract Price		
Target	Ceiling	Qty
$80.8	N/A	0

Current Contract Price		
Target	Ceiling	Qty
$84.2	$86.2	0

Estimated Price at Completion	
Contractor	Program Manager
$92.5	$100.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-2.9	$-1.1
Cumulative Variances to Date (10/20/89)	$-8.3	$-1.7
Net Change	$-5.4	$-0.6
Cumulative Variance Change Percent	-186.2%	-54.5%

Explanation of Change: The schedule variance remains stable after the replan of eight work packages authorized by Space Systems Division. The functional baseline portion of the systems requirements did overrun but IBM feels that future effort will not be as difficult and that existing planned budget is adequate. IBM underestimated the cost impacts of modern software engineering techniques and ADA. Cost performance continues to overrun, however, IBM is proposing a cost containment plan in Jan 90. IBM EPC assumes they will be able to regain cost and schedule. The impact to the program is to be-determined in the Jan 90 cost containment meetings.

15. (U) Contract Information: (Then-Year Dollars in Millions)

Ground Station Improvements, 86-89

IBM Systems Integration Division
Boulder, CO,
F04701-85-C-0178, CPIF
Award: October 1, 1985
Definitized: May 23, 1986

Initial Contract Price		
Target	Ceiling	Qty
$14.4	15.8	0

Current Contract Price		
Target	Ceiling	Qty
$125.6	$125.6	0

Estimated Price at Completion	
Contractor	Program Manager
$125.3	$126.1

Schedule Variance	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+2.9	$-1.2
Cumulative Variances to Date (10/20/89)	$+1.3	$-1.0
Net Change	$-1.6	$+0.2
Cumulative Variance Change Percent	-55.1%	+16.6%

Explanation of Change: Cost and schedule variances are insignificant. No impact to the program.

15. Contract Information (Cont): (Then-Year Dollars in Millions)

b. Procurement

Mobile Ground Terminal-14
IBM Federal Systems Division,
Boulder, CO,
F04701-81-C-0022, FPIF/CPFF
Award: October 1, 1985
Definitized: October 1, 1985

Initial Contract Price		
Target	Ceiling	Qty
$62.0	$66.9	1

Current Contract Price		
Target	Ceiling	Qty
$195.6	$204.5	6

Estimated Price At Completion	
Contractor	Program Manager
$221.1	$224.1

	Cost Variance	Schedule Variance
Schedule Variance:		
Previous Cumulative Variances	$-11.8	$-7.3
Cumulative Variances To Date (10/20/89)	$-17.9	$-5.5
Net Change	$- 6.1	$+1.8
Cumulative Variance Change Percent	-51.7%	+24.7%

Explanation of Change: Late deliveries of GFE (Link 1/2), subcontractor problems with the Magnetic Tape Cartridge Unit, and software development problems have been the major schedule variance contributors. The software and systems engineering WBS elements have overrun and are the major contributors to the negative cost variance. Transportation subsystem is the main driver in future cost variance. The reason the Contractor's and the Program Manager's EPC is higher the contract ceiling is because only half of the contract is active and being reported. Therefore the EPC's for this half of the contract appears to be higher than ceiling which is not the case for the entire 0022 (Basic and MGT-14) contract. The impact to the program is an estimated seven month schedule slip in the delivery of the vehicles to the Air Force, which is not reflected by the schedule variance.

15. Contract Information (Cont): (Then-Year Dollars in Millions)

b. Procurement

Satellite 14-17 Production and Long-Lead
TRW Electronics and Defense
Redondo Beach, CA,
F04701-82-C-0035, FFP/FPIF/CPFF,
Award: March 11, 1982
Definitized: December 15, 1982

Initial Contract Price

Target	Ceiling	Qty
$47.9	N/A**	4

Current Contract Price

Target	Ceiling	Qty
$606.6	$634.2	4

Estimated Price At Completion

Contractor	Program Manager
$635.2	$633.9

Schedule Variance	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-35.4	$- 7.6
Cumulative Variances To Date (11/03/89)	$-38.9	$-46.8
Net Change	$- 3.5	$-39.2
Cumulative Variance Change Percent	-9.8%	-515.7%

Explanation of Change: TRW has regressed BCWP for McDonnell Douglas Electronic Systems Company (MDESC) sub to correspond with rephased LCS #1-4 delivery dates (as authorized in the C/SCSC approved TRW System Description). It is an interim assessment while MDESC replans LCS #1-4. MDESC's replanning is on hold pending contractual direction. Late part deliveries and technical and production difficulties associated with first time build, design and manufacturing problems for System Tests Sets, and extension of program LOE to support Assembly and Test (A&T) and LCS #1 delays were cost drivers. Additionally, there were first time satellite integration and test difficulties. Impact to the program is delayed LCS capability until Block 18.

15. (U) Contract Information (Cont): (Then-Year Dollars in Millions)

b. Procurement

Satellite 18-22 Production and Long-Lead
TRW Electronics and Defense
Redondo Beach, CA,
F04701-86-C-0022, FP1/CPFF/CPAF
Award: July 30, 1987
Definitized: July 30, 1987

Initial Contract Price		
Target	Ceiling	Qty
$743.5	$782.5	5

Current Contract Price		
Target	Ceiling	Qty
$753.8	$760.9	5

Estimated Price At Completion	
Contractor	Program Manager
$752.3	$760.9

	Cost Variance	Schedule Variance
Schedule Variance		
Previous Cumulative Variances	$-2.6	$- 5.2
Cumulative Variances To Date (11/03/89)	$-0.2	$-16.0
Net Change	$+2.4	$-10.8
Cumulative Variance Change Percent	+92.3%	-207.7%

Explanation of Change: Cost variance is due to slight overrun in the Spacecraft Project WBS element. Schedule variance is being driven by late deliveries of componets. No impact to contract or program.

15. Contract Information (Cont): (Then-Year Dollars in Millions)

b. Procurement

Sensor 18-22
Aerojet ElectroSystems Co,
Azusa, CA
F04701-86-C-0023, FPIF/AF/CPFF
Award: August 11, 1987
Definitized: August 11, 1987

Initial Contract Price

Target	Ceiling	Qty
$432.8	$454.9	5

Current Contract Price

Target	Ceiling	Qty
$464.5	$488.6	5

Estimated Price At Completion

Contractor	Program Manager
$465.2	$463.4

	Cost Variance	Schedule Variance
Schedule Variance		
Previous Cumulative Variances	$+ 2.1	$-0.4
Cumulative Variances To Date (10/28/88)	$ -8.1	$-0.5
Net Change	$-10.2	$-0.1
Cumulative Variance Change Percent	-485.7%	-25.0%

Explanation of Change: Cost variance caused by production inefficiences due to late receipt of electric components and the late initiation of Sensor 18 testing. Schedule variance is insignificant. No impact to the program.

16. ⇔ Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 85.7% (24 yrs/28 yrs)

(2) Percent Program Cost Appropriated: 74.2% ($6170.9/$8314.1)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY67-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-FY94)	Total
RDT&E	1459.4	80.0	70.0	225.0	1834.4
Procurement - Missile	3332.4	346.6	326.2	1278.5	5283.7
Procurement - Other	857.6	67.4	78.2	165.3	1168.5
MILCON	27.5	-	-	-	27.5
Total	5676.9	494.0	474.4	1668.8	8314.1

c. Annual Summary --

Fiscal Year	Qty	FY 78 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Total Then-Year Dollars Prog	Oblig*	Expend*	Escl Rate (%)
Appropriation: RDT&E								
1967				57.1	30.8	30.8	30.8	3.1
1968				93.4	52.3	52.3	52.3	3.6
1969				162.4	95.3	95.3	95.3	4.2
1970				118.9	73.5	73.5	73.5	5.4
1971				130.7	84.4	84.4	84.4	5.3
1972				47.5	31.9	31.9	31.9	3.6
1973				46.7	32.3	32.3	32.3	3.6
1974				77.6	60.1	60.1	60.1	8.3
1975				40.7	34.4	34.4	34.4	10.8
1976				18.2	16.4	16.4	16.4	7.0
1976Q				-	-	-	-	2.8
1977				30.4	29.4	29.4	29.4	7.5
1978				28.0	28.7	28.7	28.7	6.0
1979				27.2	30.6	30.6	30.6	8.4
1980				24.8	31.0	31.0	31.0	9.4
1981				63.2	87.6	87.6	87.6	11.9
1982				97.4	144.2	144.2	144.2	9.2
1983				76.9	119.2	119.2	119.2	4.9
1984				29.6	47.7	47.7	47.7	3.8
1985				38.1	63.3	63.3	63.3	3.4
1986				37.4	63.8	63.8	49.7	2.8
1987				64.8	113.9	111.4	100.5	2.7
1988				48.4	88.2	86.6	69.6	3.1
1989				52.8	100.4	78.2	43.0	4.2
1990				40.5	80.0	43.8	-	4.0
1991				34.0	70.0	-	-	4.2
1992				22.5	48.1	-	-	4.0
1993				44.8	98.9	-	-	3.7
1994				34.2	78.0	-	-	3.4
Subtotl	4			1588.2	1834.4	1476.9	1355.9	

* Reflects Program Office records as of 31 Dec 89.

16. Program Funding Summary (Cont'd):
(Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	FY 78 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Total Then-Year Dollars Prog	Oblig*	Expend*	Escl Rate (%)
Appropriation: Missile Procurement								
1969				31.4	17.8	17.8	17.8	3.5
1970				62.3	37.0	37.0	37.0	4.7
1971	3		282.6	165.3	102.8	102.8	102.8	5.7
1972	2		188.4	157.5	105.2	105.2	105.2	3.7
1973	3		282.6	231.4	167.1	167.1	167.1	4.7
1974				38.1	28.1	28.1	28.1	8.4
1975	1		94.2	91.7	80.8	80.8	80.8	16.3
1976				42.1	39.5	39.5	39.5	7.9
1976Q				-	-	-	-	7.9
1977				27.9	28.0	28.0	28.0	7.5
1978				88.9	94.1	94.1	94.1	6.0
1979				100.0	123.4	123.4	123.4	8.7
1980				73.9	103.9	103.9	103.9	9.7
1981				33.5	51.8	51.8	51.8	11.9
1982				146.2	241.4	241.4	241.4	9.6
1983	2		581.6	272.8	476.8	476.8	476.8	9.0
1984	2		581.6	230.7	420.5	420.5	400.2	8.0
1985				28.4	53.0	53.0	53.0	3.4
1986				57.5	111.4	109.6	70.0	2.8
1987				131.2	264.0	259.1	247.5	2.7
1988	1		130.9	168.8	353.4	340.5	212.5	3.1
1989	2		261.8	196.4	432.4	415.6	84.4	4.2
1990	1		130.9	151.6	346.6	271.7	-	4.0
1991	1		130.9	137.6	326.2	-	-	4.2
1992				125.3	307.3	-	-	4.0
1993	2		336.7	250.0	632.6	-	-	3.7
1994	1		168.1	129.8	338.6	-	-	3.4
Subtotl	21		3170.3	3170.3	5283.7	3567.7	2765.3	

* Reflects Program Office records as of 31 Dec 89.

16. (U) Program Funding Summary (Cont'd):
(Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	FY 78 Base-Year Dollars			Total Then-Year Dollars			Escl Rate (%)
		Flyaway		Total				
		Nonrec	Rec		Prog	Oblig*	Expend*	
Appropriation: Other Procurement								
1969				31.3	17.6	17.6	17.6	3.5
1970				144.5	85.4	85.4	85.4	4.7
1971				56.5	35.0	35.0	35.0	5.7
1972				65.2	42.0	42.0	42.0	3.7
1973				27.6	19.0	19.0	19.0	4.7
1974				2.2	1.7	1.7	1.7	8.4
1975				6.4	5.6	5.6	5.6	16.3
1976				13.7	12.8	12.8	12.8	7.9
197Q				-	-	-	-	7.9
1977				13.6	13.6	13.6	13.6	7.5
1978				.3	.3	.3	.3	6.0
1979				6.0	7.6	7.6	7.6	8.7
1980				19.0	26.6	26.6	26.6	9.7
1981				46.9	70.3	70.3	70.3	11.9
1982				66.5	103.4	103.4	103.4	9.2
1983				55.8	90.1	90.1	90.1	4.9
1984				21.7	36.1	36.1	36.1	3.8
1985				29.9	51.4	51.4	42.4	3.4
1986				68.4	121.2	96.6	96.6	2.8
1987				48.6	89.4	75.3	58.6	2.7
1988				13.9	26.6	12.3	4.3	3.1
1989				0.9	1.9	1.3	.7	4.2
1990				32.4	67.4	37.7	-	4.0
1991				36.2	78.2	-	-	4.2
1992				29.0	64.8	-	-	4.0
1993				29.6	68.4	-	-	3.7
1994				13.5	32.1	-	-	3.4
Subtotl				879.6	1168.5	841.7	769.7	
Appropriation: Contruction								
1975				19.6	17.3	17.3	17.3	8.5
1976								
197T								
1977								
1978								
1979								
1980								
1981								
1982								
1983				1.1	1.9	1.9	1.9	4.9
1984								
1985				4.8	8.3	8.3	8.3	3.4
Subtotl				25.5	27.5	27.5	27.5	
Total	25			5663.6	8314.1	5913.8	4918.4	

* Reflects Program Office Records
as of 31 Dec 89.

17. (U) Production Rate Data: No report. Production less than 6 per year.

18. (U) Operating and Support Costs:

a. Not available

b. Not available

c. Contractor Support Costs --

(Then-Year Dollars in Millions)

	FY 1989 & PRIOR	FY1990 YEAR	FY1991 YEAR	BALANCE TO COMPLETE	TOTAL
O&M (AF)	1.7	6.0	5.1	TBD	12.8
Industrial Fund	0	0	0	TBD	0.0
TOTAL	1.7	6.0	5.1	TBD	12.8

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N-14 EA-6B-2

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SELECTED ACQUISITION REPORT (RCS:DD-COMP-(Q&A)823)
PROGRAM: EA-6B

AS OF DATE: 31 DECEMBER 1989

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MAR 2 1 [illegible]

1. DESIGNATION / NOMENCLATURE (POPULAR NAME):
EA-6B/TACTICAL ELECTRONIC WARFARE (PROWLER)

2. DOD COMPONENT: U. S. NAVY

3. RESPONSIBLE OFFICE AND TELEPHONE NUMBER:
NAVAL AIR SYSTEM COMMAND
WASHINGTON, DC 20361-1234

PROGRAM MANAGER: CAPT M. KEARNEY
ASSIGNED: 4 AUGUST 1987
TELEPHONE: (202) 692-8083

4. PROGRAM ELEMENTS:
RDT&E: 0604222N, 0604270N, 0204154N
PROCUREMENT: APPN 1506 ICN 0115
APPN 1506 ICN 0116

5. RELATED PROGRAMS: A-6E INTRUDER, E-2/C, F-14 TOMCAT AND F-111.

Classified by: OPNAVINST [illegible]
Declassify on: OADR

90-C-0624
No Security Objection
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MAR 2 1990
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Dept. of the Navy

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6. MISSION AND DESCRIPTION: [redacted] The EA-6B's primary mission is the suppression and degradation of enemy electronic defense systems by use of tactical jamming or high speed anti-radiation (HARM) missiles. Other missions include passive early warning for fleet defense and battlefield electronic surveillance. It is equipped with computer controlled electronics surveillance receivers and up to eleven high power jamming transmitters in various frequency bands depending on the particular mission. The EA-6B is powered by two J-52-408 engines. The aircraft is 59 feet in length and has a wing span of 53 feet.

7. PROGRAM HIGHLIGHTS:

a. [redacted] Significant Historical Developments - The basic EA-6B aircraft was introduced into the fleet in 1971. Since Initial Operating Capability (IOC) several improvements have been approved for the basic EA-6B aircraft including Expanded Capability (EXCAP), Improved Capability I (ICAP-I), Improved Capability II (ICAP-II), and Advanced Capability (ADVCAP). All of these improvements have been introduced into the fleet with the exception of ADVCAP which has an IOC of [redacted](b)(1) The system is expected to meet operational and performance requirements.

b. Significant Developments Since Last Report:

MAY	1989 -	Awarded firm fixed price contract for Vehicle Enhancement Program.
OCT	1989 -	First flight of ADVCAP development aircraft (P-5).
SEP	1989 -	Receiver Processor Group (RPG)/ALQ-149 Program Changes Approval Document signed.
NOV	1989-	Completed contractor early flight testing of RPG/ALQ-149.

c. Changes Since "As of" Date - None.

8. THRESHOLD BREACHES: There are currently no DAE baseline breaches as of 17 Mar 1989.

9. ~~(C)~~ SCHEDULE:

a. Milestones -	PROD EST	APPROVED PROGRAM	CURRENT ESTIMATE	
- Milestone IIIA Production Decision	N/A	Nov 70	Nov 70	
- EA-6B Navy Decision Coordination Paper No. 20 Rev. A	Jun 71	N/A	Jun 71	
- EA-6B Standard Version (Board of Inspection and Survey)	1971	N/A	Jan 71	
- EA-6B Standard Version (Navy Preliminary Evaluation)	1972	N/A	1972	
- EXCAP EA-6B Operational Evaluation	May 74	N/A	May 74	
- First EXCAP Delivery	N/A	Nov 77	Nov 77	
- EA-6B ICAP/ALQ-99 TJS (Navy Preliminary Evaluation)	Nov 75	N/A	Nov 75	
- ICAP ALQ-99 TJS (Navy Preliminary Evaluation)	Apr 76	N/A	Apr 76	
- EA-6B EXCAP (Operational Evaluation)	Jul 76	N/A	Jul 76	
- Service Acceptance Trials & Tech Eval of ICAP EA-6B; Final Report	Nov 77	N/A	Nov 77	
- EA-6B ICAP BIS	Nov 77	N/A	Nov 77	
- EA-6B ICAP Aircraft (Operational Evaluation)	Mar 79	N/A	Mar 79	
- First ICAP Delivery	N/A	Nov 77	Nov 77	
- Navy Preliminary Evaluation of ALQ-99 Sys in EA-6B ICAP-II Aircraft	Mar 82	N/A	Mar 82	
- First ICAP-II Delivery	N/A	Sep 82	Sep 82	
- ICAP-II Initial Trials Phase & Navy Tech Eval of Service Acceptance Trials, Proj BIS 21323, Final Rpt	Sep 82	N/A	Sep 82	
- Operational Evaluation of ICAP-II Aircraft	Dec.82	N/A	Dec 82	
- Board of Inspection and Survey Rpt- ICAP-II	Aug 83	N/A	Aug 83	
ADVCAP FSED	Mar 83	Mar83	Mar 83	
ADVCAP First Flight	May 87	Jul 89	Oct 89	CH-1
ADVCAP Contractor Tech Eval	Feb 85	Sep 89	Feb 90	CH-1
ADVCAP Navy Preliminary Eval	Aug 87	Jan 90	Mar 90	CH-1
ADVCAP Tech/Oper Assessment (DT-IIE/OT-IIA)	N/A	Mar90	Oct 90	CH-1
ADVCAP MS III-A (LRIP)	N/A	Oct 90	Mar 91	CH-1
ADVCAP TECHEVAL (DT-11F)	N/A	Mar93	Jun 93	CH-1
ADVCAP First Delivery	Sep 90	Mar93	May93	CH-1
ADVCAP OPEVAL (OT-IIB)	N/A	Jun 93	Oct 93	CH-1
ADVCAP MS III-B (AFP)	N/A	Jan 94	Mar 94	CH-1
[redacted] ADVCAP IOC (FIRST DEPLOYABLE SQDN)	N/A	(b)(1)		
ADVCAP FOT&E	N/A	Sep 94	Nov 94	CH-1

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b. Previous Change Explanations: Production Estimate/Approval Program milestones were updated to reflect the approved NDCP for EW Counter Response dated 9 September 1985.

Estimates reflect milestone changes that were necessary due to dollar reductions in the program in FY 90 and FY 91. The changes reflect Advance Capability (ADVCAP) going into production in FY 91 instead of FY 90 as originally scheduled.

c. Current Change Explanations: CH-1 - Current milestone estimates reflect changes caused by late delivery of Litton Amecom RPG engineering development model equipment in support of the Grumman ADVCAP FSD contract.

d. References: Production Estimate: EW Counter Response NDCP dated 9 September 1985.
Current Estimate: DAE Baseline revision approved 17 March 1989.

10. TECHNICAL / OPERATIONAL CHARACTERISTICS (ICAP II):

a. [redacted] Technical

(b)(1)

[redacted]

b. ~~(C)~~ Operational

	PROD EST	APPROVED PROGRAM GOAL / THRESHOLD	DEMON-STRATED PERF	CURRENT ESTIMATE
Speed (KTs)	(b)(1)			
(1) Max at Sea Level				
(2) Stall Speed (Power Approach)				
Specific Range				
at Opt Altitude (NM / lb)				
Takeoff Distance				
(over 50' obstacle)				
Radius/Range (Combat) (NM)				
Combat Ceiling Altitude (ft)				
Mission Reliability				
Maintainability				
(1) Standard Depot Level Maint (SDLM)	N/A	36/36	24	24
(2) Maint Man-hrs per Flight Hr	N/A	51/51	36	51
Weight (Takeoff) (lb)	58,600	58,600/58,600	58,600	58,600
Dimensions (Length/Span) (ft)	59/53	59/53;59/53	59/53	59/53

c. Previous Change Explanation: None

d. Current Change Explanation: None

e. References: Prod Est. - PBD 369-1 of 30 Dec 1966.
Approved Program: DAE Baseline approved 17 Mar 1989.

11. PROGRAM ACQUISITION COST (Current Estimate in Millions of Dollars)

a. Cost -

	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	210.6	376.4	352.4
Procurement	2,029.0	3940.4	5,557.8
Airframe	(639.9)	(1,358.2)	(1,568.1)
Engine	(98.9)	(158.2)	(162.5)
Avionics	(490.9)	(1,037.5)	(1,951.3)
Total Flyaway	(1,229.7)	(2,553.9)	(3,681.9)
Other Wpn Sys Cost	(678.6)	(1,078.6)	(1,329.9)
Initial Spares	(120.7)	(307.9)	(546.0)
Construction (MILCON)	0.0	0.0	0.0
Total FY84 Base-Year $	2,239.6	4,316.8	5,910.2
Escalation	508.2	923.0	2,024.1
Development (RDT&E)	(30.9)	(61.0)	(59.5)
Procurement	(477.3)	(862.0)	(1,964.6)
Construction (MILCON)	0.0	0.0	0.0
Total Then-Year $	2,747.8	5,239.8	7934.3

Note: The approved program has changed since the Dec 88 SAR; $15.6M was erroneously reported in Other Weapons System Cost and should have been shown in Airframe.

b. Quantities -

Developments (RDT&E)	0	0	0
Procurement	38	98	(b)(1) [redacted]
Total	38	98	

c. Foreign Military Sales - N/A

d. Nuclear Costs - N/A

e. References: Prod Est - PBD 369-1 of 30 Dec 1966
DAE Baseline approved 17 Mar 1989

12. PROGRAM ACQUISITION / CURRENT PROCUREMENT UNIT COST SUMMARY:
(Current (Then-Year) Dollars in Millions)

		Current Est (Dec 89 SAR)	Current Year UCR Baseline (Dec 88 SAR)	Budget Year UCR Baseline (DEC 89 SAR)
a. Program Acquisition				
(1)	Cost	7,934.3	5,239.8	7934.3
(2)	Quantity	(b)(1) [redacted]	98	(b)(1) [redacted]
(3)	Unit Cost		53.467	
b. Current Procurement		(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1)	Cost	147.9	147.9	372.4
	Less CY Adv Proc	-16.0	-16.0	-46.6
	Plus PY Adv Proc	+0	+0	+16.0
	Net Total	131.9	131.9	341.8
(2)	Quantity	0	0	3
(3)	Unit Cost	0	0	113.9

[redacted]

13. COST VARIANCE ANALYSIS:

a. Summary - (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	241.5	2,506.3		2,747.8
Previous Changes				
Economic	+47.1	+399.0		+446.1
Quantity		+2,652.7		+2,652.7
Schedule	+148.9	+176.3		+325.2
Engineering		+0.4		+0.4
Estimating	-0.1	-1,763.0		-1,763.1
Other				
Support		+830.7		+830.7
Subtotal	+195.9	+2,296.1		+2,492.0
Current Changes				
Economic	+5.8	+134.7		+140.5
Quantity		+1,511.2		+1,511.2
Schedule				
Engineering				
Estimating	-31.3	+280.2		+248.9
Other				
Support		+793.9		+793.9
Subtotal	-25.5	+2,720.0		+2,694.5
Total Changes	+170.4	+5,016.1		+5,186.5
Current Estimate	411.9	7,522.4		7,934.3

(FY 1984 Constant (Base-Year) Dollars in Millions)

	RDT& E	PROC	MILCON	TOTAL
Production Estimate	210.6	2,029.0		2,239.6
Previous Changes:				
Economic				
Quantity		+2,057.2		+2,057.2
Schedule	+124.5	+117.7		+242.2
Engineering		+0.4		+0.4
Estimating	+41.3	-866.7		-825.4
Other				
Support		+602.8		+602.8
Subtotal	+165.8	+1,911.4		+2,077.2
Current Changes:				
Economic				
Quantity		+938.1		+938.1
Schedule				
Engineering				
Estimating	-24.0	+189.9		+165.9
Other				
Support		+489.4		+489.4
Subtotal	-24.0	+1,617.4		+1,593.4
Total Changes	+141.8	+3,528.8		+3,670.6
Current Estimate	352.4	5,557.8		5,910.2

13. b. Previous Change Explanations -

(1) RDT&E

Economic:	Revised Escalation indices.
Schedule:	Increase due to introduction of ALQ-149/RPG into ADVCAP aircraft, integration of HARM into ICAP II and ADVCAP aircraft, development of Jammer Modulation, ADVCAP repricing and expanded frequency jammer development.
Estimating:	Revised program estimates.

(2) PROCUREMENT

Economic:	Revised Escalation indices.
Quantity:	Total number of budgeted aircraft increased by twelve (12).
Schedule :	Total number of budgeted aircraft increased by twelve (12) and added two additional fiscal years.
Engineering:	Revised estimates.
Estimating:	Decrease due to revised program estimates.
Support:	Increase due to PGSE, training, pubs,ILS and initial spares to support additional 12 aircraft and two additional fiscal years.

(3) MILCON: None.

c. Current Change Explanations -

		Base Year	Then Year
(1) RDT&E			
Economic:	Revised escalation indices	-	+5.8
Estimating:	Recategorization of Consolidated Electronic Warfare funding.	-24.0	-31.3
(2) PROCUREMENT			
Economic:	Revised escalation indices.	-	+134.7
Quantity:	Increase of (b)(1) aircraft to reflect cost to complete program.	+938.1	+1,511.2
Estimating:	Increase is due to revised program estimates.	+189.9	+280.2
Support:	Increase due to PGSE, training, pubs, ILS and initial spares requirements necessary to support four additional fiscal years (b)(1) aircraft).	+489.4	+793.9
(3) MILCON:	None.		

14. PROGRAM ACQUISITION UNIT COST (PAUC) HISTORY:
(Then-year Dollars in millions)

a. Initial SAR Estimate to Current Estimate -

PAUC (PdE Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
(b)(1)									

15. CONTRACT INFORMATION: (Then-Year Dollars in Millions)

a. RDT&E:

RECEIVER PROCESSOR GROUP
Grumman Aerospace
Bethpage, LI, NY 11714
N00019-83-C-0148/FFP
Award Date: Feb 1984
Definitization: Jul 1986

Initial Contract Price

Target	Ceiling	Qty
$255.0	N/A	6

Current Contract Price

Target	Ceiling	Qty
$255.0	N/A	6

Estimated Price at Completion

Contractor	Program Manager
$255.0	$255.0

Explanation of Increase - Target price erroneously reported in prior SAR. Contract is negotiated NTE $255.0.
Note: CPR not required for FFP contracts

15. b. PROCUREMENT

AIRFRAME
Grumman Aerospace
Bethpage, LI, NY 11714
N00019-86-C-0266/FFP
Award Date: May 1987
Definitization: Jul 1988

Initial Contract Price

Target	Ceiling	Qty
$223.1	N/A	12

Current Contract Price

Target	Ceiling	Qty
$235.2	N/A	12

Estimated Price at Completion

Contractor	Program Manager
$235.2	$235.2

Explanation of increase: Increase in target due to contract mod for ILS and GSE sustaining engineering.
Note: CPR not required for FFP contracts.

AIRFRAME
Grumman Aerospace
Bethpage, LI, NY 11714
N00019-87-C-0234/FFP
Award Date: Mar 88
Definitization: Dec 88

Initial Contract Price

Target	Ceiling	Qty
$283.6	N/A	12

Current Contract Price

Target	Ceiling	Qty
$283.6	N/A	12

Estimated Price at Completion

Contractor	Program Manager
$283.6	$283.6

Note: CPR not required for FFP contracts

16. PROGRAM FUNDING SUMMARY: (Current Estimate in Millions of Dollars)

a. Program Status -
(1) Percent Program Completed: 50%
(2) Percent Program Cost Appropriated: 40.2% ($3,189.6/$7,934.3)

b. Appropriation Summary -

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY84-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-98)	Total
RDT&E	281.3	22.8	13.2	94.6	411.9
Procurement	2,737.6	147.9	372.4	4,264.5	7,522.4
MILCON	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
Total	3,018.9	170.7	385.6	4,359.1	7,934.3

16. PROGRAM FUNDING SUMMARY (Con't):(Current Estimate in millions of Dollars)

c. [redacted] Annual Summary -

Fiscal Year	Qty	Flyaway FY 84 Dollars Nonrec	Flyaway FY 84 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
				Appropriation: RDT&E				
1984				24.8	25.3	25.3	23.6	3.8
1985				34.1	35.8	35.8	33.2	3.4
1986				74.9	81.0	81.0	66.1	2.8
1987				54.2	60.3	60.3	45.1	2.7
1988				53.6	61.6	61.6	52.7	3.0
1989				14.4	17.3	17.0	11.5	4.2
1990				18.3	22.8	0.1	0.0	4.0
1991				10.2	13.2			4.2
1992				20.6	27.7			4.0
1993				24.5	34.1			3.7
1994				22.8	32.8			3.4
TOTAL				352.4	411.9	281.1	232.2	
				Appropriation Procurement				
1983			16.8	16.8	17.0	17.0	17.0	9.0
1984	8	2.5	226.7	456.1	478.8	478.8	460.0	8.0
1985	6	9.9	180.2	335.1	361.9	361.9	341.0	3.4
1986	12	26.8	277.2	375.8	418.3	418.3	389.0	2.8
1987	12	3.8	287.6	388.4	447.5	447.5	371.4	2.7
1988	12	5.1	285.0	381.2	458.7	453.1	281.1	3.0
1989	12	139.0	223.9	443.5	555.4	421.2	101.0	4.2
1990	0	40.2	12.3	113.6	147.9	4.5	0.0	4.0
1991	3	74.5	95.9	275.5	372.4			4.2
1992	(b)(1)	13.3	252.8	472.8	661.6			4.0
1993		- 0 -	188.1	304.6	440.3			3.7
1994		- 0 -	223.8	367.7	548.2			3.4
1995		13.0	264.7	414.0	636.3			3.1
1996		13.0	285.1	431.0	683.0			3.1
1997		13.0	279.7	423.2	691.4			3.1
1998		13.0	215.0	358.5	603.7			3.1
TOTAL		367.1	3,314.8	5,557.8	7,522.4	2,602.3	1,960.5	

17. PRODUCTION RATE DATA:

a. Annual Production Rates

	Production Rates (Qty/Yr)			
Fiscal Year Buy	Development Estimate	Production Estimate Baseline	Current Estimate	Maximum Economic
1984	N/A	8	8.0	24
1985	N/A	6	6.0	24
1986	N/A	12	12.0	24
1987	N/A	12	9.6	24
1988	N/A	12	9.6	24
1989	N/A	12	9.6	24
1990	N/A	12	0.0	23
1991	N/A	12	4.0	
1992	N/A		(b)(1)	
1993	N/A			
1994	N/A			

b. Cost Variance - (Dollars in Millions)

Item		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY$)	2,239.6	+3,670.6	5,910.2	-	5,910.2
	(TY$)	2,747.8	+5,186.5	7934.3	-	7,934.3
PAUC	(BY$)	58.9	-23.5	(b)(1)	-	35.4
	(TY$)	72.3	-24.8		-	47.5

c. Schedule Variance

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date	SEP85		SEP 85		SEP 85
Duration	70	+111	181	--	181
End Date	JUL 91		OCT 00		OCT 00

d. Deliveries (Plan/Actual)

	To Date
RDT&E	0/0
Procurement	43/43

[redacted]

17. e. Approved Design to Cost Goal - N/A

18. OPERATING AND SUPPORT COSTS:

a. Assumptions and Ground Rules - N/A.

b. Costs - N/A

c. Contractor Support Costs -

	FY88 ACTUAL	FY89 ESTIMATE	FY90 ESTIMATE	FY91 ESTIMATE	COST TO COMPLETE	TOTAL
O&M,N	3.1	2.5	3.0	1.6	-	10.2
NIF	2.6	2.8	3.5	3.6	-	12.5
DEPOT MAINT	34.8	44.9	-	-	-	79.7
OTHER	2.3	2.6	2.0	2.0	-	8.9
TOTAL	42.8	52.8	8.5	7.2	-	111.3

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Security Objection to Open Publication
Office of the Chief of Naval Operations
Dept. of the Navy

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: E-6A

AS OF DATE: DECEMBER 31, 1989

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1. Designation/Nomenclature: E-6A Airborne Strategic Communications

2. DoD Component: U. S. Navy

3. Responsible Office and Telephone Number:

E-6A Program Office (PMA271)
Naval Air Systems Command
Washington, DC 20361-1271

PM: CAPT Eddie W. Hampshire, USN
Assigned: 19 October 1989
AV 222-8086; COMM (202) 692-8086

4. Program Elements/Procurement Line Items:
RDT&E: PE0101402N

PROCUREMENT: PE11315N APPN 1506 ICN 0435

MILCON: PE 0303196Y

5. Related Programs: EC-130Q/TACAMO; High Power Transmit Set (HPTS); E-3A AWACS; TRIDENT Fleet; MILSTAR; WWABNCP; E-4B

~~Classified by:~~
~~OPNAVINST [illegible]13.6(11)~~
~~[redacted]eclassify on OADR~~

~~SECRET~~

6. Mission and Description: The E-6A TACAMO aircraft, previously ECX, is a manned strategic communications relay platform (replacement for the EC-130/TACAMO aircraft) and is a critical node in the Minimum Essential Emergency Communications Network (MEECN). The primary mission of the E-6A is to monitor multiple networks in the VLF, HF, and UHF frequency spectrum, process Single Integrated Operational Plan (SIOP) Emergency Action Messages (EAMs) originating under JCS Emergency Action Procedures (EAP), and provide survivable and enduring communications connectivity from the National Command Authority (NCA) to the Fleet Ballistic Missile Submarine Forces (SSBNs) during pre-, trans-, and post-attack phases of general nuclear exchange. A secondary mission is to provide a survivable relay for tactical Command, Control and Communications (C^3) capability between the NCA and other elements of the SIOP Plan/Secure Reserve Force including the Launch Control Centers (LCC), the Strategic Air Command (SAC) missile complex, and airborne command posts for Commander in Chief, Pacific (CINCPAC) and Commander in Chief, U.S. Naval Forces, Europe (CINCUSNAVEUR).

7. Program Highlights:

a. Significant Historical Developments -- In December 1981 a NADEC Decision Memorandum approved the ECX program. In January 1982, the Operational Requirement for TACAMO/ECX (OR W1438) was approved. On 11 February 1982, a Request for Quotation was released. A letter contract with Boeing Aerospace Company was signed on 29 April 1983 for the Full Scale Development effort and included options for fourteen (14) production aircraft. On 30 June 1983 ECX was formally designated as E-6A. FY 1986 President's Budget approved continuation of the development and procurement of the first two aircraft in FY-86. In July 1985 the contractor successfully completed its Critical Design Review. A Pre-CEB was completed in November 1985. The first EC-130 to be stripped of Mission Avionics was started in December 1985. The Class III mock-up was completed in December 1985. Production approval was received in February 1986, and the Full Scale Development/Pre-Production contract was definitized in June 1986. Tinker AFB has been designated as the single site MIDCONUS E-6A home base. Navy Decision Coordinating Paper (NDCP) was approved January 1986, and the Test and Evaluation Master Plan (TEMP) was approved in November 1986. Prototype aircraft rollout took place on 18 December 1986. A DOD program budget decision was made in December 1986 to increase the total number of aircraft to be procured from 15 to 16. In January 1987 contract award and production go ahead for 3 FY-87 aircraft (#'s 3, 4, 5) and FY-88 long lead for additional 3 aircraft (#'s 6, 7, 8) was approved. The ferry flight of FSD aircraft to Boeing Field was accomplished in February 1987. In June 1987 the DT-IIIB flight test of FSD aircraft commenced. In July 1987 excessive wing tip/pod oscillation was discovered. The wing fix to be

performed by Boeing will incorporate adding inner wing stiffeners and also will include replacing the outer wing with one that is structurally stronger. The Long Trailing Wire Antenna (LTWA) touched the horizontal stabilizer at high bank angles in August 1987. Assessment of additional test and evaluation and options to manage problem are in final stage. Congressional Appropriations Act released $11.8M in MILCON funds for initial design/construction of facilities at Tinker AFB, contingent upon reapproval of Navy life cycle cost study citing Tinker AFB as best site for Main Operating Base (MOB) in December 1987. Study approved through VCNO as of 1 March 1988. In January 1988 the projected delivery of the FSD aircraft and first production aircraft was changed to March 1989 due to ECPs for the KG-84 (Crypto equipment which replaced the KW-7) and the EVS (Enhanced VERDIN System). NAS Barbers Point designated as transition site for VQ-3 in April 1988. Likewise, NAS Patuxent River designated for VQ-4, and Tinker AFB designated MOB for both squadrons when facilities ready, in 1992. DT-IIIB completed in April 1988. The prototype E-6A arrived at NATC Patuxent River for TECHEVAL and EMI/EMC testing in May 1988. MILCON funding for FY-89, $38.2M, released for Tinker construction in October 1988. The prototype completed TECHEVAL Phase I testing in October 1988. Production #1 completed EMP testing at NATC Patuxent River.

b. Significant Developments Since Last Report -- On 16 February 1989, the E-6A prototype aircraft lost one-third of the vertical fin, one-half of the rudder and ten feet of the right horizontal stabilizer. Ground breaking ceremonies were held on 16 June 1989 at Tinker AFB, OK which will be the E-6A Main Operating Base. The first E-6A production aircraft was delivered to the fleet in July 1989. As of 31 December 1989 there have been a total of five deliveries. On 28 September 1989 the prototype E-6A again lost a portion of the vertical fin rudder and right horizontal stabilizer while undergoing one of a series of flutter tests conducted by Boeing to determine the cause of the similar incident that occurred in February 1989. Analysis of the test data from the extensive instrumentation package in operation during the second aircraft incident is underway. On 3 October 1989, Boeing machinists went on a 48 day strike which ended on 21 November. Overall impact was a day-for-day slip in production, plus one additional week slip for production startup. Resumption of work assessment on-going. E-6A flew its first operational mission in November.

8. Threshold Breaches: There is currently a DAE Baseline (17 Oct 1989) breach which involves a 24 month schedule slip of the delivery of the prototype aircraft and FOC will slip 12 months due to tail flutter problem and solution.

Schedule:

a. Milestones --

	Dev. Est.	Approved Baseline	Current Estimate	
Justification for Major Systems New Starts (JMSNS)(Substantiation with POM)	Jul 81	Jul 81	Jul 81	
Program Initiation (NADEC Decision Memo)	Dec 81	Dec 81	Dec 81	
Operational Requirement	Jan 82	Jan 82	Jan 82	
Request for Quotations (RFQ)	Mar 82	Mar 82	Mar 82	
Award of Full Scale Development Contract	May 83	Apr 83	Apr 83	
Preliminary Design Review (PDR)	Oct 83	Nov 83	Nov 83	
DNSARC III	Dec 83	Feb 86	Feb 86	
Release Long Lead Production Funds	Dec 83	Jun 84	Jun 84	
Critical Design Review (CDR)	Aug 84	Jul 85	Jul 85	
First Test Flight	Aug 86	Jun 87	Jun 87	
Navy Technical Evaluation (NTE)	Aug 87	Jul 88	Jul 88	
Deliver Prototype Aircraft	Feb 87	Jan 90	Dec 91	(CH-1)
Deliver First Production Aircraft	Aug 87	Jul 89	Jul 89	
([redacted]) Initial Operational Capability (IOC)	(b)(1) [redacted]			
([redacted]) Full Operational Capability (FOC)				CH-2)

b. Previous Change Explanations -- Wing load and DTWA clearance problems found in DTIIIB test; fix is identified and will be incorporated by Boeing prior to delivery. FOC was changed to accommodate the JSTARS buy and to smooth transition for the east coast squadron.

c. Current Change Explanations --
(CH-1) Two tail incidents have caused the schedule slip.
(CH-2) Two tail incidents and a strike by Boeing machinists have caused the 12 month schedule slip.

d. References:

Development Estimate: Operational Requirement W1438 11 Jan 1982 Annex C to JSPD 84-91 [redacted] PE 0101402N.

Approved Program: DAE baseline approved 17 October 1989.

Technical/Operational Characteristics:

	DEV EST	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
a. Technical --				
(U) Weight Empty (lbs)	165,125	167,800/167,800	167,012	167,012
(U) Maximum Gross Weight (lbs)	342,000	342,000/342,000	342,000	342,000
(U) Maintainability (manhours/flt hr)	16.5	16.5/ 16.5	TBD	16.5
(S) Reliability	(b)(1)			
(S) MFHBF (Critical)				
(S) MFHBF (Major)				
b. Operational				
(U) Cruise Speed (Mach No.)	.75	.75/ .75	.66 to .77	.75
(U) Endurance (hours)	14	14/ 14	15	15
(U) Critical Field Length(feet)	(b)(1)			
(U) Range (unrefueled: NM)	6,000	6,000/ 6,000	6,500	6,500
(U) Extended Airborne Operations(hr)	72	72/ 72	TBD	72
(U) EMP Hardened (Upset Margin - db)	30	30/ 30	TBD	30
(U) Orbit Verticality of Training Wire Antenna (%)	(b)(1)			
(U) Emergency Operations	Critical Engine Inoperative		TBD	Critical Engine Inoperative

c. Previous Change Explanation -- N/A

d. Current Change Explanations -- N/A

e. References --

Development Estimate: Operational Requirement W1438 11 Jan 1982 Annex C to JSPD FY 84-91 PE #0101402N.

Approved Program: DAE Baseline date 17 October 1989.

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development	292.6	325.5	328.0
Procurement	1292.1	1114.9	1122.0
Airframe	(653.7)	(876.3)	(870.9)
Engine	(168.7)	-	-
Avionics	(121.6)	(20.0)	(19.9)
Total Flyaway	(944.0)	(896.3)	(890.8)
Other Wpn Sys Cost	(213.2)	(116.4)	(116.1)
Initial Spares	(134.9)	(102.2)	(115.1)
Construction (MILCON)	-	53.1	52.6
Total FY 82 Base-Year $	1584.7	1493.5	1502.6
Escalation	667.0	483.4	494.5
Development (RDT&E)	(61.6)	(51.6)	(52.3)
Procurement	(605.4)	(413.5)	(423.4)
Construction (MILCON)	-	(18.3)	(18.8)
Total Then-Year $	2251.7	1976.9	1997.1
b. Quantities --			
Development	1	1	1
Procurement	14	15	15
Total	15	16	16

c. Foreign Military Sales -- N/A

d. Nuclear Cost -- None

e. References --

Development Estimate: Operational Requirement W1438 11 Jan 1982 Annex C to JSPD 84-91 PE #010402N.

Approved Program: DAE Baseline dated 17 Oct 1989

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Est (Dec 89 SAR)	Current Year UCR Baseline (Dec 88 SAR)	Budget Year UCR Baseline (Dec 89 SAR)
a. Program Acquisition --			
(1) Cost	1997.1	1976.9	1997.1
(2) Quantity	16	16	16
(3) Unit Cost	124.8	123.6	124.8

b. Current Procurement --	Current Year (FY 1990)	Current Year (FY-1990 APPN)	Budget Year (FY 1991)
(1) Cost	-	-	N/A
Less CY Adv Proc	-	-	N/A
Plus PY Adv Proc	-	-	N/A
Net Total	-	-	N/A
(2) Quantity	-	-	N/A
(3) Unit Cost	-	-	N/A

13. Cost Variance Analysis:
a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	354.2	1897.5	-	2251.7
Previous Changes:				
Economic	-10.5	-221.0	-2.0	-233.5
Quantity	-	+61.2	-	+61.2
Schedule	-	-5.5	-	-5.5
Engineering	-2.9	+50.5	-	+47.6
Estimating	+33.4	+16.7	+73.4	+123.5
Other	-	-	-	-
Support	+2.9	-271.0	-	-268.1
Subtotal	+22.9	-369.1	+71.4	-274.8
Current Changes:				
Economic	-	+9.9	+0.8	+10.7
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+3.2	-9.6	-0.8	-7.2
Other	-	-	-	-
Support	-	+16.7	-	+16.7
Subtotal	+3.2	+17.0	-	+20.2
Total Changes	+26.1	-352.1	+71.4	-254.6
Current Estimate	380.3	1545.4	71.4	1997.1

(FY 1982 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	292.6	1292.1	0.0	1584.7
Previous Changes:				
Quantity	-	+41.1	-	+41.1
Schedule	-	-5.3	-	-5.3
Engineering	-2.4	-7.1	-	-9.5
Estimating	+27.1	-34.6	+53.1	+45.6
Other	-	-	-	-
Support	+8.2	-171.3	-	-163.1
Subtotal	+32.9	-177.2	+53.1	-91.2
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+2.5	-5.5	-0.5	-3.5
Other	-	-	-	-
Support	-	+12.6	-	+12.6
Subtotal	+2.5	+7.1	-0.5	+9.1
Total Changes	+35.4	-170.1	+52.6	-82.1
Current Estimate	328.0	1122.0	+52.6	1502.6

b. Previous Change Explanations --

(1) RDT&E

Economic:	Revised escalation indices
Engineering:	Revised test program scope
Estimating:	Communications suites integration and testing; refined estimates
Support:	Increased field requirements

(2) Procurement

Economic:	Revised escalation indices
Quantity:	Addition of 1 production aircraft in FY-86
Schedule:	Delivery schedule extended by one year
Engineering:	Revised mission avionics requirements
Estimating:	Reduction caused by restructured program; revised change order; availability of independent cost estimate; correction of prior report error; incorporation of EVS/EVP system in avionics suite
Support:	Refinement of Support Equipment Requirements Document; refinement of support requirements

(3) MILCON

Economic:	Revised escalation indices
Estimating:	Reduced hangar facilities; refined estimates

c. Current Change Explanations --

	(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E		
Increased Operational Testing requirements and structural repairs (Estimating)	+2.5	+3.2
(2) Procurement		
Revised escalation indices (Economic)	-	+9.9
Reduced estimate to absorb increases resulting from revised economic escalation (Estimating)	-5.7	-9.9
Revised requirement for enhanced VERDIN system/ enhanced VERDIN processor (Estimating)	+0.2	+0.3
Increased requirement for initial spares (Support)	+12.6	+16.7
(3) MILCON		
Revised escalation indices (Economic)	-	+0.8
Current and prior year inflation offset (Estimating)	-0.5	-0.8

14. Program Acquisition Unit Cost (PAUC) History: (Millions of then-year dollars)

a. Initial/Development Estimate to Current Estimate --
(1) Same as Current Baseline Estimate.

b. Current Baseline Estimate to Current Estimate

PAUC (Dev Est)	Changes								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
+150.1	-13.9	-5.6	-0.3	+2.9	+7.3	-	-15.7	-25.3	+124.8

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E--

FSD Aircraft: Initial Contract Price

	Target	Ceiling	Qty
Boeing Aerospace Co., Seattle, Washington N00019-83-C-0176, FPP	$316.5	N/A	1

Award date: 29 April 1983

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$329.3	N/A	1	$329.5	$329.5

b. Procurement -- Initial Contract Price

Production Aircraft:	Target	Ceiling	Qty
Boeing Aerospace Co., Seattle, Washington	NTE 1,449.5	N/A	14

N00019-83-C-0176, Advance Acquisition Contract
Definitization: FY 86 - 88 resulted in a unilateral price determination.
FY 89 option was exercised by a unilateral modification to the contract.

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
TBD 1/	N/A	15	NTE 1,126.2	TBD 1/

1/ Disclosure could jeopardize negotiations.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 90.9% (10 yrs/11 yrs)

(2) Percent Program Cost Appropriated: 99.8% ($1993.2/$1997.1)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY 81-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete	Total (N/A)
RDT&E	380.3	-	-	-	380.3
Procurement	1526.0	15.5	3.9	-	1545.4
MILCON	49.9	21.5	-	-	71.4
Total	1956.2	37.0	3.9	-	1997.1

c. Annual Summary --

Fiscal Year	Flyaway FY 82 Dollars Qty Nonrec	Rec	Base Year	Total Then-Year Dollars Program	Obli-gated	Ex-pended	Escl Rate
Appropriation: RDT&E							
1981			0.9	0.9	0.9	0.9	10.6
1982			1.0	1.0	1.0	1.0	7.6
1983			34.7	37.2	37.2	31.7	4.9
1984			63.1	70.0	70.0	46.6	3.8
1985			59.0	67.4	67.4	63.7	3.4
1986			76.6	90.2	90.2	80.9	2.8
1987			62.8	76.1	76.1	65.6	2.7
1988			27.4	34.3	34.3	7.7	3.0
1989			2.5	3.2	3.2	0.0	4.2
Subtotal 1			328.0	380.3	380.3	298.1	-

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY 82 Dollars Nonrec	Rec	Base Year	Program	Total Then-Year Dollars Obligated	Expended	Escl Rate
Appropriation: Procurement								
1984	0	-	-	79.7	98.5	98.2	98.2	8.0
1985	0	-	-	-	0.0	-	-	3.4
1986	2	136.2	118.3	264.0	345.9	345.9	309.1	2.8
1987	3	0.0	170.7	286.2	388.2	295.1	279.8	2.7
1988	3	0.0	162.2	234.4	332.1	307.2	160.7	3.0
1989	7	0.0	303.4	245.1	361.3	328.8	45.6	4.2
1990	0	0.0	0.0	10.1	15.5	-	-	4.0
1991	0	0.0	0.0	2.5	3.9	-	-	4.2
Subtotal	15	136.2	754.6	1122.0	1545.4	1375.2	893.4	-
Appropriation: MILCON								
1988				9.1	11.8	9.2	0.5	3.0
1989				28.2	38.1	37.1	-	4.2
1990				15.3	21.5	11.8	-	4.0
Subtotal				52.6	71.4	58.1	0.5	-
Total	16			1502.6	1997.1	1813.6	1192.0	-

17. Production Rate Data:

a. Annualized Production Rates:

Fiscal Year	Production Rates (Quantity/Year) Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1985	2	N/A	0	N/A
1986	3	N/A	2	N/A
1987	3	N/A	3	N/A
1988	3	N/A	3	N/A
1989	3	N/A	7	N/A

b. Cost Variance -- Dollars in Millions

Item		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Economic
Prog Acq Cost	(BY $)	N/A	N/A	1,502.6	N/A	N/A
	(TY $)	N/A	N/A	1,997.1	N/A	N/A
PAUC	(BY $)	N/A	N/A	93.9	N/A	N/A
	(TY $)	N/A	N/A	124.8	N/A	N/A

c. Schedule Variance --

	Production Estimate	Variance (CE vs PdE)	Current Estimate	Variance (CE vs Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	FEB/86	N/A	N/A
Duration (in months)	N/A	N/A	64	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	MAY/91	N/A	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	1/0
Procurement	15/5

e. Approved Design to Cost Goal -- N/A

18. Operating and Support Costs:

a. Assumptions and Ground Rules --

Seven E-6A aircraft form a typical operating squadron. Flight hours per aircraft per month, steady state operations, is 188 hours. No modifications to the E-6A are included. Aircraft service life is 30 years; SDLM cycle set at 14,000 flight hours, requires two months and 12,000 manhours to perform. Maintenance concept is organizational to depot (O to D) with intermediate support to be developed at Tinker AFB. The personnel costs are the direct costs to support the primary personnel and to operate the aircraft; base operating support personnel are not included. Operating consumables include POL and support material. Depot maintenance costs include airframe (SDLM), engine rework, and component repair. For the E-6A, sustaining investment consists of replenishment spares, support equipment/spares, trainer maintenance, software support, follow-on flight and maintenance training, supply support management, contractor support, installation support personnel, and positioning of crews and maintenance detachment. The antecedant system is a squadron of seven EC-130 aircraft operating a nominal 142 flight hours per aircraft per month. The sustaining investment consists of replenishment spares only.

(b) Costs -- (FY 1982 Constant (Base-Year) Dollars in Millions

Cost Element	Avg Annual Cost per E-6A Squadron	Avg Annual Cost per EC-130 Squadron
Personnel	18.4	26.6
Consumables	23.6	10.6
Depot Maintenance	8.4	4.8
Intermediate Maintenance	0.7	-
Sustaining Investment	6.3	0.5
Total	57.4	42.5

(c) Contractor Support Costs --

(Then-Year Dollars in Millions)

	FY 1989 & Prior	FY 1990 Year	FY 1991 Year	Balance To Complete	Total
O&MN	11.3	39.0	56.3	Not Avail	106.6

A-5 ATACMS

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SAR-89-111

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: Army TACMS

AS OF DATE: December 31, 1989

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1. (U) Designation and Nomenclature (Popular Name): Army Tactical Missile System (Army TACMS)

2. (U) DoD Component: ARMY

3. (U) Responsible Office and Telephone Number:
Army Tactical Missile System Project Office (SAAE-FS-AT) COL THOMAS KUNHART
Assigned: March 15,1985
Program Executive Office, Fire Suppo AV 746-1141 COMM 205 876-1141
Redstone Arsena, AL 35898-5650

4. (U) Program Elements/Procurement Line Items:
RDT&E:
PE 64324
PROCUREMENT:
APPN 2032 ICN SSN C98500 (Army)
APPN 2032 ICN SSN CA0261 (Army)
MILCON:
PE 024030

(b)(1)

5. (U) Related Programs: Army TACMS Smart Submunition Warhead (Block II); Multiple Launch Rocket System (MLRS)

CLASSIFIED BY: Army TACMS SCG 14 FEB 90
DECLASSIFY ON: OADR

CLEARED AS AMENDED
FOR OPEN PUBLICATION
MAR 22 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

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6. [redacted] Mission and Description: The Army Tactical Missile System (Army TACMS) is a ground-launched missile system consisting of a surface-to-surface guided missile with an anti-personnel/anti-materiel (APAM) warhead configuration. The Army TACMS is fired from the Multiple Launch Rocket System (MLRS) modified M270 launcher and will be deployed within the ammunition loads of corps MLRS battalions and/or division artillery MLRS batteries. The Army TACMS shall include, but not be limited to GUIDED MISSILE AND LAUNCHING ASSEMBLY: XM39; Missile/Launch Pod Assembly (M/LPA) Trainer; TRAINER SET, GUIDED MISSILE: XM165; TRAINER TEST, DEVICE, GUIDED MISSILE: XM70; modified M270 launcher; and the Army TACMS Missile Facilities.

7. [redacted] Program Highlights:

a. (U) Significant Historical Developments -- In 1981, the Army established a special task force (STF) to initiate development of requirements for a Corps Support Weapon System (CSWS) to engage high priority targets at ranges beyond those of existing weapons. At approximately the same time, the Air Force initiated development of a Conventional Stand-Off Weapon (CSW) to attack high value, heavily defended, land and sea targets for global force employment. In June 1982, DoD directed the merger of these two programs into a joint development program designated as the Joint Tactical Missile System (JTACMS). The objective of the program was to develop and field a missile with maximum commonality to meet the requirements of both services. In 1983, a TRADOC study resulted in an Army decision to utilize the MLRS launcher to fire the JTACMS. In 1984, a joint service decision was made to abandon efforts to develop a common missile and DoD approved the Army's request to develop an Army peculiar weapon to counter Warsaw Pact second echelon forces. During FY 85, the name was changed to Army TACMS and the Required Operational Capability (ROC) was approved in May 1985. In June 1985, the Assistant Secretary of the Army for Research, Development and Acquisition (SARDA) approved release of the request for proposals (RFPs) for the full scale development program. A competitive RFP was issued for the missile/launch pod assembly (M/LPA) and a sole source RFP was issued to the MLRS prime contractor for the integration of the Army TACMS with the MLRS launcher. The Army System Acquisition Review Council (ASARC) approved the program in December 1985. The Defense System Acquisition Review Council (DSARC) approved the program in February 1986. The Secretary of Defense Decision Memorandum (SDDM) was issued on March 18, 1986. After a formal source selection evaluation, a competitive contract was awarded March 26, 1986 to LTVMEG for missile development. This contract also included not-to-exceed options for 1,000 M/LPAs. The sole source integration contract was also awarded to LTVMEG on March 27, 1986. A Decision Coordinating Paper (DCP) was submitted on May 20, 1986 and received OSD approval on September 11, 1986. During 1987, static test firing of seven flight weight rocket motors was successfully completed. The M74 Grenade Fuzes (M219E1A1) were successfully tested. Army TACMS was selected to receive the DoD Acquisition Streamlining Excellence Award at the National Conference on Acquisition Streamlining. The Army TACMS Integration Contract Summary Critical Design Review (CDR) was successfully conducted. A CDR of all hardware items except the fire direction data

7. [redacted] Program Highlights (Cont'd):

manager (FDDM) was conducted. Logistics demonstration was started in March 1988. The option for long lead time items was exercised in May 1988.

b. [redacted] Significant Developments Since Last Report -- Engineering Design Test (EDT) flights were completed in February 1989. The Low Rate Initial Production (LRIP) Contract was awarded in February 1989. Development Test (DT) flights were completed in December 1989. In December 1989, a "Rump" ASARC was conducted which obtained approval for a second year of LRIP for 104 missiles in FY 90.

Army TACMS is expected to satisfy the mission requirements.

c. [redacted] Changes Since As Of Date -- None.

8. [redacted] Threshold Breaches: There are currently no DAE Program Baseline (dated March 1990) breaches.

9. [redacted] Schedule:

a. [redacted] Milestones --

	Development Estimate	Approved Program	Current Estimate
Began Assault Breaker Technology Demonstration	APR 78	APR 78	APR 78
Began Special Task Force	MAR 81	MAR 81	MAR 81
Mission Element Need Statement (MENS) Approval	APR 81	APR 81	APR 81
Joint Program Directed	JUN 82	JUN 82	JUN 82
Completed Assault Breaker Technology Demonstration	DEC 82	DEC 82	DEC 82
ROC Approved	MAY 85	MAY 85	MAY 85
RFP Released	JUN 85	JUN 85	JUN 85
Milestone II (ASARC)	DEC 85	DEC 85	DEC 85
Milestone II (DSARC)	FEB 86	FEB 86	FEB 86
FSD Contract Award	MAR 86	MAR 86	MAR 86
LLTI Contract Option Award	N/A	MAY 88	MAY 88
EDT-C Completion	N/A	FEB 89	FEB 89(Ch-1)
DA Program Review (ASARC IIIa)	N/A	FEB 89	FEB 89
LRIP Contract Option Award	N/A	FEB 89	FEB 89
DT Flight Test Start	N/A	MAR 89	MAR 89(Ch-1)
DT Flight Test Complete	N/A	DEC 89	DEC 89(Ch-1)
OT Readiness Review	N/A	MAR 90	MAR 90(Ch-1)
OT Flight Test Start	N/A	MAR 90	MAR 90(Ch-1)
OT Flight Test Complete	N/A	JUN 90	JUN 90(Ch-1)
OT Ground Test Start	N/A	MAR 90	MAR 90(Ch-1)
OT Ground Test Complete	N/A	JUN 90	JUN 90(Ch-1)
MILESTONE III (ASARC)	N/A	SEP 90	SEP 90(Ch-2)
First LRIP Delivery	N/A	FEB 90	MAR 90(Ch-2)
Confirmatory Test Completion	N/A	JUL 90	JUL 90

a. [redacted] Milestones -- Continued

	Development Estimate	Approved Program	Current Estimate
FUE	N/A	SEP 90	SEP 90 (Ch-2)
PVT Completion (if required)	N/A	OCT 90	OCT 90 (Ch-2)

b. [redacted] Previous Change Explanations --

Milestone III added to the schedule to reflect date for approval of full-scale production, milestone for TC-LP added to the schedule and milestone for FUE added to the schedule. LLTI contract was awarded early.

c. [redacted] Current Change Explanations --

(Ch-1) The following milestones have slipped due to Control Actuation System (CAS) second source qualification, which delayed DT Flight completion and availability of OT missiles, and FDDM software immaturity which delayed the start of OT. The FDDM has now been decoupled from OT, however, not before a slip occurred: EDT-C completion from Dec 88 to Feb 89, DT Flight Test start from Feb 89 to Mar 89, DT Flight Test complete from Sep 89 to Dec 89, Final OTRR from Sep 89 to Mar 90, OT Flight Test start from Sep 89 to Mar 90, OT Flight Test complete from Jan 90 to Jun 90, OT Ground Test start from Nov 89 to Mar 90, OT Ground Test complete from Jan 90 to Jun 90.

(Ch-2) A change in acquistion strategy from Full-Rate Production to LRIP II has slipped the following milestones: Milestone III ASARC from Feb 90 to Sep 90, First LRIP Delivery from Feb 90 to March 90, FUE from Jul 90 to Sep 90, and PVT Completion if required from Jul 90 to Oct 90.

d. [redacted] References --

Development Estimate: SDDM, dated March 18, 1986, subject: "Army Tactical Missile System (Army TACMS) Block I," based on Milestone II (DSARC) decision.

Approved Program: DAE Approved Baseline dated March 1990.

10. [redacted] Technical/Operational Characteristics:

a. [redacted] Technical --

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
Missile Reliability:				
OT				
PVT/FUE				

(b)(1)

Army TACMS, December 31, 1989

(S) Technical/Operational Characteristics (Cont'd):

a. (U) Technical --	Dev Est	Approved Program Goal/Threshold		Demon-strated Perf	Current Estimate
Launcher Reliability (in hrs MTBOMF)	N/A	54	54	55.3	55.3 (Ch 1)
b. (S) Operational --					
Range:					
Design Goal	(b)(1)				
Min Acceptable (km)					
Payload: (kg)					
Design Goal					
Min Acceptable (kg)					
Missile Launch Pod Assembly Weight (in kg)	N/A	NTE 2300	NTE 2300	2300	NTE 2300

c. (U) Previous Change Explanations -- None.

d. (U) Current Change Explanations --

Ch 1: Launcher Reliability--Current estimate changed from 54 to 55.3. No measurable launcher reliability improvement is anticipated after the Development Test/Operational Test (DT/OT) milestone. An analysis of MLRS launcher test results and field experience indicates an MTBOMF of 57 hours against the Army TACMS mission profile. Reliability predictions of the MLRS terminally guided warhead (TGW) and Army TACMS modifications indicate a degradation of the MTBOMF to 54 hours. A Reliability Qualification Test (RQT) was conducted at which a reliability of 55.3 hours MTBOMF at 75 percent confidence was demonstrated. The MTBOMF will be further verified during IOTE.

Army TACMS, December 31, 1989

10. (S) Technical/Operational Characteristics (Cont'd):

(b)(1)



e. (U) References --

Development Estimate: SDDM, dated March 18, 1986, subject: "Army Tactical Missile System (Army TACMS) Block I," based on Milestone II (DSARC) decision.

Approved Program: DAE Approved Baseline dated March 1990.

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. (U) Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	651.5	563.7	562.0
Procurement	484.4	1205.2	1207.1
Missiles	(460.8)	(1185.0)	(1185.0)
Ground Support Equip	(0.8)	(0.0)	(0.0)
Total Flyaway	(461.6)	(1185.0)	(1185.0)
Other Wpn Sys Cost	(22.2)	(20.2)	(20.1)
Peculiar Support	(0.0)	(0.0)	(0.0)
Initial Spares	(0.6)	(0.0)	(2.0)
Construction	0.0	3.8	3.7
Ops. and Maint. (O&M)	0.0	0.0	0.0
Total FY 87 Base-Year $	1135.9	1772.7	1772.8

11. (U) Program Acquisition Cost (Cont'd):

a. (U) Cost -- (Cont'd)	Development Estimate	Approved Program	Current Estimate
Escalation	86.4	408.3	408.6
Development (RDT&E)	(5.2)	(3.7)	(3.6)
Procurement	(81.2)	(403.8)	(404.1)
Construction (MILCON)	(0.0)	(0.8)	(0.9)
Ops. and Maint. (O&M)	(0.0)	(0.0)	(0.0)
Total Then-Year $	1222.3	2181.0	2181.4
b. (U) Quantities --			
Development (RDT&E)	50	50	50
Procurement	1000	2834	2834
Construction (MILCON)	0	0	0
Ops. and Maint. (O&M)	0	0	0
Total	1050	2884	2884

c. (U) Foreign Military Sales -- None.

d. (U) Nuclear Costs -- None.

e. (U) References --

Development Estimate: SDDM, dated March 18, 1986, subject: "Army Tactical Missile System (Army TACMS) Block I," based on Milestone II (DSARC) decision.

Approved Program: DAE Approved Baseline dated March 1990.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. (U) Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1) Cost	2181.4	1604.0	2181.4
(2) Quantity	2834.0	2187.0	2834.0
(3) Unit Cost	0.770	0.733	0.770
b. (U) Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	93.5	93.5	187.2
Less CY Adv Proc	7.6	7.6	18.5
Plus PY Adv Proc	4.3	4.3	7.6
Net Total	90.2	90.2	176.3
(2) Quantity	104.0	152.0	318.0
(3) Unit Cost	0.867	0.593	0.554

Army/TACMS, (b)(1) 31, 1989

12. (U) Program Acquisition/Current Procurement Unit Cost Summary (Cont'd):

Paragraph 12 Comments:
12.a.(2)-This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation.

12.b.(3)-Secretary of the Army notified Congress in February 1990 that the Army TACMS current procurement cost has breached the Nunn-McCurdy threshold by more than 25 percent. A quarterly SAR will be submitted in March with the required Unit Cost Exception Report in accordance with Title 10, Section 2433.

13. (U) Cost Variance Analysis:

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	656.7	565.6	0.0	1222.3
Previous Changes:				
Economic	-1.0	+5.2	-	+4.2
Quantity	-	+479.8	-	+479.8
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-81.8	-25.1	+4.6	-102.3
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-82.8	+459.9	+4.6	+381.7
Current Changes:				
Economic	+1.4	+48.1	-	+49.5
Quantity	-	+516.6	-	+516.6
Schedule	-	+23.8	-	+23.8
Engineering	-	-	-	-
Estimating	-9.7	-2.8	-	-12.5
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-8.3	+585.7	-	+577.4
Total Changes	-91.1	+1045.6	+4.6	+959.1
Current Estimate	565.6	1611.2	4.6	2181.4

13. a) Cost Variance Analysis (Cont'd):

(FY 1987 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	651.5	484.4	0.0	1135.9
Previous Changes:				
- Quantity	-	+380.2	-	+380.2
- Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-80.9	-25.5	+3.8	-102.6
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-80.9	+354.7	+3.8	+277.6
Current Changes:				
Quantity	-	+370.7	-	+370.7
Schedule	-	-0.1	-	-0.1
Engineering	-	-	-	-
Estimating	-8.6	-2.6	-0.1	-11.3
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-8.6	+368.0	-0.1	+359.3
Total Changes	-89.5	+722.7	+3.7	+636.9
Current Estimate	562.0	1207.1	3.7	1772.8

b. (b) Previous Change Explanations --

RDT&E
- Economic: Revised escalation indices
- Estimating: Program cost estimate revision is mandated by funding reduction

PROCUREMENT
- Economic: Revised escalation indices
- Estimating: Program cost estimate revision is mandated by funding reductions
- Quantity: Addition of 1187 missiles

MILCON
- Estimating: Adjustment for prior year inflation

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised escalation indices(Economic).	--	+1.4
Program cost estimate revision is mandated by funding reductions(Estimating).	-8.6	-9.7
(2) PROCUREMENT		
Revised escalation indices(Economic).	--	+48.1
SAR now reflects total program requirements which changed from 2237 to 2834(Quantity)	+370.7	+516.6
SAR reflects stretch-out of delivery period to incorporate increased quantities(Schedule).	-.1	+23.8
Program cost estimate revision is mandated by funding reductions(Estimating).	-2.6	-2.8
(3) MILCON		
Adjustment for prior year inflation (Estimating).	-.1	--

14. (U) Program Acquisition Unit Cost (PAUC) History: (Then-Year Dollars in Millions)

Army TACMS

a. (U) Initial SAR Estimate to Current Baseline Estimate - -

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
2.191	-0.087	-0.002	--	0.145	-1.041	--	0.016	-0.969	1.222

b. (U) Current Baseline Estimate to Current Estimate - -

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1.222	+0.019	-0.438	+0.008	--	-0.041	--	--	-0.452	0.770

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E

M/LPA:	Initial Contract Price Target	Ceiling	Qty
LTV Aerospace & Defense C Dallas, TX DAAH01-86-C-A036, FPI Award: March 26, 1986 Definitized: March 26, 1986	$180.4	$203.4	50.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$183.0	$206.4	50.0	$195.3	$195.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-7.3	$-7.1
Cumulative Variances To Date (11/30/89)	$-15.8	$-5.0
Net Change	$-8.5	$2.1

Explanation of Change: The improvement to the schedule variance is attributed to the delivery of major components from vendors and work-around schedules that were put in place to meet program schedule. Cost variance is due to having to qualify a second source for the Control Actuation System (CAS) and to expedite hardware deliveries with extensive overtime by LTV and supply vendors to maintain the revised program schedule.

Integration:	Initial Contract Price Target	Ceiling	Qty
LTV Aerospace & Defense C Dallas, TX DAAH01-86-C-A037, FPI Award: March 27, 1986 Definitized: March 27, 1986	$83.0	$94.4	0.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$102.3	$110.3	0.0	$116.3	$116.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-4.5	$-13.2
Cumulative Variances To Date (11/30/89)	$-6.5	$-13.3
Net Change	$-2.0	$-0.1

Explanation of Change: The majority of the schedule and cost growth is in the software areas (Fire Control System (FCS) and Fire Direction Date Manager (FDDM)). Late definition of the FCS requirements and late availability of the FDDM software has impacted the testing, fabrication and integration process.

16. (U) Program Funding Summary:

a. (U) Program Status --

(1) Percent Program Completed: 61.1% (11 yrs/18 yrs)

(2) Percent Program Cost Appropriated: 33.8% ($736.4 / $2181.4)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-97)	Total
RDT&E	524.6	41.0	-	-	565.6
Procurement	77.3	93.5	187.2	1253.2	1611.2
MILCON	-	-	-	4.6	4.6
O&M	-	-	-	-	-
Total	601.9	134.5	187.2	1257.8	2181.4

c. (U) Annual Summary --

Fiscal Year	Qty	Flyaway FY87 Dollars		Total Base Years	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2040 Research, Development, Test & Eval, Army								
1980				12.7	9.4	9.4	9.4	10.6
1981				17.1	14.0	14.0	14.0	10.6
1982				13.6	11.8	11.8	11.8	7.6
1983				6.7	6.0	5.7	5.7	4.9
1984				53.6	50.2	34.0	34.0	3.8
1985				79.2	76.4	51.2	51.2	3.4

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY87 Dollars		Total Base Years	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2040 Research, Development, Test & Eval, Army (Cont'd)								
1986				107.3	106.6	106.5	106.5	2.8
1987				74.9	76.5	76.5	76.0	2.7
1988				94.5	100.1	100.1	94.1	3.0
1989				66.7	73.6	70.4	44.3	4.2
1990				35.7	41.0	12.8	0.1	4.0
Subtot	50			562.0	565.6	492.4	447.1	
Appropriation: 2032 Missile Procurement, Army								
1988				3.9	4.3	3.5	1.9	3.0
1989	66		50.3	63.3	73.0	65.4	6.0	4.2
1990	104		70.0	77.9	93.5	9.4		4.0
1991	318		151.2	150.4	187.2			4.2
1992	411		170.8	177.2	228.2			4.0
1993	456		190.7	189.9	252.4			3.7
1994	445		180.2	180.5	247.5			3.4
1995	456		166.8	167.1	236.2			3.1
1996	456		159.3	153.5	223.7			3.1
1997	122		45.7	43.4	65.2			3.1
Subtot	2834		1185.0	1207.1	1611.2	78.3	7.9	

c. (U) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY87 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2050 Military Construction, Army								
1992				3.7	4.6			4.0
Subtot	0			3.7	4.6			
Total	2884		1185.0	1772.8	2181.4	570.7	455.0	

17. (U) Production Rate Data:
a. (U) Annualized Production Rates --

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1989	66	N/A	66	N/A
1990	276	N/A	104	N/A
1991	452	N/A	318	N/A
1992	440	N/A	411	N/A
1993	470	N/A	456	N/A
1994	483	N/A	445	N/A
1995	0	N/A	456	N/A
1996	0	N/A	456	N/A
1997	0	N/A	122	N/A

b. Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Acq. Cost (BY $)	N/A	N/A	1772.8	N/A	N/A
- (TY $)	N/A	N/A	2181.4	N/A	N/A
PAUC Cost (BY $)	N/A	N/A	0.626	N/A	N/A
(TY $)	N/A	N/A	0.770	N/A	N/A

c. Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	FEB 89	N/A	N/A
Duration (in mon)	N/A	N/A	+110	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	APR 98	N/A	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	36/36
Procurement	0/0
MILCON	0/0
O & M	0/0

e. Approved Design-to-Cost Goal --

	Development Estimate	Current Estimate	Latest Approved Threshold
	(Average Unit Flyaway Cost)		
@ Qty 1000 - @ Peak Rate: 38/mo			
FY 87 Base-Year $	0.5	0.4	0.4
Then Year $	0.5	0.6	0.6
@ Qty 218 (1st three years) - @ Peak Rate: 38/mo			
FY 87 Base-Year $	0.6	0.7	0.7
Then Year $	0.7	0.8	0.9

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules --

Army TACMS will be deployed on the MLRS launcher and within the MLRS organizational units. Army TACMS O&S costs are included in the O&S section of the MLRS SAR and are from the Dec 89 Army TACMS Baseline Cost Estimate. Manning/crew support will be provided by MLRS organizational unit. Army TACMS is a certified round. Maintenance determined on the basis of periodic surveillance tests. O&S costs taken from Dec 89 Baseline Cost Estimate:

b. (U) Costs -- (FY 1987 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per MISSILE	Avg Annual Cost Per (Antecedent)
Fielding	.000	.000
Sustainment	.005	.000
Total	.005	.000

c. (U) Contractor Support Costs -- (Current (Then-Year) Dollars in Millions)

Funding	FY1989 & Prior	FY1990	FY1991	Balance To Complete	Total
O&M	0.7	0.5	---	---	1.2
Industrial Fund	---	---	---	---	---
Total	0.7	0.5	---	---	1.2

Paragraph 18 Comments:
Sustainment Average unit cost is .005 in Section B.

N-45 V-22

~~UNCLASSIFIED~~

SAR-89-063

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: V-22 (OSPREY)

AS OF DATE: December 31, 1989

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1. Designation and Nomenclature (Popular Name): V-22 Joint Services Advanced Vertical Lift Aircraft (Osprey)

DoD Component: U.S. Marine Corps, U.S. Navy, U.S. Air Force

3. Responsible Office and Telephone Number:
   Naval Air Systems Command
   PMA-275
   Washington, D.C.

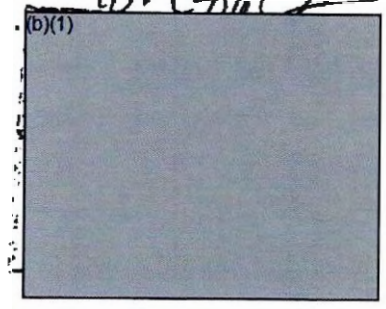
   PM: COL J. H. Schaefer,USMC
   Assigned: January 19, 1990
   (202) 692-7413
   AUTOVON 222-7413

4. Program Elements/Procurement Line Items:
   RDT&E: PE 0603203N
   PE 0604262N
   PE 0603256N (Shared Funding)
   PE 64222A
   PE 1110011F (Shared Funding)
   PE 64227F
   PROCUREMENT: APPN 1506 ICN 0163
   PE 0206121M
   MILCON: N/A

5. Related Programs: None

90-C-0662

(b)(1) [redacted]



~~UNCLASSIFIED~~

6. Mission and Description: The V-22 Osprey was a Department of the Navy program for the purpose of developing, testing, evaluating, procuring and fielding a tilt rotor, vertical take off and landing aircraft for Joint Service application. The V-22 program was designed to provide an aircraft to meet the amphibious/vertical assault needs of the Marine Corps, the strike rescue needs of the Navy, and the special operations needs of the Air Force. The V-22 would have replaced the CH-46, CH53A and D in the Marine Corps, the HH-3A in the Navy, and supplement H-53, H-60 and C-130 in the Air Force. The V-22 would be capable of flying over 2000 nautical miles without refueling, giving the services the advantage of a VSTOL aircraft that could rapidly self-deploy to any location in the world.

7. Program Highlights:

a. Significant Historical Developments -- Preliminary Design was initiated in April 1983 with Bell-Boeing. Allison Gas Turbine Division of General Motors Corp was selected for engine design. The V-22 program went through Milestone II (DSARC II) in April 1986 and was approved for entry into Full Scale Development on 1 May 1986, at which time the FSD contract with Bell-Boeing was signed. Rollout of aircraft #1 occurred 23 May 1988. Allison delivered 3 ground test engines and 13 flight test engines to the airframe manufacturer (Bell-Boeing). First Flight of Aircraft #1 occurred 19 March 1989. The Secretary of Defense cancelled the V-22 program per PBD 986 dated 19 April 1989. This is the final SAR.

b. Significant Developments Since Last Report -- Aircraft #1 has accumulated 24.1 flight hours; #2, 27.3 flight hours; and #4, 0.8 hours of flight test. Congressional action provided $255.0M RDT&E in FY 1990.

c. Changes Since "As Of" Date -- None

8. Threshold Breaches: None. There were no breaches to the DAE Baseline dated 30 June 1989.

Schedule:

a. Milestones	Development Estimate	Approved Program	Current Estimate
Milestone 0 (DEPSECDEF Memo)	Dec 81	Dec 81	Dec 81
Milestone 1 (DEPSECDEF Memo)	Dec 82	Dec 82	Dec 82
Preliminary Design Contract Award	Apr 83	Apr 83	Apr 83
Milestone II (DSARC II)	Apr 86	Apr 86	Apr 86
FSD Contract Award	May 86	May 86	May 86
Production Contract Award (Long Lead AAC)	Jan 89	Jan 89	Mar 89
Operational Testing IIA	Aug 89	Aug 89	N/A
Milestone IIIA (USMC Pilot Prod)	Dec 89	Dec 89	N/A
Operational Testing (IIB)	Aug 90	Aug 90	N/A
Milestone IIIB (All Serv Ltd Prod)	Dec 90	Dec 90	N/A
Operational Testing IIC (OPEVAL)	Aug 91	Aug 91	N/A
Operational Testing IID (AF OPEVAL)	Aug 91	Aug 91	N/A
First Fleet Deliveries	Dec 91	Dec 91	N/A
Milestone IIIC (USN/MC/A Full Prod)	Dec 91	Dec 91	N/A
Milestone IIID (USAF Full Prod)	Dec 91	N/A	N/A
USMC IOC (5 Acft Training Det)	1992	May 92	N/A
USAF IOC (6 Acft Mission Capable)	1994	1994	N/A
USA FUE (First Unit Equipped)	FY1994	N/A	N/A
USA IOC (First Operational Company Equipped)	FY1995	FY 1995	N/A

b. Previous Change Explanations -- Contract award date reflects contractual agreement. Army references no longer applicable. The Secretary of Defense cancelled the V-22 Program per PBD 986 dated 19 April 1989.

c. Current Change Explanations -- None

d. References --

Development Estimate: DCP dtd 1 May 1986.

Approved Program: DAE baseline approved 30 June 89.

10. Technical/Operational Characteristics:

a. Technical	Development Estimate	Approved Program Goals /Thres	Demons Perf.	Current Estimate
Length, ft Folded/Unfolded	62.24/57.33	N/A /62.24/57.33		N/A
Width, ft Folded/Unfolded	18.42/83.83	N/A /18.42/83.83		N/A
Height, ft Folded/Unfolded	17.98/21.73	N/A /17.98/21.73		N/A
Empty Weight, lbs	31,768	N/A /31,786		N/A
b. Operational				
Readiness, msn capability rate (% MC)	70	N/A /70		N/A
Mission Complete Probability, Rate (MFHBMA - Design Controllable)	98	N/A /98		N/A
Direct Maintenance Man-Hours per Flight Hour, Design Controllable:				
Org. Level, Unscheduled (Corrective)	7.0	N/A /7.0		N/A
Org. Level, Schedule (Preventive)	2.5	N/A /2.5		N/A
World-wide Self-Deployment, nm (minimum distance)	2100	N/A /2100		N/A
Continuous Cruise Speed, kts	250	N/A /250		N/A
Dash Speed, kts	275	N/A /275		N/A
Instantaneous G-Loading (+/-)	+4.0/-1.0	N/A /+4.0/-1.0		N/A
Troop Capacity	24	N/A /24		N/A
External Cargo, lbs	10,000	N/A /10,000		N/A

c. Previous Change Explanations -- The Secretary of Defense cancelled the V-22 Program per PBD 986 dated 19 April 1989.

d. Current Change Explanations -- None

e. References --

Development Estimate: DCP dtd 1 May 1986.

Approved Program: DAE baseline approved 30 June 89.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Baseline	Current Estimate
a. Cost --			
Development (RDT&E)	2443.7	1973.3	2170.0
Procurement	20493.1	279.5	279.5
Airframe	(11013.0)	(99.8)	(99.8)
Engine	(1519.8)	(38.7)	(38.7)
Avionics	(1293.5)	(0.1)	(0.1)
Other Hardware	(493.7)	(0.0)	(0.0)
Non Recurring	(1197.1)	(140.9)	(140.9)
Total Flyaway	(15517.1)	(279.5)	(279.5)
Other Wpn Sys Cost	(3299.6)	(0.0)	(0.0)
Initial Spares	(1676.4)	(0.0)	(0.0)
Construction (MILCON)	136.2	0.0	6.1
Total FY 86 Base-Year $	23073.0	2252.8	2455.6
Escalation	6589.3	147.6	183.9
Development (RDT&E)	(181.5)	(93.2)	(128.2)
Procurement	(6371.1)	(54.4)	(54.4)
Construction (MILCON)	(36.7)	(0.0)	(1.3)
Total Then-Year $	29662.3	2400.4	2639.5
b. Quantities --			
Development (RDT&E)	6	0	0
Procurement	913	0	0
Total	919	0*	0*

*While one or more Development aircraft may be provisionally accepted under the terms of the contract, none will be "fully configured end items" because, due to termination, they will not meet the "Test Aircraft Delivery Configuration Requirements" of the contract.

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Development Estimate: FY 1988/89 President's Budget.

Approved Program: DAE baseline approved 30 June 1989.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Est (Dec 89 SAR)	UCR Baseline (Dec 88 SAR)	UCR Baseline (Dec 89 SAR)
a. Program Acquisition --			
(1) Cost	N/A	N/A	N/A
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

b. Current Procurement --	Current Year (FY 1990)	Current Year (FY 1990 APPN)	Budget Year (FY 1991)
(1) Cost	N/A	N/A	N/A
Less CY Adv Proc	N/A	N/A	N/A
Plus PY Adv Proc	N/A	N/A	N/A
Net Total	N/A	N/A	N/A
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

13. Cost Variance Analysis

a. Summary -- (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	2625.2	26864.2	172.9	29662.3
Previous Changes				
Economic	-4.7	-	-	-4.7
Quantity	-542.6	-20095.5	-	-20638.1
Schedule	+0.6	-	+7.8	+8.4
Engineering	-	-	-	-
Estimating	-12.0	+0.1	-180.7	-192.6
Support	-	-6434.9	-	-6434.9
Other	-	-	-	-
Subtotal	-558.7	-26530.3	-172.9	-27261.9
Current Changes				-
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+231.7	-	+7.4	+239.1
Support				-
Other	-	-	-	-
Subtotal	+231.7	-	+7.4	+239.1
Total Changes	-327.0	-26530.3	-165.5	-27022.8
Current Estimate	2298.2	333.9	+7.4	2639.5

(FY 1986 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	2443.7	20493.1	136.2	23073.0
Previous Changes				-
Quantity	-462.1	-15237.6	-	-15699.7
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-8.3	-	-136.2	-144.5
Support	-	-4976.0	-	-4976.0
Other	-	-	-	-
Subtotal	-470.4	-20213.6	-136.2	-20820.2
Current Changes				-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+196.7	-	+6.1	+202.8
Support	-	-	-	-
Other	-	-	-	-
Subtotal	+196.7	-	+6.1	+202.8
Total Changes	-273.7	-20213.6	-130.1	-20617.4
Current Estimate	2170.0	279.5	6.1	2455.6

13. Cost Variance Summary (Con't):

b. Previous Change Explanations --

RDT&E

Economic:	Revised escalation indices
Schedule:	Air Force rescheduled simulator modification from 1991 to 1992
Engineering:	Air Force deleted Integrated Defense Avionics Digital system effort, added analysis of EW requirements
Estimating:	Navy reprogrammings and adjustments, Air Force engineering change proposal
ALL Categories:	Termination of V-22 program

PROCUREMENT

Economic:	Revised escalation indices
Quantity:	Air Force reduction in aircraft from 80 to 55
	Correction of Quantity Variance in previous SAR due to Army withdrawal
Schedule:	Navy rephasing of program quantities
	Air Force change in buy schedule from 1992 to 1993
Estimating:	Repricing of Air Force aircraft reflecting impact of Army withdrawal and Air Force reduction in Quantity
	Repricing of Air Force aircraft reflecting impact of Army withdrawal
	Navy refinement in estimating
	Navy articles of GFE moved to CFE status
	Air Force adjustment in tooling estimate
Support:	Navy revised estimate
	Air Force increases in initial spares, decrease in Peculiar Support Equipment and data requirements, addition of trainer/simulator requirements
	Correction of Support Variance in previous SAR due to Army withdrawal
L Categories:	Termination of V-22 program

MILCON

Economic:	Revised escalation indices
Schedule:	Air Force rephasing facilities requirements
Estimating:	Navy reestimate of requirements
ALL Categories:	Termination of V-22 program

c. Current Change Explanations --

	(Dollars in Millions) Base-Year $	Then-Year $
(1) RDT&E		
Navy FY90 budget appropriated by Congress (Estimating)	+217.6	+255.0
The Air Force Engineering Change Proposal effort was cancelled due to termination of the program. (Estimating)	-20.9	-23.3

(2) PROCUREMENT - N/A

(3) MILCON - N/A

14. Program Acquisition Unit (PAUC) History: (Then-Year Dollars in Millions)

a. Initial SAR Estimate to Current Baseline Estimate --

PAUC Planning Estimate	CHANGES								PAUC Dev Estimate
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
40.2	-4.9	-6.7	+0.8	-	-	+2.9	-	-7.9	32.3

b. Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	CHANGES								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
+32.278									*

*Funding for the V-22 Program was not included in the FY1991 President's budget.

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E

Full Scale Development (Airframe):
Bell-Boeing, Fort Worth, TX
N00019-85-C-0145, FPI
2 May 1986

Initial Contract Price		
Target	Ceiling	Qty
$1,714.0	$1,810.0	6

Current Contract Price		
rget	Ceiling	Qty
,729.1	$1,825.9	6

Estimated Price at Termination	
Contractor	Program Manager
$1610.0	$1610.0

	Cost Variance	Schedule Variance
Previous Cumulative Variance	$-214.0	$-142.8
Cumulative Variances to Date (11/30/89)	-298.0	-137.6
Net Change	$ -84.0	$ +5.2
Cumulative Variance Change Percent	39.3%	3.6%

Explanation of Change: The FSD contract will be terminated after 30 September 1990.

Full Scale Development (Engine):
Allison Gas Turbine, Indpls, IN
N00019-85-0034, FFP
2 May 1986

Initial Contract Price		
Target	Ceiling	Qty
$76.4	$76.4	21

Current Contract Price		
Target	Ceiling	Qty
$83.7	$83.7	21

Estimated Price at Termination	
Contractor	Program Manager
$81.5	$81.5

Explanation of Change: The contract will be terminated after 30 September 1990.

b. Procurement -- N/A

c. MILCON -- N/A

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 100% (9 yrs / 9 yrs)

(2) Percent Program Cost Appropriated: 100% ($2639.5/$2639,5)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior FY82-89	Budget Year FY-90	Budget Year FY-91	Balance to Complete FY 92-98	Total
RDT&E	2043.2	255.0	0.0	0.0	2298.2
Procurement	333.9	0.0	0.0	0.0	333.9
MILCON	0.0	7.4	0.0	0.0	7.4
Total	2377.1	262:4	0.0	0.0	2639.5

c. Annual Summary -- RDT&E Navy

1982	-			1.5	1.3	1.3	1.1	7.60
1983	-			37.3	*34.5	34.5	34.5	4.90
1984	-			90.2	86.5	86.5	84.8	3.80
1985	-			175.7	173.6	173.6	171.6	3.40
1986	-			514.1	522.7	522.7	515.7	2.80
1987	-			400.6	419.4	419.3	411.2	2.70
1988	-			427.9	463.0	462.9	355.9	3.00
1989	-			267.4	301.3	300.7	148.9	4.20
1990	-			217.5	255.0	131.1	11.0	4.00
Subtotal	-			2132.2	2257.3	2132.6	1734.7	
Appropriation: Procurement Navy								
1989	-	-	-	279.5	333.9	131.8	14.5	4.20
Subtotal	-	-	-	279.5	333.9	131.8	14.5	
Appropriation: MILCON Navy								
1990				8.1	7.4			4.00
TOT Navy	-	-	-	2417.8	2598.6	2264.4	1749.2	

* NOTE: FY 1983 RDT&E $'s reflect $29.9M of Army funds (P.E. 64222A)

Appropriation: RDT&E Air Force								
1985	-			0.6	0.6	0.6	0.6	3.40
1986	-			2.2	2.2	2.2	2.2	2.80
1987	-			2.8	2.9	2.9	2.9	2.70
1988	-			23.8	25.7	25.4	23.4	3.00
1989	-			8.4	9.5	4.3	-	4.20
Subtotal	-			37.8	40.9	35.4	29.1	
Appropriation: MILCON Air Force								
				-	-	-	-	
TOT AF	-	-	-	37.8	40.9	35.4	29.1	

Production Rate Data:

a. Annualized Production Rates -- : N/A

b. Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less DE)	Current Estimate	Variance (CE less MAX)	Maximum Economic
Prog Acq Cost (BY $)	N/A	N/A	2455.6	N/A	N/A
(TY $)	N/A	N/A	2639.5	N/A	N/A
PAUC (BY $)	N/A	N/A	N/A	N/A	N/A
(TY $)	N/A	N/A	N/A	N/A	N/A

c. Schedule Variance --

Start Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A
Duration (in Months)	N/A	N/A	N/A	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
Procurement	0/0

e. Approved Design to Cost Goal -- N/A

Operating and Support Costs:

a. Assumptions and Ground Rules -- N/A

b. Contractor Support Costs -- N/A

17. Production Rate Data:

a. Annualized Production Rates -- : N/A

b. Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less DE)	Current Estimate	Variance (CE less MAX)	Maximum Economic
Prog Acq Cost (BY $)	N/A	N/A	2455.6	N/A	N/A
(TY $)	N/A	N/A	2639.5	N/A	N/A
PAUC (BY $)	N/A	N/A	N/A	N/A	N/A
(TY $)	N/A	N/A	N/A	N/A	N/A

c. Schedule Variance --

Start Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A
Duration (in Months)	N/A	N/A	N/A	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
Procurement	0/0

e. Approved Design to Cost Goal -- N/A

18. Operating and Support Costs:

a. Assumptions and Ground Rules -- N/A

b. Contractor Support Costs -- N/A

[redacted]

SAR-89-025

N-21 LCAC

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)

PROGRAM: LCAC

AS OF DATE: December 31, 1989

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MAR 22 1990

1. [redacted] Designation/Nomenclature (Popular Name): LCAC/Landing Craft, Air Cushion

2. (U) DOD Component: U. S. Navy

3. (U) Responsible Office and Telephone Number:

Amphibious Warfare and Strategic
Sealift Program Office (PMS377)
Naval Sea Systems Command
Washington, DC 20362-5101

PM: Mr. E. E. Shoults
Assigned: April 29, 1985
AV 332-8511; COMM (703)
602-8511

4. (U) Program Elements/Procurement Line Items:

RDT&E: PE 0604567N Project 1803, 0857 (Shared funding)

PROCUREMENT: APPN 1611N ICN 5105

MILCON: PE 0204796N (Shared funding)
PE 0805796N (Shared funding)

5. (U) Related Programs: AALC; LHD; LSD 41; LSD 41 (CV)

90-C0666

[redacted]



6. (U) Mission and Description: The LCAC program has been established to transport weapon systems, equipment, cargo, and personnel of the assault elements of the marine air/ground task force from ship to shore and across the beach. The LCAC is a fully Amphibious Air Cushion vehicle capable of operating from existing and future amphibious well deck ships. Having an on-cushion length of 88ft and beam of 47ft, the LCAC can carry a 60 ton payload (75 ton overload capacity) and provides drive through capability by means of ramps forward and aft.

7. (U) Program Highlights:

a. (U) Significant Historical Developments --In 1970, contracts were awarded for the design and construction of prototype Amphibious Assault Landing Craft (AALC). Results from the test program led to the follow-on LCAC production program. Bell Aerospace, Textron was competitively awarded contracts for production of six craft (three authorized in FY82 and three in FY83).

The first LCAC successfully completed acceptance trials on 7 December 1984 at the Naval Coastal Systems Center (NAVCOASTSYSCEN) in Panama City, Florida. During the initial phase of operational testing (OT-IIIA) early in 1985 the LCAC met all mission specifications; however, discrepancies affecting craft reliability were identified. Correction of these discrepancies were shown effective during Operational Testing (OT IIIB) in April 1987. Approval for Full Production was granted by ASN in June 1987.

A second source, Avondale Gulfport Marine (AGM), formerly Lockheed Shipbuilding Company, was selected to produce two FY85 craft in Sep 1985.

b. (U) Significant Development since last report --To date, AGM has been awarded 15 craft and TMS 45 craft (total of 60). The most recent award was made 22 Dec 1989 (12 FY90 craft, Craft No. 49-60) which resulted in 9 craft to TMS and 3 to AGM.

Successful Acceptance Trials for LCAC 15 and LCAC 16 (AGM Craft) were accomplished on 24 August 1989 and 16 November 1989, respectively. AGM delivered Craft 15 and 21 on 15 September 1989 and 10 March 1989, respectively.

Successful shock test trials were completed 15 December 1989 with LCAC 12 and the LSD 44 off Key West, FL. The LCAC was successfully isolated from the full impact of the underwater shock transmitted through the ships well deck by a shock attenuation system (SAS).

The LCAC program has been shown to satisfy the mission requirement.

c. (U) Changes Since "As Of" Date -- None

8. (U) Threshold Breaches: DAE baseline breach identified 31 December 1989. Material Support Date and Naval Support Date slipped beyond 180 days. DAE baseline dated 31 December 1988.

9. (U) Schedule:

a. (U) Milestones --

	Production Estimate	Approved Program	Current Estimate
(U) MILESTONE II SAIP	Feb 80	Feb 80	Feb 80
(U) MENS APPROVED	Oct 80	Oct 80	Oct 80
(U) DETAIL DESIGN/LONG - LEAD MATERIAL CONTRACT	Jun 81	Jun 81	Jun 81
(U) MILESTONE IIIA APPROVAL - OF LEAD PROD	Dec 81	Dec 81	Dec 81
(U) CONTRACT AWARD	Feb 82	Dec 81	Feb 82
(U) FIRST CRAFT DELIVERY	Dec 84	Dec 84	Dec 84
(U) MILESTONE IIIB APPROVAL - FOR FULL PROD	Jul 85	Jun 87	Jun 87
(U) MATERIAL SUPPORT DATE	Apr 88	Apr 88	Nov 91(CH-1)
(U) NAVAL SUPPORT DATE	Jan 90	Jan 90	Nov 91(CH-2)
*(U) INITIAL OPERATIONAL - CAPABILITY	Jul 86	Dec 86	Dec 86

*IOC - Reflects date the lead craft are ready for operational deployment.

b. (U) Previous Change Explanation --

Correction of operating problems surfaced during operational testing on LCAC 1, and trials on LCAC caused delay in delivery of LCACs 2-6. This resulted in the slippage of Initial Operating Capability (IOC) by 5 months.

MSD was revised to January 1990 to coincide with latest data promulgated by the Material Manager Ships Parts Control Center (SPCC).

c. (U) Current Change Explanation --

(CH-1) Material Support Date (MSD) slipped from Jan 90 to Nov 91 because SPCC will not be ready to support the LCAC program with respect to stocked parts until Nov 91. SPCC original estimate reflected data for a smaller craft population. The last craft system is projected to be fully supported in Nov 91.

(CH-2) Naval Support Date (NSD) was changed from Jan 90 to Nov 91 due to slippage in the Ready for Training (RFT) date of the Full Mission Trainer (FMT). The new RFT is now Sep 91. Slippage for the FMT has been attributed to a shortfall of FY89 RDT&E Dollars to full fund the trainer. Sufficient FY90 funds have been identified to meet the Nov 91 RFT date.

d. (U) References --

Production Estimate: SECNAV Memo dated December 21, 1981, Subject: "LCAC Milestone IIIA DNSARC Decision Memorandum"; Approved LCAC NDCP dated May 25, 1983.

Approved Program: DAE Baseline approved 31 December 1988.

10. (U) Technical/Operational Characteristics:

	PDE Est	Approved Program Goal/threshold	Demonstrated Perf	Current Estimate
a. (U) Technical --				
(U) Operating Crew	5	5/5	5	5
(U) Troop Capacity (Internal)	24	24/24	24	24
(U) Cargo Deck Area (ft2)	1,800	1,809/1,800	1,809	1,809
(U) Length-On Cushion (ft)	88'	87'11"/88'	87'11"	87'11"
(U) Beam-On Cushion (ft)	47'	47'/47'	47'	47'
b. (U) Operational --				
(U) Speed (kts)	35	40+/35+	40+	40+
(U) Design Payload (lbs)	120,000	120,000/120,000	120,000	120,000
(U) System Reliability	0.90	0.94/0.90	0.96	0.96
(U) Maintainability MMH/OH Total (CM+PM)	34	24/34	29.6	34
(U) Unrefueled Range	195	100/100	195+	195+

c. (U) Previous Change Explanations --

Demonstrated performance for the cargo deck area exceeds the production estimate.

Trials have shown that the craft exceeds minimum speed requirements.

Improved reliability based on demonstrated performance.

d. (U) Current Change Explanations -- None

e. (U) References --

Production Estimate: Approved LCAC NDCP dated May 25, 1983.

Approved Program: DAE Baseline approved 31 December 1988.

11. [redacted] Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Production Estimate	Approved Program	Current Estimate
a. Cost			
Development (RDT&E)	21.2	33.5	31.3
Procurement (SCN)	1023.6	2128.6	2074.1
(Sailaway)	(982.3)	(2016.9)	(1963.0)
(Ship System)	(3.3)	(3.7)	(3.7)
(Initial Spares)	(13.4)	(0.0)	(0.0)
(Outfitting/Post Delivery)	(24.6)	(108.0)	(107.4)
Construction (Milcon)	58.5	87.0	81.9
Total FY88 Base-Year $	1103.3	2249.1	2187.3
Escalation	507.4	623.1	672.8
Development (RDT&E)	(0.2)	(0.0)	(-0.6)
Procurement (SCN)	(489.3)	(596.2)	(648.0)
Construction (Milcon)	(17.9)	(26.9)	(25.4)
Total Then-Year $	1610.7	2872.2	2860.1
b. Quantities			
Development (RDT&E)	0	0	0
Procurement (SCN)	60	105	107
Total	60	105	107

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Production Estimate: Approved LCAC NDCP dated 25 May 1983

Approved Program: DAE Baseline approved 31 December 1988

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:

(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition --	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	2860.1	2872.2	2860.1
(2) Quantity	107	105	107
(3) Unit Cost	26.7	27.4	26.7
b. Current Procurement --	(FY 90)	(FY90 APPN)	(FY 91)
(1) Cost	273.8	273.8	270.1
Less CY Adv Proc	-22.6	-22.6	-23.2
Plus PY Adv Proc	18.6	18.6	22.6
Less OF/PD	-4.0	-4.0	-2.2
Less PY Escal	0.0	0.0	0.0
Net Total	265.8	265.8	267.3
(2) Quantity	12	12	12
(3) Unit Cost	22.2	22.2	22.3

13. [redacted] Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Est. (PDE)	21.4	1512.9	76.4	1610.7
Previous Changes:				
Economic	-2.6	-462.2	-6.4	-471.2
Quantity	0.0	1243.4	0.0	1243.4
Schedule	0.0	33.3	0.0	33.3
Engineering	0.0	2.8	0.0	2.8
Estimating	14.7	318.6	43.9	377.2
Other	0.0	0.0	0.0	0.0
Support	0.0	76.0	0.0	76.0
Subtotal	12.1	1211.9	37.5	1261.5
Current Changes:				
Economic	-0.2	84.1	3.4	87.3
Quantity	0.0	33.1	0.0	33.1
Schedule	0.0	-4.8	0.0	-4.8
Engineering	0.0	0.0	0.0	0.0
Estimating	-2.6	-115.2	-10.0	-127.8
Other	0.0	0.0	0.0	0.0
Support	0.0	0.1	0.0	0.1
Subtotal	-2.8	-2.7	-6.6	-12.1
Total Changes	9.3	1209.2	30.9	1249.4
Current Estimate	30.7	2722.1	107.3	2860.1

13. (U) Cost Variance Analysis (Continued):

a. Summary -- (FY 1982 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Est. (PDE)	21.2	1023.6	58.5	1103.3
Previous Changes:				
Quantity	0.0	799.5	0.0	799.5
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	2.2	0.0	2.2
Estimating	12.3	238.9	28.5	279.7
Other	0.0	0.0	0.0	0.0
Support	0.0	64.4	0.0	64.4
Subtotal	12.3	1105.0	28.5	1145.8
Current Changes:				
Quantity	0.0	24.0	0.0	24.0
Schedule	0.0	-1.2	0.0	-1.2
Engineering	0.0	0.0	0.0	0.0
Estimating	-2.2	-77.3	-5.1	-84.6
Other	0.0	0.0	0.0	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	-2.2	-54.5	-5.1	-61.8
Total Changes	10.1	1050.5	23.4	1084.0
Current Estimate	31.3	2074.1	81.9	2187.3

13. [redacted] Cost Variance Analysis (Cont'd):

b. Previous Change Explanations --

RDT&E
Economic: revised economic escalation rates
Estimating: refinement of estimates; qualification of second source for LCAC construction; repricing of contract design requirements; revised program estimates; increase for additional program requirements; reduced R&D effort

Procurement
Economic: revised economic escalation rates
Quantity: addition of 9 craft in FY92 and associated advance procurement (AP); addition of 12 craft in FY93 and associated AP; addition of 12 craft in FY94 and associated AP; addition of 3 craft in FY92
Schedule: delay of 3 LCAC from FY85 to FY89; planned construction contract awarded 2 months early; rescheduling 9 craft from FY88-90 to FY91 and associated AP; AP associated with rescheduling FY88 craft; transfer of 9 craft from FY88 to FY90-92, 3 each year; rephasing 3 craft based on FY89 CONG from FY90 to FY89; rephasing 3 craft based on FY89 CONG from FY92 to FY89
Engineering: increase for arctic-configured LCAC
Estimating: adjustment for inflation; correction to prior constant dollar assumptions; congressional reduction to PM growth; reduction to engineering services; additional funding for conversion of contract from CPAF to FPI; revised program estimates; major commodity escalation adjustments; re-estimation of contractor provisioning material; second source planning; decrease due to program repricing; increase for contract cost growth; reductions for Gramm Rudman; transfer of contract design funds to RDT&E; actual execution; rephasing of LLTM and repricing based on FY85/86 contract award; increase to offset reduced AP in FY88; reduced LLTM requirements; reduced program estimate; increase based on contract option price; rephasing of program estimates; returned cost on completed program; transfer of CAS to inhouse; transfer of craft repair parts and CRAMLL from FY90 to FY89

Support: reduction to Outfitting and Post Delivery associated with rescheduling of craft; repricing of Outfitting and Post Delivery requirements; additional Post Delivery associated with new craft and rescheduled craft; increased Outfitting requirements for additional 9 craft in FY92 and for 9 rescheduled craft; reduction of Outfitting and Post Delivery for Gramm Rudman; actual execution; initial ACU 4 COSAL Buy; increase in Outfitting and Post Delivery for additional 27 craft; rephasing of Post Delivery requirements; returned Outfitting cost on completed program

MILCON:

Economic: revised economic escalation rates

Estimating: refinement of estimates; correction of prior constant dollar assumptions; addition of MILCON Projects; revised program estimates; rescheduling of MILCON projects

13. [redacted] Cost Variance Analysis (Continued):

c. Current Change Explanations	(Dollars in Millions) Base-Year $	Then-Year $
1) RDT&E		
ECONOMIC		
Revised Dec 89 econ. escalation rates	0.0	-0.2
ESTIMATING	-2.2	-2.6
Returned cost for completed craft	(-0.7)	(-0.8)
Reduced R&D effort	(-1.5)	(-1.8)
2) Procurement		
ECONOMIC		
Revised Dec 89 econ. escalation rates	0.0	84.1
QUANTITY		
Addition of two craft in FY90	24.0	33.1
SCHEDULE		
Rescheduling of (1) Ship in FY94 to FY90	-1.2	-4.8
ESTIMATING	-77.3	-115.2
Refinement of program estimate	(-10.9)	(-16.4)
Returned cost on completed craft	(0.6)	(0.7)
Gramm Rudman adjustment	(-3.2)	(-4.4)
Reduced LLTM requirements	(-11.6)	(-17.0)
Reduction of CFE spares	(-4.5)	(-7.0)
Multi-Year procurement savings	(-60.5)	(-90.5)
CAAS reduction	(-0.4)	(-0.8)
Increase to full funding to offset reduced AP	(10.5)	(16.0)
Increased cost associated with program closeout	(2.7)	(4.2)
SUPPORT	0.0	0.1
Returned outfitting cost on completed craft	(-0.6)	(-0.7)
Returned post delivery cost on completed craft	(-0.2)	(-0.2)
Rephasing of post delivery requirements and (2) additional craft	(0.8)	(1.0)
3) Milcon		
ECONOMIC		
Revised Dec 89 econ. escalation rates	0.0	3.4
ESTIMATING	-5.1	-10.0
Refinement of program estimates	(-2.1)	(-3.4)
Rephasing of program estimates	(2.2)	(2.3)
Reduction of MILCON projects	(-5.2)	(-8.9)

14. [redacted] Program Acquisition Unit Cost (PAUC) History:

(Then-Year Dollars in Millions)

a. Initial SAR Estimate to Current Baseline Estimate -- (Same as Current Baseline Estimate)

b. Current Baseline Estimate to Current Estimate --

PAUC (Pde Estimate)	Changes								PAUC (Current Estimate)
	Econ	Qty	Sched	Eng	Est	Other	Spt	Total	
26.8	-3.6	0.2	0.3	0.0	2.3	0.0	0.7	-0.1	26.7

15. Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E -- N/A

b. (U) Procurement --

LCAC (24-33)
Textron Marine Systems,
New Orleans, LA
N00024-87-C-2096, FPI
Award: July 1, 1987
Definitized: July 1, 1987

Initial Contract Price		
Target	Ceiling	Qty
$166.6	$181.8	10

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$167.5	$182.7	10	$167.5	$167.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-4.2	$+16.6
Cumulative Variances to Date (11/26/89)	$-8.2	$+10.3
Net Change	$-4.0	$- 6.3

Explanation of Change: The unfavorable cost variance is a result of earnings adjustments for labor and overhead, due to the over progressing of Test and Support activities. The favorable schedule variance is identified with early transfer of Material, however, the net change to schedule variance results from deterioration to ahead of schedule construction. The Program Manager's assessment takes into consideration the above variance.

LCAC (15-17, 19-20, 22-23)
Avondale Gulfport Marine, Inc.
Gulfport, MS
N00024-87-C-2089, FPI
Award: July 1, 1987
Definitized: July 1, 1987

Initial Contract Price		
Target	Ceiling	Qty
$115.2	$122.9	7

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$115.5	$123.2	7	$111.3	$115.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+1.5	$-0.9
Cumulative Variances To Date (11/24/89)	$+4.6	$-4.6
	$+3.1	$-3.7

Explanation of Change: The favorable change in cost variance is identified with cost saving in low value and major Material items, also completing work for less cost than originally planned. The unfavorable schedule variance is identified with late delivery of major Material items. The Program Manager's assessment take into consideration the above variance.

15. (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

b. (U) Procurement --

	Initial Contract Price		
LCAC (37-48)	Target	Ceiling	Qty
Textron Marine Systems New Orleans, LA N00024-89-C-2028, FPI Award: December 13, 1988 Definitized: December 13, 1988	$132.4	$144.6	12

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$132.4	$144.6	12	$128.1	$132.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances to Date (11/26/89)	$+0.4	$+1.3
Net Change	$+0.4	$+1.3

Explanation of Change: The favorable cost variance is identified with Level of Effort labor activities not being performed at the planned budget level. The favorable schedule variance is identified with material. The Program Manager's assessment takes into consideration the above variance.

	Initial Contract Price		
LCAC (34-36)	Target	Ceiling	Qty
Avondale Gulfport Marine, Inc. Gulfport, MS N00024-89-C-2110, FPI Award: December 13, 1988 Definitized: December 13, 1988	$ 42.6	$ 44.8	3

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 42.6	$ 44.8	3	$42.6	$42.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances to Date (11/24/89)	$+1.0	$+ .5
Net Change	$+1.0	$+ .5

Explanation of Change: The favorable cost variance is the result of labor and overhead for support groups being less than budgeted, combined with Level of Effort support start later than planned. The favorable schedule variance is identified with material Progress Payment and earlier than planned procurement. The Program Manager's assessment takes into consideration the above variance.

15. [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

b. [redacted] Procurement --

LCAC (52-60) 1/
Textron Marine Systems
New Orleans, LA
N00024-89-C-2028, FPI
Award: December 22, 1989
Definitized: December 22, 1989

Initial Contract Price		
Target	Ceiling	Qty
$104.2	$112.8	9

Current Contract Price		
Target	Ceiling	Qty
$104.2	$112.8	9

Estimated Price At Completion	
Contractor	Program Manager
*	$104.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (12/31/89)		
Net Change		

Explanation of Change: None

* First Cost Performance Report not required until 60 days after contract award.

LCAC (49-51) 1/
Avondale Gulfport Marine, Inc.
Gulfport, MS
N00024-89-C-2110, FPI
Award: December 22, 1989
Definitized: December 22, 1989

Initial Contract Price		
Target	Ceiling	Qty
$ 39.1	$ 41.1	3

Current Contract Price		
Target	Ceiling	Qty
$ 39.1	$ 41.1	3

Estimated Price At Completion	
Contractor	Program Manager
*	$ 39.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (12/31/89)		
Net Change		

Explanation of Change: None

* First Cost Performance Report not required until 60 days after contract award.

1/ Added

c. [redacted] MILCON -- N/A

16. [redacted] Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 70.0% (14 yrs/ 20 yrs)

(2) Percent Program Cost Appropriated: 58.4% ($1669.9/$2860.1)

b. Appropriation Summary
(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY77-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-96)	Total
RDT&E	30.7	0.0	0.0	0.0	30.7
Procurement	1307.4	273.8	270.1	870.8	2722.1
Milcon	56.2	1.4	22.7	27.0	107.3
TOTAL	1394.3	275.2	292.8	897.8	2860.1

16. [redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY82 Dollars		Total Base Year $	Total Then-Year $			Escal Rate %
		NonRec	Rec		Program	Oblig	Expend	
APPROPRIATION: RDT&E								
1977	0	0.0	0.0	0.3	0.2	0.2	0.2	2.58
1978	0	0.0	0.0	2.1	1.5	1.5	1.5	6.80
1979	0	0.0	0.0	1.9	1.5	1.5	1.5	8.40
1980	0	0.0	0.0	9.2	8.2	8.2	8.2	10.59
1981	0	0.0	0.0	4.8	4.7	4.7	4.7	10.61
1982	0	0.0	0.0	5.2	5.3	5.3	5.3	7.60
1983	0	0.0	0.0	1.0	1.1	1.1	1.1	4.90
1984	0	0.0	0.0	0.8	0.9	0.9	0.9	3.80
1985	0	0.0	0.0	0.5	0.6	0.6	0.6	3.40
1986	0	0.0	0.0	2.6	3.1	3.1	2.5	2.80
1987	0	0.0	0.0	2.1	2.6	2.6	2.4	2.70
1988	0	0.0	0.0	0.8	1.0	0.9	0.5	3.00
1989	0	0.0	0.0	0.0	0.0	0.0	0.0	4.20
1990	0	0.0	0.0	0.0	0.0	0.0	0.0	4.00
1991	0	0.0	0.0	0.0	0.0	0.0	0.0	4.20
1992	0	0.0	0.0	0.0	0.0	0.0	0.0	4.00
Subtotal	0	0.0	0.0	31.3	30.7	30.6	29.4	----

16. [redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY82 Dollars		Total Base Year $	Total Then-Year $			Escal Rate %
		NonRec	Rec		Program	Oblig	Expend	
APPROPRIATION: Procurement								
1981	0	0.0	0.0	50.6	53.5	53.5	51.5	9.60
1982	3	55.0	98.1	106.2	115.6	115.5	113.5	7.50
1983	3	0.0	66.1	66.1	69.9	69.8	67.9	3.80
1984	6	0.0	120.1	150.6	169.3	168.7	155.7	3.60
1985	9	0.0	193.2	225.8	258.4	251.9	207.1	2.10
1986	12	0.0	233.2	229.5	270.9	255.3	162.7	1.00
1987	0	0.0	0.0	22.7	25.5	25.1	22.3	1.50
1988	0	0.0	0.0	30.2	38.3	36.3	5.7	2.50
1989	15	0.0	243.0	230.2	306.0	280.1	16.6	2.80
1990	12	0.0	193.3	198.9	273.8	231.2	0.0	4.00
1991	12	0.0	187.8	189.4	270.1	0.0	0.0	4.20
1992	12	0.0	191.2	196.8	289.6	0.0	0.0	4.00
1993	12	0.0	191.2	193.5	293.9	0.0	0.0	3.70
1994	11	0.0	190.8	177.6	278.3	0.0	0.0	3.40
1995	0	0.0	0.0	3.5	5.2	0.0	0.0	3.10
1996	0	0.0	0.0	2.5	3.8	0.0	0.0	3.10
Subtotal	107	55.0	1908.0	2074.1	2722.1	1487.4	803.0	----

16. [redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY82 Dollars		Total Base Year $	Total Then-Year $			Escal Rate %
		NonRec	Rec		Program	Oblig	Expend	
APPROPRIATION: MILCON								
1984	0	0.0	0.0	18.2	20.8	19.5	19.5	3.80
1985	0	0.0	0.0	16.5	19.4	18.0	18.0	3.40
1986	0	0.0	0.0	13.2	16.0	16.0	15.0	2.80
1987	0	0.0	0.0	0.0	0.0	0.0	0.0	2.70
1988	0	0.0	0.0	0.0	0.0	0.0	0.0	3.00
1989	0	0.0	0.0	0.0	0.0	0.0	0.0	4.20
1990	0	0.0	0.0	1.0	1.4	0.0	0.0	4.00
1991	0	0.0	0.0	15.5	22.7	0.0	0.0	4.20
1992	0	0.0	0.0	11.6	17.5	0.0	0.0	4.00
1993	0	0.0	0.0	0.0	0.0	0.0	0.0	3.70
1994	0	0.0	0.0	5.9	9.5	0.0	0.0	3.40
1995	0	0.0	0.0	0.0	0.0	0.0	0.0	3.10
1996	0	0.0	0.0	0.0	0.0	0.0	0.0	3.10
Subtotal	0	0.0	0.0	81.9	107.3	53.5	52.5	----
TOTAL	107	55.0	1908.0	2187.3	2860.1	1571.5	884.9	----

16. [redacted] Production Rate Data:

a. Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Dev. Estimate	Prod. Estimate	Current Estimate	Maximum
1982	N/A	3	3	3
1983	N/A	3	3	3
1984	N/A	6	6	6
1985	N/A	12	9	9
1986	N/A	12	12	12
1987	N/A	12	0	12
1988	N/A	12	0	15
1989	N/A	0	15	15
1990	N/A	0	12	15
1991	N/A	0	12	15
1992	N/A	0	12	15
1993	N/A	0	12	0
1994	N/A	0	11	0
1995	N/A	0	0	0
1996	N/A	0	0	0

b. Cost Variance (Dollars in Millions)

Item		Prod. Estimate	Variance (CE less Pde)	Current Estimate	Variance (CE less Max)	Maximum
Prog Acq Cost	(BY $)	1103.3	+1084.0	2187.3	-196.6	2383.9
	(TY $)	1610.7	+1249.4	2860.1	-159.6	3019.7
PAUC	(BY $)	18.4	+2.0	20.4	+0.5	19.9
	(TY $)	26.8	-0.1	26.7	+1.5	25.2

17. [redacted] Production Rate Data (Cont'd):

d. Schedule Variance --

Item	Prod. Estimate	Variance (CE less Pde)	Current Estimate	Variance (CE less Max)	Maximum
Start Date (Mo/Yr)	02/82	---	02/82	---	02/82
Duration (in Months)	110	+73	183	+28	155
Start Date (Mo/Yr)	04/91	+73	05/97	+28	01/95

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	0/ 0
Procurement	19/17

e. Approved Design to Cost Goal -- (Average Unit Sailaway Cost)

	Dev. Estimate	Current Estimate	Latest Approved Threshold
@ Qty 107 - @ Peak Rate: 6/yr			
FY82 Base-Year $	16.372	18.346	20.237
Then-Year $	24.332	24.233	25.912
@ Qty 12 (1st Three Years) - @ Peak Rate: 6/yr			
FY82 Base-Year $	23.775	28.275	28.817
Then-Year $	29.942	30.867	31.742

18. [redacted] Operating and Support Cost:

a. Assumptions and Ground Rules -- N/A

b. Costs -- N/A

c. Contractor Support Costs --

	FY 1988	FY 1989	FY 1990	FY 1991	TOTAL
O&M,N	0.8	0.7	0.6	0.7	2.8
Industrial Fund (NIF)	0.0	0.0	0.0	0.0	0.0
	0.8	0.7	0.6	0.7	2.8

SAR-89-026

~~CONFIDENTIAL~~

N-22 LHD 1

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)

PROGRAM: LHD 1 CLASS

AS OF DATE: December 31, 1989

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AS AMENDED

MAR 21 1990

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(b)(1)

1. (U) Designation/Nomenclature (Popular Name): LHD 1/Amphibious Assault Ship

2. (U) DOD Component: U. S. Navy

3. (U) Responsible Office and Telephone Number:

Amphibious Warfare and Strategic Sealift Program Office (PMS377)
Naval Sea Systems Command
Washington, D.C. 20362-5105

PM: Mr. E. E. Shoults
Assigned: April 29, 1985
AV 332-8511; COMM (703) 602-8511

4. (U) Program Elements/Procurement Line Items:

RDT&E: PE 0603564N Project 0408 (Shared funding)
PE 0604567N Project S0857, 01803 (Shared funding)

PROCUREMENT: APPN 1611N ICN 3035

5. (U) Related Programs: Landing Craft, Air Cushion (LCAC)

~~Classified by: OPNAVINST S5513.3B-08~~
~~Declassify on: Originating Agency Determination Required (OADR)~~
~~Downgrade Instructions: Not subject to Automatic Downgrade~~

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6. [redacted] Mission and Description: The ships primary amphibious mission is to embark, deploy and land elements of a Marine landing force in an assault by helicopters, landing craft, amphibious vehicles, and by combinations of these methods. LHD 1 Class has a secondary/convertible mission for sea control and power projection.

7. [redacted] Program Highlights:

a. [redacted] Significant Historical Developments -- The LHD program began in FY 1981 as part of an overall program to address impending block obsolescence of the Navy's amphibious lift capability. In June 1981, SECNAV proposed that the LHD have a convertible sea control mission; and, in November, directed that the Program be a modified LHA design.

A detail design and construction contract was awarded to Ingalls Shipbuilding Incorporated (ISI) in February 1984 for the Lead Ship. Construction began in September 1984 and the ship was launched in August 1987.

A single-ship contract for LHD 2, with options for LHD 3 and 4, was awarded to ISI in September 1986. Construction on LHD 2 began in July 1988.

Planning for LHD 5 commenced in April 1988.

b. [redacted] Significant Development Since Last Report -- LHD 1 Acceptance Trials were conducted in March 1989 and the ship was delivered to the Navy on 5 May 1989. Underway Replenishment Ship Qualification Trials and LHD/LCAC Interface trials were successfully completed in October 1989. The Combat System Ship Qualification Trial was conducted during October and November 1989. LHD 1 Final Contract Trials were held in December 1989.

In March 1989, the Keel was laid for LHD 2 and construction began on LHD 3. At years end, LHD 2 and LHD 3 were approximately 40% and 5% complete, respectively.

The LHD 5 contract design is underway with ISI, the lead-ship contractor, performing a significant amount of the effort under a contract awarded 22 August 1989.

The LHD 5 contract design is a LHD 2-4 steam repeat with operational and warfighting improvements.

The LHD 1 program has been shown to satisfy the mission requirement.

c. (U) Changes Since "As Of" Date -- None

8. (U) Threshold Breaches: There are currently no DAE baseline (dated 31 December 1988) breaches.

9. (U) Schedule:

a. (U) Milestones --

	Development Estimate	Approved Program	Current Estimate
(U) Milestone I	Oct 81	Oct 81	Oct 81
(U) Milestone II SAIP	Jul 82	Jul 82	Jul 82
(U) Start Contract Design	Aug 82	Aug 82	Aug 82
(U) Milestone IIIA Prod - Decision	Jun 83	Jun 83	Jun 83
(U) Award Lead Ship - Contract	Dec 83	Feb 84	Feb 84
(U) Milestone IIIB Prod - Decision	Jul 85	Aug 85	Aug 85
(U) Approval Full - Production (AFP)	Aug 85	Aug 85	Aug 85
(U) Launch First Ship	Aug 87	Aug 87	Aug 87
(U) Acceptance Trials - (Lead Ship)	Feb 89	Feb 89	Mar 89 (CH-1)
(U) Lead Ship Delivery	Mar 89	Mar 89	May 89 (CH-1)
(U) Material Support Date	Mar 89	Mar 89	Jul 89 (CH-2)
(U) Naval Support Date	May 90	May 90	Oct 90 (CH-2)
*(U) Initial Operational - Capability	(b)(1) [redacted]		(CH-3)

*IOC - Reflects date the lead ship is ready for operational deployment.

b. (U) Previous Change Explanations --

The contract award date for the LHD 1 Class Lead Ship was updated to reflect actual date of Feb 28, 1984. Original date for the Initial Operating Capability for the LHD was improperly calculated. The SAR was updated to reflect correct data.

c. (U) Current Change Explanation --

(U) (CH-1) Initial Builders Trials (BT) were not fully successful causing the shipbuilder to schedule a second BT at a later date which resulted in a one month delay of the Acceptance Trials (AT) (Feb 89 to Mar 89) and a six week delay (Mar 89 to May 89) for the delivery date.

(U) (CH-2) Due to late receipt of Provisioning Technical Documentation from the contractor, the Material Support Date was rescheduled from Mar 89 to Jul 89 and Naval Support Date was rescheduled from May 90 to Oct 90.

(U) (CH-3) (b)(1) [redacted]

d. (U) References --

Development Estimates: Top Level Requirements (TLR) dated 8 December 1983, CNO Ser 03/C387632 dated 2 December 1982

Approved Program: DAE Baseline approved 31 December 1988.

10. (U) Technical/Operational Characteristics:

a. (U) Technical --	DEV Est	Approved Program Goal/threshold	Demonstrated Perf 1/	Current Estimate
(U) Troops	1,873	1,873/1,873	1,873	1,873
(U) Vehicle Square (ft^2)	22,900	22,900/22,900	22,900	22,900
(U) Cargo Cube (ft^3)	109,000	109,000/109,000	109,000	109,000
(U) LCAC	3	3/3	3	3
(U) Length (ft)	840	840/844	844	844
(U) Beam (ft)	106	106/106	106	106
(U) Draft (Full Load) (ft)	26'	26'/26'	26'8"	26'8"
(U) Displacement (Full Load)	39,400	39,400/40,533	40,533	40,533
(U) Offload Capability (Tons/Hr	300	300/300	300	300
(U) Propulsion	Steam	Steam/Steam	Steam	Steam
(U) Shaft HP/No. Screws	70,000/2	70,000/2	70,000/2	70,000/2
(U) Medical Facilities	6 ORs	6 ORs/6 ORs*	6 ORs	6 ORs

b. (U) Operational --	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
(U) Speed (Kts)	22	22/22	22	22
(U) Endurance	(b)(1)			
(U) @ 22 Kts				
(U) Armament				
- Close in Weapon System	3	3/3	3	3
- Self Defense Missile System	2	2/2	2	2

c. (U) Previous Change Explanations --

The 26/39,400 draft and displacement estimates were figures provided during the design development phase. The 26'8" and 40,533 reflects the full load weight estimate at the completion of the Contract Design.

d. (U) Current Change Explanations -- None.

e. (U) References --

Development Estimate: SECNAV Memo dated 2 December 1982, subject "LHD 1 Class Amphibious Assault Ship SAIP"; LHD 1 Class NDCP dated 15 August 1985

Approved Program: DAE Baseline approved 31 December 1988.

* Operating Room (ORs)

1/ Demonstrated performance values reflect results of Acceptance Trials 6-9 Mar 89; Performance and Special Trials 6-10 Jul 89; LCAC Interface Trials 23-29 Oct 89; and Combat System Ship Qualification Trials 26-30 Oct 89.

[redacted] Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost			
Development (RDT&E)	39.9	48.9	43.6
Procurement (SCN)	2891.9	4756.8	4685.5
(Sailaway)	(2794.9)	(4541.7)	(4479.9)
(Ship System)	(10.1)	(11.5)	(11.5)
(Initial Spares)	(9.3)	(10.6)	(10.6)
(Outfitting/Post Delivery)	(77.6)	(193.0)	(183.5)
Total FY82 Base-Year $	2931.8	4805.7	4729.1
Escalation	1519.2	1269.0	1356.8
Development (RDT&E)	(3.7)	(6.0)	(5.9)
Procurement (SCN)	(1515.5)	(1263.0)	(1350.9)
Total Then-Year $	4451.0	6074.7	6085.9 *

* Excludes $41.5M FY94 advance procurement for the FY95 ship.

b. Quantities			
Development (RDT&E)	0	0	0
Procurement (SCN)	3	6	6
Total	3	6	6

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Development Estimate: SECNAV Memo dated 2 December 1982, Subject "LHD 1 Class amphibious assault ship SAIP"; LHD 1 Class NDCP dated 15 August 1985.

Approved Program: DAE Baseline approved 31 December 1988

12. [redacted] Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition --	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR
(1) Cost	6085.9	6074.7	6085.9
(2) Quantity	6	6	6
(3) Unit Cost	1014.3	1012.5	1014.3
b. Current Procurement --	(FY 90)	(FY90 APPN)	(FY 91)
(1) Cost	49.0	49.0	969.1
Less CY Adv Proc	-34.6	-34.6	0.0
Plus PY Adv Proc	0.0	0.0	34.6
Less OF/PD	-14.4	-14.4	-9.3
Less PY Escal	0.0	0.0	0.0
Net Total	0.0	0.0	994.4
(2) Quantity	0	0	1
(3) Unit Cost	0.0	0.0	994.4

III. (U) Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	43.6	4407.4	0.0	4451.0
Previous Changes:				
Economic	-0.3	-1518.0	0.0	-1518.3
Quantity	0.0	4005.5	0.0	4005.5
Schedule	0.0	-206.8	0.0	-206.8
Engineering	0.0	0.0	0.0	0.0
Estimating	11.6	-796.0	0.0	-784.4
Other	0.0	0.0	0.0	0.0
Support	0.0	127.7	0.0	127.7
Subtotal	11.3	1612.4	0.0	1623.7
Current Changes:				
Economic	0.3	149.1	0.0	149.4
Quantity	0.0	0.0	0.0	0.0
Schedule	4.5	-22.3	0.0	-17.8
Engineering	0.0	67.9	0.0	67.9
Estimating	-10.2	-170.8	0.0	-181.0
Other	0.0	0.0	0.0	0.0
Support	0.0	-7.3	0.0	-7.3
Subtotal	-5.4	16.6	0.0	11.2
Total Changes	5.9	1629.0	0.0	1634.9
Current Estimate	49.5	6036.4	0.0	6085.9

Cost Variance Analysis (Continued):

a. Summary -- (FY 1982 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	39.9	2891.9	0.0	2931.8
Previous Changes:				
Quantity	0.0	2528.9	0.0	2528.9
Schedule	0.0	-168.0	0.0	-168.0
Engineering	0.0	0.0	0.0	0.0
Estimating	9.0	-571.2	0.0	-562.2
Other	0.0	0.0	0.0	0.0
Support	0.0	75.2	0.0	75.2
Subtotal	9.0	1864.9	0.0	1873.9
Current Changes:				
Quantity	0.0	0.0	0.0	0.0
Schedule	3.4	7.4	0.0	10.8
Engineering	0.0	46.5	0.0	46.5
Estimating	-8.7	-122.2	0.0	-130.9
Other	0.0	0.0	0.0	0.0
Support	0.0	-3.0	0.0	-3.0
Subtotal	-5.3	-71.3	0.0	-76.6
Total Changes	3.7	1793.6	0.0	1797.3
Current Estimate	43.6	4685.5	0.0	4729.1

13. [redacted] Cost Variance Analysis (Cont'd):

b. Previous Change Explanations --

RDT&E
Economic: revised economic escalation rates
Estimating: revised program estimates; addition of contract design funds; repricing of program requirements; increase in R&D effort; revised estimate to complete contract design

Procurement
Economic: revised economic escalation rates
Quantity: addition of 1 ship in FY90; addition of 1 ship in FY93; AP associated with addition of 1 ship in FY93
Schedule: rescheduling FY90 ship to FY91; changing the acquisition strategy from an annual to multiyear procurement; slip of (1) ship from FY91 to FY92
Estimating: revised program estimates; adjustment due to a Program Budget Decision; revised estimates for multiyear procurement; major commodity escalation adjustment; contract design requirements; CSS/CAAS reductions; favorable contract negotiations; profit reduction; reduction due to Gramm Rudman cut; repricing of the FY91 program; transfer of contract design funds from SCN to RDT&E; actual execution; GFE and other repricing; escalation savings; increase to cover cost overrun and additional cosal requirements; transfer FY91 AP to FY92 full funding; transfer FY91 AP to FY92 AP; transfer of CAS to inhouse
Support: revised Outfitting and Post Delivery estimates; addition of Outfitting and Post Delivery for new ship; revised Outfitting and Post Delivery estimates associated with rescheduling of ship; repricing of Outfitting and Post Delivery requirements; increased Outfitting and Post Delivery to support FY93 ship; rephasing of Outfitting requirements based on Lead Ship

. [redacted] Cost Variance Analysis (Continued):

c. Current Change Explanations

1) RDT&E	(Dollars in Millions) Base-Year $	Then-Year $
ECONOMIC		
Revised Dec 89 Econ. Escalation Rates	0.0	0.3
SCHEDULE		
Rephasing of R&D to accomodate rescheduling of FY92 ship to FY91	3.4	4.5
ESTIMATING	-8.7	-10.2
Refinement of program estimates	(-0.5)	(-0.3)
Returned cost on completed program	(-5.1)	(-5.4)
Reduction in R&D requirements for contract design	(-3.1)	(-4.5)
2) Procurement		
ECONOMIC		
Revised Dec 89 Econ. Escalation Rates	0.0	149.1
SCHEDULE	7.4	-22.3
AP associated with rescheduling of (1) ship from FY92 to FY91	(0.3)	(-0.8)
Rescheduling of (1) ship from FY92 to FY91	(7.1)	(-21.5)
ENGINEERING		
Increase based on configuration for combat and ship system improvement	46.5	67.9
ESTIMATING	-122.2	-170.8
Refinemet of program estimates	(-4.7)	(-5.2)
Returned cost on completed program	(-17.8)	(-19.4)
Revised Program Estimate	(0.3)	(-0.7)
Gramm Rudman adjustment	(-8.6)	(-11.0)
Multi-year procurement savings	(-78.6)	(-116.1)
CAAS reduction	(-11.6)	(-16.6)
GFE repricing	(-1.2)	(-1.8)
SUPPORT	-3.0	-7.3
Increased post delivery to cover trial card deficiencies on LHD 1	(0.9)	(1.1)
Returned cost for outfitting on completed programs	(-2.8)	(-3.2)
Rephasing of outfitting requirements assoc. with rescheduling of FY92 ship to FY91	(-1.1)	(-5.2)

14. [redacted] Program Acquisition Unit Cost (PAUC) History:

(Then-Year Dollars in Millions)

a. Initial SAR Estimate to Current Baseline Estimate --
(Same as Current Baseline Estimate)

b. Current Baseline Estimate to Current Estimate --

PAUC (Pde Estimate)	Changes								PAUC (Current Estimate)
	Econ	Qty	Sched	Eng	Est	Other	Spt	Total	
1483.7	-228.1	-74.4	-37.4	11.3	-160.9	0.0	20.1	-469.4	1014.3

15. [redacted] Contract Information: (Then-Year Dollars in Millions)

a. ([redacted]) RDT&E -- N/A

b. ([redacted]) Procurement --

LHD 1	Initial Contract Price Target	Ceiling	Qty
Ingalls Shipbuilding, Inc., Pascagoula, MS N00024-82-C-2260, FPI Award: February 28, 1984 Definitized: February 28, 1984	$962.1	$1150.8	1

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$1023.8	$1226.3	1	$1028.4	$1028.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-57.9	$-13.0
Cumulative Variances to Date (12/24/89)	$-80.7	$- 4.0
Net Change	$-22.8	$+ 9.0

Explanation of Change: The unfavorable cost and schedule variances are due to the inefficiencies in construction labor. The increased negative cost variance results from construction labor hours needed to complete work prior to delivery (5/89) and associated overhead. The decrease in the negative schedule variance results from the contractor having delivered LHD 1. The Program Manager's assessment takes into consideration the above variance. This contract will not be reported in future SARs.

LHD 2 1/	Initial Contract Price Target	Ceiling	Qty
Ingalls Shipbuilding, Inc., Pascagoula, MS N00024-86-C-2005, FPI Award: September 10, 1986 Definitized: September 10, 1986	$401.3	$453.3	1

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$471.0	$531.7	1	$525.7	$525.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+ 1.4	$- 9.2
Cumulative Variances To Date (12/24/89)	$- 9.6	$+ 3.2
Net Change	$-11.0	$+12.4

15. [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

Explanation of Change: The unfavorable cost variance is a result of the contractor experiencing cost growth in material. Material is anticipated to overrun at completion. The favorable schedule variance is related to the purchasing of material ahead of schedule. The Program Manager's assessment remains at ceiling for construction and target price for Long Lead Time Material and is within approved funding. Based on Program Manager's estimate, in addition to absorbing profit, a loss of $114.2M will be incurred.

LHD 3 1/	Initial Contract Price Target	Ceiling	Qty
Ingalls Shipbuilding, Inc., Pascagoula, MS N00024-86-C-2005, FPI Award: November 20, 1987 Definitized: November 20, 1987	$380.4	$409.2	1

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$393.2	$423.1	1	$423.1	$423.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-7.9	$- 0.4
Cumulative Variances to Date (12/24/89)	$-8.8	$-21.6
Net Change	$- .9	$-21.2

Explanation of Change: The unfavorable cost variance is identified with material payments being greater than planned. Material is anticipated to overrun at completion. The cumulative and net change in the negative schedule variance is a result of contractor not properly time phasing the material baseline. Based on Program Manager's estimate, in addition to absorbing profit, a loss of $ 87.1M will be incurred.

LHD 4 1/	Initial Contract Price Target	Ceiling	Qty
Ingalls Shipbuilding, Inc. Pascagoula, MS N00024-86-C-2005, FPI Award: October 3, 1988 Definitized: October 3, 1988	$366.9	$391.4	1

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$378.9	$404.5	1	$404.5	$404.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances to Date (12/24/89)	$-5.8	$+6.8
Net Change	$-5.8	$+6.8

15. [redacted] Contract Information (Cont'd) : (Then-Year Dollars in Millions)

Explanation of Change: The unfavorable cost variance is identified with material payments being greater than planned, material is anticipated to overrun at completion. The favorable schedule variance is identified with purchasing, receipt, and allocation of material earlier than originally planned. The Program Manager's assessment remains at ceiling and is within approved funding. Based on Program Manager's estimate, in addition to absorbing profit, a loss of $84.6M will be incurred.

1/ The LHD 2, 3, and 4 contracts are currently budgeted to ceiling.

c. [redacted] MILCON -- N/A

[redacted] Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 55.6% (10 yrs/ 18 yrs)

(2) Percent Program Cost Appropriated: 64.5% ($3927.9/$6085.9)

b. Appropriation Summary
(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY81-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-98)	Total
RDT&E	39.7	7.8	2.0	0.0	49.5
Procurement	3831.4	49.0	969.1	1186.9	6036.4
TOTAL	3871.1	56.8	971.1	1186.9	6085.9

16. [redacted] Program Funding Summary: (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY82 Dollars		Total Base Year $	Total Then-Year $			Escal Rate %
		NonRec	Rec		Program	Oblig	Expend	
APPROPRIATION: RDT&E								
1981	0	0.0	0.0	0.9	0.9	0.9	0.9	10.61
1982	0	0.0	0.0	11.1	11.4	11.4	11.1	7.60
1983	0	0.0	0.0	17.9	19.2	19.2	18.8	4.90
1984	0	0.0	0.0	0.8	0.9	0.9	0.9	3.80
1985	0	0.0	0.0	1.7	2.0	2.0	1.9	3.40
1986	0	0.0	0.0	0.3	0.4	0.4	0.4	2.80
1987	0	0.0	0.0	0.5	0.6	0.6	0.5	2.70
1988	0	0.0	0.0	0.6	0.8	0.8	0.7	3.00
1989	0	0.0	0.0	2.7	3.5	1.0	0.4	4.20
1990	0	0.0	0.0	5.7	7.8	2.0	0.0	4.00
1991	0	0.0	0.0	1.4	2.0	0.0	0.0	4.20
1992	0	0.0	0.0	0.0	0.0	0.0	0.0	4.00
Subtotal	0	0.0	0.0	43.6	49.5	39.2	35.6	----

[redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY82 Dollars		Total Base Year $	Total Then-Year $			Escal Rate %
		NonRec	Rec		Program	Oblig	Expend	
APPROPRIATION: Procurement								
1982	0	0.0	0.0	41.3	45.0	45.0	44.9	7.50
1983	0	0.0	0.0	48.6	53.7	53.7	53.0	3.80
1984	1	150.0	1084.0	1168.3	1317.5	1281.7	1220.9	3.60
1985	0	0.0	0.0	34.0	39.2	39.2	30.5	2.10
1986	1	0.0	727.2	693.7	822.0	697.2	398.1	1.00
1987	0	0.0	0.0	29.3	35.8	35.8	19.5	1.50
1988	1	0.0	588.6	593.3	759.1	606.0	183.0	2.60
1989	1	0.0	573.2	573.7	759.1	518.7	55.3	2.80
1990	0	0.0	0.0	36.8	49.0	0.0	0.0	4.00
1991	1	0.0	697.5	679.6	969.1	0.0	0.0	4.20
1992	0	0.0	0.0	54.5	76.3	0.0	0.0	4.00
1993	1	0.0	659.4	658.0	998.3	0.0	0.0	3.70
1994	0	0.0	0.0	20.1	28.8	0.0	0.0	3.40
1995	0	0.0	0.0	14.2	21.0	0.0	0.0	3.10
1996	0	0.0	0.0	23.4	35.6	0.0	0.0	3.10
1997	0	0.0	0.0	3.7	5.8	0.0	0.0	3.10
1998	0	0.0	0.0	13.0	21.1	0.0	0.0	3.10
Subtotal	6	150.0	4329.9	4685.5	6036.4	3277.3	2005.2	----
Total	6	150.0	4329.9	4729.1	6085.9	3316.5	2040.8	----

17. (U) Production Rate Data: N/A

18. (U) Operating and Support Cost:

a. N/A

b. N/A

c. Contractor Support Costs -- N/A

SAR-89-028

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N-23 LSD 41

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)

PROGRAM: LSD 41 CLASS

AS OF DATE: December 31, 1989

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AS AMENDED

MAR 2 1 1990

Chief of ... Navy

90 C0659

1. (U) Designation/Nomenclature (Popular Name): LSD 41 Class/Dock Landing Ship

2. (U) DOD Component: U. S. Navy

3. (U) Responsible Office and Telephone Number:

Amphibious Warfare and Strategic Sealift Program Office (PMS377)
Naval Sea Systems Command
Washington, DC 20362-5101

PM: Mr. E. E. Shoults
Assigned: April 29, 1985
AV 332-8511; COMM (703) 602-8511

4. (U) Program Elements/Procurement Line Items:

RDT&E: PE 0603564N Project 00408 (Shared funding)
PE 0603567N Project 00408 (Shared funding)
PE 0604567N Project 01803, S0857 (Shared funding)

PROCUREMENT: APPN 1611N ICN 3030

5. (U) Related Programs: LCAC, LSD 41 CV

~~Classified by: OPNAVINST S5513.3B-41~~
~~Declassify on: Originating Agency's Determination Required (OADR)~~
~~Downgrade Instructions: Not subject to Automatic Downgrade~~

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6. (U) Mission and Description: To conduct sustained combat operations, to gain/maintain sea control. To project naval power ashore by transporting landing force elements, landing craft, Landing Craft, Air Cushion (LCAC) and assault amphibians to the objective area, launching preloaded assault craft and amphibians to support amphibious assault and to operate in the amphibious warfare environment. The Dock Landing Ship (LSD 41) is a twin-screw, 22 knot, diesel propelled amphibious assault ship, with an overall length of 609 feet and a maximum beam of 84 feet. It also has accommodations for a total of 917 (413 crew and 504 troops, which includes 102 surge troops).

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- An Operational Requirement (OR) (OR-0863-AW) for a Dock Landing Ship (LSD 41) was established by the Chief of Naval Operations (CNO) on 2 November 1976. On 1 November 1978, the Secretary of Navy approved the Contract Design Characteristics. On 16 January 1981, Milestone III was approved. The Lead Ship Detail Design and Construction contract was awarded to Lockheed on 9 February 1981, with the first follow-ship awarded on 26 March 1982 and the second follow-ship 27 January 1983. On 21 November 1983, the Navy competitively awarded a Fixed Price Incentive contract to Avondale Industries, Inc. for construction of the LSD 44. An option for LSD 45 and 46 construction was executed on 26 November 1984 and the final option for LSD 47 and 48 construction was executed on 11 December 1985.

On 8 November 1984 the LSD 41 contract was re-negotiated from Cost Plus Award Fee (CPAF) to Cost Plus Fixed Fee (CPFF) with ceiling limiting the government's liability for the overrun to $38.0M. The LSD 42 contract was converted from a CPAF to Fixed Price Incentive (FPI) with a 50/50 share ratio. LSD 43 was completed under a FPI contract. LSD 41-43 have been delivered to the Navy.

b. (U) Significant Development Since Last Report -- LSD 44 was delivered to the Navy on 24 February 1989. LSD 44-48 contract was renegotiated from a FPI contract to a Firm Fixed Price (FFP) contract on 20 June 1989. LSD 44 Final Contract Trials were conducted in November 1989 followed by successful conduct of Shock Trials in December 1989. LSD 45 Builders Trials were conducted in September 1989 and Acceptance Trials in November 1989.

The LSD 41 program has been shown to satisfy the mission requirement.

c. (U) Changes Since "As Of" Date -- None

8. [redacted] Threshold Breaches: There are currently no DAE baseline (dated 31 December 1988) threshold breaches.

9. [redacted] Schedule:

a. ([redacted]) Milestones --

	Production Estimate	Approved Program	Current Estimate
([redacted]) Milestone I	N/A	Jul 77	Jul 77
([redacted]) SAIP Approval	Nov 78	Nov 78	Nov 78
([redacted]) Approval for - Production	Jan 81	Jan 81	Jan 81
([redacted]) Lead Ship Award	Feb 81	Feb 81	Feb 81
([redacted]) Launch Lead Ship	Jun 83	Jun 83	Jun 83
([redacted]) Acceptance Trials - (Lead Ship)	Oct 84	Dec 84	Dec 84
([redacted]) Delivery Lead Ship	Nov 84	Jan 85	Jan 85
([redacted]) Material Support Date	Jan 85	Jan 85	Jan 85
([redacted]) Naval Support Date	Feb 86	Feb 86	Feb 86
*([redacted]) Initial Operational - Capability	Nov 85	Feb 86	Feb 86

*IOC - Reflects date the lead craft are ready for operational deployment.

b. Previous Change Explanations --

Delay in acceptance trials from 8 October 1984 to 7 December 1984 and delivery from 30 November 1984 to 8 January 1985 resulted from the shipbuilder overrunning his production man-hours to complete the ship.

Delay in IOC of two months is the result of 2 month late delivery of the Lead Ship, coupled with extension of SCN period to conduct Shock Test, and LCAC/LSD interface trials which delayed PSA start date.

c. ([redacted]) Current Change Explanation -- None

d. ([redacted])References --

Production Estimate: Revised NDCP, dated March 1985, subject LSD 41 Class.

Approved Program: DAE baseline dated 31 December 1988.

10. [redacted] Technical/Operational Characteristics:

	Production Estimate/Approved Program	Demonstrated Perf	Current Estimate
a. ( ) Technical --			
( ) Accommodations			
(1) Troops	338/338	338	338
(2) Crew	413/413	413	413
(3) Staff	166/166	166	166
( ) Vehicle Square ft	12,800/12,800	12,800	12,800
( ) Marine Cargo - (Cubic ft)	5,000/5,000	5,000	5,000
( ) Helicopter Spots - (CH-46)	1 + 1/1 + 1	1 + 1	1 + 1
( ) Landing Craft	4 LCAC/4 LCAC	4 LCAC	4 LCAC
( ) Length (ft)	609/609	609	609
( ) Beam (ft)	84	84	84
( ) Draft (ft)	19'5"/19'5"	19'5"	19'5"
b. ( ) Operational --			
( ) Speed (kts)	22/22	22	22
( ) Endurance (22 kts) (NM)	[redacted] (b)(1)		

c. ( ) Previous Change Explanations -- None

d. ( ) Current Change Explanations -- None

e. ( ) Reference --

Production Estimate: Revised NDCP, dated March 1985, subject LSD 41 Class.

Approved Program: DAE baseline dated 31 December 1988.

11. [redacted] Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Production Estimate	Approved Program	Current Estimate
a. Cost			
Development (RDT&E)	46.9	51.0	51.2
Procurement (SCN)	3177.0	2012.0	2000.5
(Sailaway)	(3021.8)	(1889.1)	(1884.2)
(Ship System)	(5.3)	(5.3)	(5.3)
(Initial Spares)	(3.5)	(3.3)	(3.3)
(Outfitting/Post Delivery)	(146.4)	(114.3)	(107.7)
Total FY81 Base-Year $	3223.9	2063.0	2051.7
Escalation	1626.0	408.4	403.6
Development (RDT&E)	(2.6)	(-3.9)	(-3.8)
Procurement (SCN)	(1623.4)	(412.3)	(407.4)
Total Then-Year $	4849.9	2471.4	2455.3
b. Quantities			
Development (RDT&E)	0	0	0
Procurement (SCN)	12	8	8
Total	12	8	8

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Production Estimate: Revised NDCP dated March 1985, subject LSD 41 Class

Approved Program: DAE Baseline approved 31 December 1988

12. [redacted] Program Acquisition/Current Procurement Unit Cost Summary:

(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Estimate	UCR Baseline	UCR Baseline
a. Program Acquisition --	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	2455.3	2471.4	2455.3
(2) Quantity	8	8	8
(3) Unit Cost	306.9	308.9	306.9
b. Current Procurement --	(FY 90)	(FY90 APPN)	(FY 91)
(1) Cost	9.1	9.1	24.9
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Less OF/PD	-9.1	-9.1	-24.9
Less PY Escal	0.0	0.0	0.0
Net Total	0.0	0.0	0.0
(2) Quantity	0	0	0
(3) Unit Cost	0.0	0.0	0.0

3. [redacted] Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Est. (PDE)	49.5	4800.4	0.0	4849.9
Previous Changes:				
Economic	-4.4	-536.8	0.0	-541.2
Quantity	0.0	-1476.4	0.0	-1476.4
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	-6.3	0.0	-6.3
Estimating	2.0	-270.8	0.0	-268.8
Other	0.0	0.0	0.0	0.0
Support	0.0	-85.8	0.0	-85.8
Subtotal	-2.4	-2376.1	0.0	-2378.5
Current Changes:				
Economic	0.1	-3.6	0.0	-3.5
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	0.2	-5.0	0.0	-4.8
Other	0.0	0.0	0.0	0.0
Support	0.0	-7.8	0.0	-7.8
Subtotal	0.3	-16.4	0.0	-16.1
Total Changes	-2.1	-2392.5	0.0	-2394.6
Current Estimate	47.4	2407.9	0.0	2455.3

13. [redacted] Cost Variance Analysis (Continued):

a. Summary -- (FY 1981 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Est. (PDE)	46.9	3177.0	0.0	3223.9
Previous Changes:				
Quantity	0.0	-928.5	0.0	-928.5
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	-5.0	0.0	-5.0
Estimating	4.1	-174.1	0.0	-170.0
Other	0.0	0.0	0.0	0.0
Support	0.0	-57.4	0.0	-57.4
Subtotal	4.1	-1165.0	0.0	-1160.9
Current Changes:				
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	0.2	-4.4	0.0	-4.2
Other	0.0	0.0	0.0	0.0
Support	0.0	-7.1	0.0	-7.1
Subtotal	0.2	-11.5	0.0	-11.3
Total Changes	4.3	-1176.5	0.0	-1172.2
Current Estimate	51.2	2000.5	0.0	2051.7

13. [redacted] Cost Variance Analysis (Cont'd):

b. Previous Change Explanations --

RDT&E
Economic: revised economic escalation rates
Estimating: reduction in RDT&E and Contract design requirements; revised programs estimates; reduction due to repricing of ship design

Procurement
Economic: revised economic escalation rates; correction of prior economic assumptions
Quantity: deletion of 4 ships and associated advance procurement
Engineering: ship construction stage prohibits low smoke cable installation
Estimating: favorable negotiations of FY84-86 contract; reduction of cost growth requirement; adjustment of FY81 ship for projected final cost; major commodity escalation change; reduction due to Gramm Rudman cut; actual execution and re-pricing of program estimates; increase based on Government share of overrun; returned cost on completed program
Support: re-pricing of Outfitting and Post Delivery requirements; actual execution; reduction due to Gramm Rudman cut; rephasing of Outfitting requirements; returned cost for Outfitting on completed program; revised Post Delivery estimate to reflect program execution

[redacted] Cost Variance Analysis (Continued):

c. Current Change Explanations

	(Dollars in Millions) Base-Year $	Then-Year $
1) RDT&E		
ECONOMIC		
Revised Dec 89 econ. escalation rates	0.0	0.1
ESTIMATING	0.2	0.2
Returned cost on completed programs	(0.2)	(0.2)
2) Procurement		
ECONOMIC		
Revised Dec 89 econ. escalation rates	0.0	-3.6
ESTIMATING	-4.4	-5.0
Refinement of program estimates	(3.0)	(3.6)
Returned cost on completed programs	(-15.2)	(-18.0)
Increase in basic construction overrun and shock preparation	(8.3)	(10.1)
Gramm Rudman adjustment	(-0.5)	(-0.7)
SUPPORT	-7.1	-7.8
Returned cost for outfitting on completed programs	(-3.8)	(-4.7)
Increase in outfitting on damage control materials resulting from lessons learned on USS Stark	(4.5)	(6.1)
Returned cost for post delivery on completed programs	(-1.4)	(-1.7)
Revised post delivery estimates	(-6.4)	(-7.5)

14. [redacted] Program Acquisition Unit Cost (PAUC) History:

(Then-Year Dollars in Millions)

a. Initial SAR Estimate to Current Baseline Estimate -- (Same as Current Baseline Estimate)

b. Current Baseline Estimate to Current Estimate --

PAUC (Pde Estimate)	Changes								PAUC (Current Estimate)
	Econ	Qty	Sched	Eng	Est	Other	Spt	Total	
404.2	-68.1	17.5	0.0	-0.8	-34.2	0.0	-11.7	-97.3	306.9

15. [redacted] Contract Information: (Then-Year Dollars in Millions)

a. ([redacted]) RDT&E -- N/A

b. ([redacted]) Procurement --

LSD 44 1/
Avondale Industries, Inc.,
New Orleans, LA
N00024-84-C-2027, FFP
Award: November 21, 1983
Definitized: June 26, 1989

Initial Contract Price		
Target	Ceiling	Qty
$166.6	$203.3	1

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$236.6	N/A	1	$236.6	$236.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-38.6	$-3.4
Cumulative Variances to Date (11/30/89)	$- 1.3	$ 0.0
Net Change	$+37.3	$+3.4

Explanation of Change: The favorable net change in cost is due to renegotiation to a Firm Fixed Price contract and its resultant rebaselining. The favorable schedule variance is the result of the ship delivery in February 1989. The Program Manager's assessment reflects Firm Fixed Price of contract.

LSD 45/46 1/
Avondale Industries, Inc.,
New Orleans, LA
N00024-84-C-2027, FFP
Award: November 26, 1984
Definitized: June 26, 1989

Initial Contract Price		
Target	Ceiling	Qty
$304.8	$394.4	2

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$357.8	N/A	2	$357.8	$357.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+ 9.9	$-17.2
Cumulative Variances To Date (11/30/89)	$-10.7	$- 4.4
Net Change	$-20.6	$+12.8

15. [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

Explanation of Change: The unfavorable net change to the cost variance is due to inefficiencies in construction labor and related overhead. The favorable net change to schedule variance is due to recovery of Production schedule as the ship is nearing delivery in January 1990. The cost and schedule variance were also affected when AII rebaselined the CPR after converting the contract to Firm Fixed Price. The Program Manager's assessment reflects Firm Fixed Price of contract.

LSD 47/48 1/	Initial Contract Price		
	Target	Ceiling	Qty
Avondale Industries, Inc., New Orleans, LA N00024-84-C-2027, FFP Award: December 11, 1985 Definitized: June 26, 1989	$297.9	$386.0	2

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$354.3	N/A	2	$354.3	$354.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+18.8	$-30.7
Cumulative Variances to Date (11/30/89)	$- 9.5	$- 0.2
Net Change	$-28.3	$+30.9

Explanation of Change: The unfavorable net change in cost variance is due to construction labor and related overhead cost being greater than planned. The favorable schedule change in variance is identified with rebaselining after the contract was converted to Firm Fixed Price. The Program Manager's assessment reflects Firm Fixed Price of contract.

c. [redacted] MILCON -- N/A

1/ Contract was converted from FPI to FFP on 26 June 1989 at the Current Target Price indicated.

[redacted] Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 93.3% (14 yrs/ 15 yrs)

(2) Percent Program Cost Appropriated: 99.0% ($2430.4/$2455.3)

b. Appropriation Summary
(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY77-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-)	Total
RDT&E	47.4	0.0	0.0	0.0	47.4
Procurement	2373.9	9.1	24.9	0.0	2407.9
TOTAL	2421.3	9.1	24.9	0.0	2455.3

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY81 Dollars		Total Base Year $	Total Then-Year $			Escal Rate %
		NonRec	Rec		Program	Oblig	Expend	
APPROPRIATION: RDT&E								
1977	0	0.0	0.0	5.1	3.7	3.7	3.7	2.58
1978	0	0.0	0.0	13.1	10.3	10.3	10.3	6.80
1979	0	0.0	0.0	7.3	6.3	6.3	6.3	8.40
1980	0	0.0	0.0	10.1	9.7	9.7	9.7	10.59
1981	0	0.0	0.0	5.7	6.0	6.0	6.0	10.61
1982	0	0.0	0.0	3.4	3.7	3.7	3.7	7.60
1983	0	0.0	0.0	3.1	3.6	3.6	3.6	4.90
1984	0	0.0	0.0	1.9	2.3	2.3	2.3	3.80
1985	0	0.0	0.0	0.7	0.9	0.9	0.9	3.40
1986	0	0.0	0.0	0.6	0.7	0.7	0.7	2.80
1987	0	0.0	0.0	0.2	0.2	0.2	0.2	2.70
Subtotal	0	0.0	0.0	51.2	47.4	47.4	47.4	----

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY81 Dollars		Total Base Year $	Total Then-Year $			Escal Rate %
		NonRec	Rec		Program	Oblig	Expend	
APPROPRIATION: Procurement								
1980	0	0.0	0.0	37.2	41.0	41.0	40.9	9.90
1981	1	22.9	304.8	340.3	387.0	387.0	385.5	9.60
1982	1	0.0	297.8	256.7	300.5	300.5	296.8	7.50
1983	1	0.0	273.6	307.1	364.7	365.1	353.0	3.80
1984	1	0.0	273.3	323.5	391.4	384.6	375.2	3.60
1985	2	0.0	365.2	391.7	484.0	464.5	394.2	2.10
1986	2	0.0	346.6	284.0	361.4	332.3	237.3	1.00
1987	0	0.0	0.0	5.0	6.0	6.0	5.7	1.50
1988	0	0.0	0.0	11.6	14.3	9.3	5.3	2.50
1989	0	0.0	0.0	18.5	23.6	5.7	2.4	2.80
1990	0	0.0	0.0	6.9	9.1	0.0	0.0	4.00
1991	0	0.0	0.0	18.0	24.9	0.0	0.0	4.20
1992	0	0.0	0.0	0.0	0.0	0.0	0.0	4.00
Subtotal	8	22.9	1861.3	2000.5	2407.9	2296.0	2096.3	----
Total	8	22.9	1861.3	2051.7	2455.3	2343.4	2143.7	----

17. (U) Production Rate Data: N/A

18. (U) Operating and Support Cost:

a. N/A

b. N/A

c. Contractor Support Costs -- N/A.

SAR-89-084

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

F-23 PEACEKEEPER PROGRAM: Peacekeeper

AS OF DATE: December 31, 1989

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1. (U) Designation and Nomenclature (Popular Name): LGM-118A/Land Based ICBM (Peacekeeper)

2. (U) DoD Component: USAF

3. (U) Responsible Office and Telephone Number:

Program Director
Ballistic Systems Division
Norton AFB
Norton AFB, CA 92409-6468

Col J. Wayne Shattuck
Assigned: June 1,1989
AV 876-3356 COMM 714 382-3356

4. (U) Program Elements/Procurement Line Items:

RDT&E:
PE 0604312F (Shared)
PROCUREMENT:
APPN 3020 ICN MMXOLG (Air Force)
APPN 3020 ICN MMXYO (Air Force)
MILCON:
PE 0101215F

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DEPARTMENT OF DEFENSE

5. (U) Related Programs: Small ICBM, Peacekeeper Rail Garrison

SAF/PAS
90-099 -T
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(U) Mission and Description: The mission of the Peacekeeper weapon system is to enhance the deterrent posture of US strategic forces. Should deterrence fail, Peacekeeper must be able to effectively attack the full spectrum of designated targets with nuclear weapons. The system must provide a prompt retaliatory capability. The Peacekeeper missile has four powered stages consisting of three solid propellant stages and a liquid fueled post-boost vehicle capable of delivering 10 multiple independently targetable reentry vehicles. This system replaces 50 Minuteman III missiles, but does not replace the Minuteman system.

7. IOT Program Highlights:

a. (U) Significant Historical Developments -- DSARC I, held in 1976, selected Trench & Horizontal Multiple Protective Shelters for further validation. In 1978, at DSARC II the Air Force recommended use of multiple vertical protective structures as the basing mode. In 1979 the President approved M-X Full Scale Engineering Development of a SALT verifiable system based in horizontal multiple protective structures. The engineering baseline called for development of separate missile transporters and launchers in addition to shelters. System Design Reviews were completed in 1980 and the first Preliminary Design Review was held in 1981. In addition, construction of flight test facilities at Vandenberg AFB began, and assembly and check out planning for deployment was started.

In 1981, the horizontal multiple protective shelter basing mode was terminated and the President directed production of 100 M-X missiles. The President also directed interim deployment of 40 missiles in existing Minuteman and Titan silos while long-term basing options of deep basing, defended fixed basing, defended deceptive basing and continuous patrol aircraft were studied. In late 1982, the President directed Closely Spaced Basing at F.E. Warren AFB, Wyoming. At this point, the M-X was named the "Peacekeeper". In April 1983, the President recommended deployment of 100 Peacekeeper missiles in 100 Minuteman silos at F.E. Warren AFB. Direction was received in July 1985 to deploy not more than 50 missiles in Minuteman silos at F.E. Warren AFB. IOC was achieved in December 1986. Program needs have been successfully met and FOC was achieved in December 1988, on cost and on schedule.

The incremental Program Management Responsibility Transfer (PMRT) process started in December 1987 with the transfer of the Transportation and Handling (T&H) System.

The Scientific Advisory Board (SAB) completed a favorable review of the Peacekeeper program in October 1987. Recommendations made by the SAB were accepted and completed in 1988. Deliveries for new inertial measurement units (IMUs) from Northrop Electronics Division (NED) met contract delivery requirements in June 89; subsequently, all deliveries have exceeded contract requirements. The Specific Force Integrating Receiver (SFIR) field reliability has shown some improvement corresponding to the IMU improvements achieved by the reduction of the moisture content inside of the IMU.

7. (U) Program Highlights (Cont'd):

An explosion of a stage one motor at Morton Thiokol, and the subsequent investigation, delayed production of Peacekeeper stage ones by five months. After the investigation was completed and corrective measures taken, a recovery schedule was established to meet FOC and accomplished. Stage one production is still behind the original schedule due to the reduced capacity at Morton Thiokol as a result of the accident. Program needs are still being met though, and they are anticipated to be back on schedule as soon more casting facilities come on line.

b. (U) Significant Developments Since Last Report -- The R&D flight test program was completed in March 1989 with all 18 flight tests being successful. The system displayed accuracies better than the requirement at maturity. The SAC Operational Test and Evaluation (OT&E) program began in June 1989.

PMRT of Peacekeeper ground equipment was completed in September 1989 with the transfer of the Canister, Air Launch Control Center, and Launch Facility/Launch Control Facility.

AVTEX Fibers, Inc., the sole qualified producer of aerospace grade rayon closed in November 1989. The critical nature of the material in Peacekeeper production compels the BSD to qualify another source of rayon supplier as soon as possible. The North American Rayon Corporation (NARC) has been identified as a likely source, and a plan to qualify and use NARC rayon is currently in work.

As a result of the past fire at Pacific Engineering and Production company (ref. 31 December 88 SAR), the company moved it's production facility and was renamed Western Electro Chemical Company (WECCO). With the help of DoD, WECCO has begun producing Ammonium Perchlorate (AP). In turn, DoD has set up a system-wide allocation board to distribute WECCO AP. Peacekeeper can meet all program needs with AP supplied through our primary source Kerr-McGee. A plan to qualify and use AP is in work if DoD distributes WECCO AP to Peacekeeper.

The Peacekeeper ICBM system is fulfilling all mission requirements.

c. (U) Changes Since As Of Date -- None.

8. (U) Threshold Breaches: There are currently no DAE baseline (dated Dec 88) breaches.

9. (U) Schedule:

a. (U) Milestones --

	Development Estimate	Approved Program	Current Estimate
Milestone I	MAR 76	MAR 76	MAR 76

a. (U) Milestones -- Continued

Milestones	Development Estimate	Approved Program	Current Estimate
Milestone II	DEC 78	DEC 78	DEC 78
Systems Design Review	FEB 80	FEB 80	FEB 80
Preliminary Design Review	AUG 80	AUG 80	AUG 80
Stage Destruct Test Complete	JUL 82	JUL 82	JUL 82
Ord Induced Shock Tests Comp	DEC 82	DEC 82	DEC 82
First Flight	JAN 83	JUN 83	JUN 83
Structure Load Tests Complete	JUN 83	JUN 83	JUN 83
First Production Contract Award	JAN 84	JAN 84	JAN 84
Propulsion Flight Proof Tests Complete	APR 84	JUL 84	JUL 84
Milestone FAD (was IOC)	DEC 86	DEC 86	DEC 86
Full Operational Capability (FOC)	N/A	DEC 88	DEC 88

b. (U) Previous Change Explanations --

First flight delayed due to development problems and congressional restrictions which ran concurrently from January to June 1983. Propulsion Flight Proof Tests were completed late due to a redesign of the Stage IV propellant tank which required an additional flight proof test in July 1984.

c. (U) Current Change Explanations --

(b)(1) [redacted]

d. (U) References --

Development Estimate: SDDM dated February 14, 1980.

Approved Program: DAE Baseline Dec 88.

10. (U) Technical/Operational Characteristics:

a. (U) Technical --	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
Payload (Mk 21 RVs)		(b)(1) [redacted]		(b)(1) [redacted]
Max Range (km)				
Throw Weight (lbs)		(b)(1) [redacted]		
Msn Eff Fctr (MEF) 2/			(b)(1) [redacted]	
Countdown & Flt Rel 3/				
Weapon System Avail 4/				
Targeting Efficiency 5				

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(U) Technical/Operational Characteristics (Cont'd):

b. (U) Operational --

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
Accuracy (CEP) (ft)				
Flight Test		(b)(1)		
Operational				(Ch-1)

c. (U) Previous Change Explanations --

The Current Estimate MEF is a result of previous changes in Targeting Efficiency and Countdown/Flight Reliability. The increase in Countdown and Flight Reliability has resulted from test results and analysis of additional flight test data. Demonstrated Accuracy is based on 17 missile flights, 120 reentry vehicles with an average range of 4250 nautical miles on a west firing to Kwajalein.

d. (U) Current Change Explanations -- (Ch-1)

The table has been changed to more accurately portray the differences between testing and operational use. The Demonstrated Flight Test Accuracy is based on the 9 missile flights with operationally representative hardware and software configurations (FTS 9-15, 17, 18). The Current Estimate for Operational Accuracy is based upon transferring the flight test results of Kwajalein Missile Range North to the reference operational trajectories since the operational trajectories can not be duplicated.

Footnotes: The approved program directs only the MEF. Subelements are provided to explain how the MEF is derived.

MEF is defined as the product of countdown & flight reliability, weapon system availability and targeting efficiency for 10 MK21 reentry vehicles at F.E. Warren AFB (throw weight limited).

Countdown & flight reliability is the probability that a missile system which is available for commitment to launch sequence will respond to a valid launch command, successfully complete the launch and flight, and detonate a given warhead within 3.5 times the circular error probable requirement. (Includes launch critical operational support equipment and aerospace vehicle equipment.)

Weapon system availability is the percentage of the missile force, under the jurisdiction of the using command and committed to the wartime mission, which is capable of commitment to the launch sequence at any random point in time.

10. (U) Technical/Operational Characteristics (Cont'd):

Targeting efficiency is a parameter defined to express the capability of a multiple warhead missile to have sufficient footprint to be effectively employed against a real set of targets. Targeting efficiency is a measure of the capability of the missile fleet containing a given missile configuration to access target sets. This measure of missile fleet performance assumes 100% coverage of a given target list. Targeting efficiency is calculated as the number of targets in the target list divided by the number of reentry vehicles employed. For example:

Targeting Efficiency = (500 targets)/(55 missiles X 10 RVs per missile) = 0.91

Accuracy is defined in terms of Circular Error Probable (CEP), the radius of a circle within which 50% of the reentry vehicles will impact at a range of 5775 nm with 27.5 degree reentry angle.

e. (U) References --

Development Estimate: SDDM dated February 14, 1980.

Approved Program: DAE Baseline Dec 88.

11. TOP Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. (U) Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	6018.2	5745.4	5745.2
Procurement	10292.0	11417.5	8976.6
Total Flyaway	(6645.9)	(8716.0)	(6650.6)
Other Wpn Sys Cost	(2546.2)	(969.3)	(969.1)
Peculiar Support	(795.7)	(1185.0)	(1044.6)
Initial Spares	(304.2)	(547.2)	(312.3)
Construction	324.7	192.2	192.4
Ops. and Maint. (O&M)	0.0	0.0	
Total FY 82 Base-Year $	16634.9	17355.1	14914.2
Escalation	5045.3	6137.0	4680.0
Development (RDT&E)	(878.9)	(686.2)	(687.4)
Procurement	(4086.2)	(5414.8)	(3956.8)
Construction (MILCON)	(80.2)	(36.0)	(35.8)
Ops. and Maint. (O&M)	(0.0)	(0.0)	(0.0)
Total Then-Year $	21680.2	23492.1	19594.2

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b. (U) Quantities --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	20	20	20
Procurement	223	235	173
Construction (MILCON)	0	0	0
Total	243	255	193

Paragraph 11 Comments:
The total costs identify the $17.4B estimate (FY 82 dollars), $23.5B TY, for the current Peacekeeper program based on the Report by the President's Commission on Strategic Forces, April 1983, and the President's letter, 19 April 1983, transmitting the Strategic Forces Technical Assissment Review (31 March 1983), to the Congress. It does not include $3199.5 in FY 82 and prior missile costs (development of flight test missiles and all equipment leading to first flight) or $1399.2 in FY 83 and prior spent on earlier basing modes (Multiple Protective Shelters, horizontal shelter system, interim deployment in 40 Minuteman silos, and Closely Spaced Basing) (then-year dollars in millions).

Construction figure does not include $86.1M in FY 82 and prior year funds (then-year dollars associated with earlier basing modes).

173 production missiles equates to 50 deployment missiles, 108 operational test and evaluation missiles, and 15 aging and surveillance missiles. The total quantity of 173 missiles supports the design service life of 15 years. If this system is projected to remain in the inventory beyond 2005, this number may need to be increased to provide sufficient assets for reliability testing. Program funding identified in this SAR corresponds to the FY 91 Amended President's Budget. Other changes caused by recent programmatic decisions are currently being analyzed. The impact of these changes on the FYDP will be in the FY 93 President's Budget following DOD corporate review.

c. (U) Foreign Military Sales -- None.

d. (U) Nuclear Costs -- None.

e. (U) References --

Development Estimate: SDDM, dated Feb 14, 1980.

Approved Program: 31 December 1988 SAR.

[redacted]

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

		Current Estimate	Curent Year UCR Baseline	Budget Year UCR Baseline
a.	(U) Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1)	Cost	19594.2	23492.1	19594.2
(2)	Quantity	173	235	173
(3)	Unit Cost	113.261	99.966	113.261
b.	(U) Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1)	Cost	731.2	731.2	673.7
	Less CY Adv Proc	0.0	0.0	0.0
	Plus PY Adv Proc	0. 0	0.0	0.0
	Net Total	731.2	731.2	637.7
(2)	Quantity	12.0	12.0	12.0
(3)	Unit Cost	60.933	60.933	56.142

Paragraph 12 Comments:

The Program Acquisition Unit Cost has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully configured end items for the purposes of this calculation.

The total quantity of 173 missiles supports the design service life of 15 years. If this system is projected to remain in the inventory beyond 2005, this number may need to be increased to provide sufficient assets for reliability testing.

The Current Year UCR Baseline FY 90 funding reflects the FY 90 Appropriations Act.

[redacted]

(U) **Cost Variance Analysis:**

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	6897.1	14378.2	404.9	21680.2
Previous Changes:				
Economic	-153.4	-751.0	-6.2	-910.6
Quantity	-	+377.6	-	+377.6
Schedule	-	+1059.9	-	+1059.9
Engineering	-	-	-97.1	-97.1
Estimating	-311.3	+3034.2	-14.0	+2708.9
Other	-	-	-	-
Support	-0.8	-1266.6	-59.4	-1326.8
Subtotal	-465.5	+2454.1	-176.7	+1811.9
Current Changes:				
Economic	+1.3	+234.7	-0.2	+235.8
Quantity	-	-3011.7	-	-3011.7
Schedule	-	-	-	-
Engineering	-	-467.8	-	-467.8
Estimating	-0.3	-44.5	+0.2	-44.6
Other	-	-	-	-
Support	-	-609.6	-	-609.6
Subtotal	+1.0	-3898.9	-	-3897.9
Total Changes	-464.5	-1444.8	-176.7	-2086.0
Current Estimate	6432.6	12933.4	228.2	19594.2

6. Cost Variance Analysis (Cont'd):

(FY 1982 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	6018.2	10292.0	324.7	16634.9
Previous Changes:				
Quantity	-	+236.4	-	+236.4
Schedule	-	+17.6	-	+17.6
Engineering	-	-	-72.5	-72.5
Estimating	-271.5	+1816.1	-10.8	+1533.8
Other	-	-	-	-
Support	-1.3	-944.6	-49.2	-995.1
Subtotal	-272.8	+1125.5	-132.5	+720.2
Current Changes:				
Quantity	-	-1749.7	-	-1749.7
Schedule	-	-	-	-
Engineering	-	-286.5	-	-286.5
Estimating	-0.2	-29.1	+0.2	-29.1
Other	-	-	-	-
Support	-	-375.6	-	-375.6
Subtotal	-0.2	-2440.9	+0.2	-2440.9
Total Changes	-273.0	-1315.4	-132.3	-1720.7
Current Estimate	5745.2	8976.6	192.4	14914.2

b. (U) Previous Change Explanations --

RDT&E

Economic: Revised economic escalation indices.

Estimating: Adjustment for current and prior year inflation. Ajustment to Budget Authority FY 87 increased risk to the program.

b. (U) Previous Change Explanations -- (Cont'd)

PROCUREMENT

Economic:	Revised economic escalation indices.
Quantity:	Increased missile buy quantity by 12 to support Rail Garrison basing.
Schedule:	Adjustment for reduced annual purchases from 21 to 12 missiles.
Estimating:	Adjustment for reduced annual purchases from 21 to 12 missiles, current and prior year inflation, and a reduction in proram funding.
Support:	Adjustment for reduced annual purchases from 21 to 12 missiles, current and prior year inflation, and an adjustment to the purchasing of initial spares (PBD 170).

MILCON

Economic:	Revised economic escalation indices.
Estimating:	Adjustment for current and prior year inflation, and refinement of estimate for storage facilities based on schedule change (May 88 Financial Review).
Support:	Removal of planning and design funds included in 30 June SAR. This change was directed by higher headquarteers since these funds were not considered program unique.

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised economic escalation indices (Economic)	-	1.3
Adjustment for current and prior year inflation (Estimating)	-0.3	-0.4
Adjustment for overinflated funding profile (Estimating)	0.1	0.1
(2) PROCUREMENT		
Revised economic escalation indices (Economic)	-	234.7
Current and prior year inflation offset (Estimating)	-25.0	-38.7
Adjustment for overinflated funding profile (Estimating)	4.2	7.5
Reduction for Military Personnel (Estimating)	-7.1	-11.1
Reduction of 62 missiles (Quantity)	-1749.7	-3011.7

c. (U) Current Change Explanations -- (Cont'd)

	(Dollars in Millions) Base-Year	Then-Year
Reduction for Government Furnished Material (Estimating)	-1.2	-2.2
Removal of hardware to support 2nd 50 UE missiles (Engineering)	-392.6	-638.4
Increase of 3 reentry systems for rebasing (Engineering)	32.0	50.0
Funds from AFLC to accomplish Sustaining Engineering (Engineering)	74.0	120.6
Removal of spares and support equipment for deployment of second 50 UE missiles (Support)	-94.3	-162.6
Current and prior year inflation offset (Support)	-3.5	-6.0
Removal of support for last 62 missiles (Support)	-277.8	-441.0
(3) MILCON		
Revised economic escalation indices (Economic)	-	-0.2
Adjustment for current and prior year inflation (Estimating)	0.2	0.2

14. (U) Program Acquisition Unit Cost (PAUC) History: (Then-Year Dollars in Millions)

a. (U) Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
89.22	-3.57	-2.72	+4.16	-0.38	+10.62	--	-5.20	+2.91	92.13

b. (U) Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
92.13	-3.901	+17.963	+6.127	-3.265	+15.400	--	11.193	+21.131	113.261

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) Procurement

Stage I, FY 86-87:

rton Thiokol
igham City, UT
4704-86-C-0091, FPIF
Award: May 27, 1987
Definitized: May 27, 1987

Initial Contract Price		
Target	Ceiling	Qty
$144.3	$154.2	26.0

Current Contract Price		
Target	Ceiling	Qty
$144.6	$154.6	26.0

Estimated Price At Completion	
Contractor	Program Manager
$161.4	$161.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$3.4	$0.8
Cumulative Variances To Date (10/31/89)	$-26.8	$-2.2
Net Change	$-30.2	$-3.0

Explanation of Change:

The change from favorable cost and schedule variances to unfavorable are primarily due to the M-592 fire incident, and overhead/indirect rate increases. The M-592 fire, and following five month investigation, has led to decreased capacity and schedule delays. As Thiokol recovers from the schedule delays, and additional capacity comes on line, the schedule variance should improve. The partial termination of the SICBM program from Thiokol's business base and the M-592 incident are responsible for

- [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

the unfavorable cost variance. The partial termination of SICBM led to an increase in the overhead/indirect rates which were absorbed by Peacekeeper. This contract is now one of the sixth largest contracts and reporting has been reinstated.

Footnotes: The Program Manager's Estimate of Price at Completion includes unpriced work. To prevent disclosure of our negotiating position, the estimate is valued at the contractor's estimate for purposes of this report.

Guidance & Control:	Initial Contract Price Target	Ceiling	Qty
Rockwell Intl. Autonetics Anaheim, CA F04704-87-C-0029, FPI/CPF Award: April 10, 1987 Definitized: June 18, 1987	$165.0	$175.4	25.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$260.4	$200.3	25.0	$260.4	$258.8

	Cost Variance	Schedule Variance
evious Cumulative Variances	$0.9	$0.0
mulative Variances To Date (10/31/89)	$-0.2	$-1.9
Net Change	$-1.1	$-1.9

Explanation of Change:

The unfavorable cost variance and schedule variance increases are insignificant. The Current Contract Ceiling Price does not include an amount for the CPFF support portion of this contract. No program or contract impact.

Footnotes: Please note this contract type is both FPIF and CPFF. Program Manager's Estimated Price at Completion Includes unpriced work. To prevent disclosure of our negotiating position, the estimate is valued at the contractor's estimate for purposes of this report.

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[redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

Inertial Measurement:	Initial Contract Price Target	Ceiling	Qty
Northrop Electronics Div. Hawthorne, CA F04704-86-C-0198, FPI/CPF Award: April 16, 1987 Definitized: April 16, 1987	$183.4	$194.2	31.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$235.7	$224.1	31.0	$251.4	$248.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-10.1	$0.8
Cumulative Variances To Date (10/31/89)	$-23.0	$-3.5
Net Change	$-12.9	$-4.3

Explanation of Change:

[redacted]e increase in the unfavorable cost variance is due to actual indirect [redacted]es being higher than first budgeted. The cost variance is also due in [redacted]t to increased vendor set up and tooling charges because the vendor expedited purchase orders on parts with higher than planned attrition rates. The change from favorable schedule variance to unfavorable is due to delayed material deliveries for hybrid and circuit card assemblies. Meetings have been held with the subcontractors to solve the remaining problems, and corrective actions have been implemented. The schedule variance should be corrected by February 90. No program or contract impact.

Footnotes: Please note this contract is both FPIF and CPFF. Current Contract Price Ceiling does not include an amount for the CPFF support portion of this contract. The Program Manager's Estimated Price at Completion includes unpriced work. To prevent disclosure of our negotiating position, the estimate is valued at the contractor's estimate for purposes of this report.

Contract Information (Cont'd): (Then-Year Dollars in Millions)

Peculiar Support Equ:
Martin Marietta
Denver, CO
F04704-85-C-0064, FPI/CPF
Award: May 7, 1985
Definitized: August 14, 1985

Initial Contract Price		
Target	Ceiling	Qty
$206.0	$233.0	0.0

Current Contract Price		
Target	Ceiling	Qty
$538.4	$532.8	0.0

Estimated Price At Completion	
Contractor	Program Manager
$528.6	$522.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$11.7	$-1.1
Cumulative Variances To Date (10/31/89)	$16.1	$-2.1
Net Change	$4.4	$-1.0

Explanation of Change:

The increase in the favorable cost variance is due to favorable forward pricing rates and lower than expected direct rates. The increase in favorable schedule variance is insignificant. No program or contract impact.

Footnotes: Please note this contract type is both FPIF and CPFF. Current Contract Price Ceiling does not include an amount for the CPFF support portion of this contract. The Program Manager's Estimated Price at Completion includes unpriced work. To prevent disclosure of our negotiating position, the estimate is valued at the contractor's estimate for purposes of this report.

15. Contract Information (Cont'd): (Then-Year Dollars in Millions)

Guidance & Control:
Rockwell International
Anaheim, CA
F04704-88-C-0096, FPIF
Award: April 14, 1989
Definitized: April 14, 1989

Initial Contract Price		
Target	Ceiling	Qty
$196.8	$207.6	44.0

Current Contract Price		
Target	Ceiling	Qty
$197.1	$207.9	44.0

Estimated Price At Completion	
Contractor	Program Manager
$198.8	$198.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (10/31/89)	$0.7	$-1.4
Net Change	N/A	N/A

Explanation of Change:

This is the first time for this contract to be included in the SAR. The favorable cost variance is due to printed wire board fabrication production efficiencies. The unfavorable schedule variance is due to late subcontractor invoice processing. Now that the late invoices are being processed, the schedule variance should be corrected in the following two months. No program or contract impact.

Footnotes: Current Contract Price Ceiling does not include an amount for the CPFF support portion of this contract. The Program Manager's Estimated Price at Completion includes unpriced work. To prevent disclosure of our negotiating position, the estimate is valued at the contractor's estimate for purposes of this report.

15. [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

Stage III:	Initial Contract Price Target	Ceiling	Qty
Hercules Magna, UT F04704-88-C-0035, FPIF Award: May 12, 1989 Definitized: May 12, 1989	$151.9	$165.2	32.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$151.9	$165.2	32.0	$151.9	$151.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date (10/31/89)	$-0.8	$2.9
Net Change	$-0.8	$2.9

Explanation of Change:

This is the first time for this contract to appear in the SAR. The unfavorable cost variance is due to unfavorable indirect rates. The favorable schedule variance is due to materials being transferred into this contract from Buy 3/4. The materials were scheduled to be delivered in November and December, but were delivered in October. No program impact.

Footnotes: The Program Manager's Estimate of Price at Completion includes unpriced work. To prevent disclosure of our negotiating position, the estimate is valued at the contractor's estimate for purposes of this report.

16. [redacted] Program Funding Summary:

a. [redacted] Program Status --

(1) Percent Program Completed: 42.1% (8 yrs/19 yrs)

(2) Percent Program Cost Appropriated: 66.8% ($15650.0 / $23414.0)

6. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY83-90)	Budget Year (FY91)	Budget Year (FY92)	Balance To Complete (FY93-01)	Total
RDT&E	6406.2	7.5	6.8	12.1	6432.6
Procurement	9015.6	673.7	669.6	2574.5	12933.4
MILCON	228.2	-	-	-	228.2
O&M	-	-	-	-	-
Total	15650.0	681.2	676.4	2586.6	19594.2

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 3600 Research, Development, T & E, Air Force								
1983				1789.1	1912.6	1912.6	1912.6	4.9
1984				1766.5	1962.6	1928.5	1925.2	3.8
1985				1326.7	1520.4	1495.2	1474.4	3.4
1986				568.2	668.8	663.1	631.2	2.8
1987				208.0	252.3	242.6	175.8	2.7
1988				27.6	34.7	34.1	29.6	3.1
1989				30.5	40.0	16.7	10.1	4.2
1990				10.9	14.8	2.3	0.4	4.0
1991				5.3	7.5			4.2

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c. (U) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 3600 Research, Development, T & E, Air Force (Cont'd)								
1992				4.6	6.8			4.0
1993				3.9	6.0			3.7
1994				3.9	6.1			3.4
Subtot	0			5745.2	6432.6	6295.1	6159.3	
Appropriation: 3020 Missile Procurement, Air Force								
1984	21	222.5	987.4	1718.6	2143.1	2057.9	1790.4	8.0
1985	21	7.8	751.8	1878.9	2399.3	2241.0	2023.8	3.4
1986	12		572.9	764.2	1012.5	905.4	783.2	2.8
1987	12		536.2	771.5	1061.6	982.9	601.9	2.7
1988	12		542.7	610.1	873.7	713.2	173.4	3.1
1989	12		486.0	527.7	794.2	523.3	65.5	4.2
1990	12		442.5	467.5	731.2	81.4		4.0
1991	12		413.4	415.6	673.7			4.2
1992	12		379.8	399.5	669.6			4.0
1993	12		311.6	376.3	651.0			3.7
1994	12		350.6	368.6	657.7			3.4
1995	12		332.1	348.5	640.9			3.1
1996	11		313.3	329.6	624.9			3.1
1997								3.1

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c. (U) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 3020 Missile Procurement, Air Force (Cont'd)								
1998								3.1
1999								3.1
2000								3.1
2001								3.1
Subtot	173	230.3	6420.3	8976.6	12933.4	7505.1	5438.2	
Appropriation: 3300 Military Construction, Air Force								
1983				15.0	16.7	12.1	12.0	4.9
1984				27.2	31.2	26.1	26.0	3.8
1985				81.4	95.7	60.6	56.8	3.4
1986				43.8	53.1	32.3	30.3	2.8
1987				20.7	25.9	22.3	22.3	2.7
1988				4.3	5.6	4.5		3.1
1989								4.2
1990								4.0
1991								4.2
1992								4.0
1993								3.7
1994								3.4
1995								3.1

c. (U) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 3300 Military Construction, Air Force (Cont'd)								
1996								3.1
1997								3.1
1998								3.1
1999								3.1
2000								3.1
Subtot	0			192.4	228.2	157.9	147.4	
Total	173	230.3	6420.3	14914.2	19594.2	13958.1	11744.9	

Paragraph 16 Comments:
The Appropriation Summary is unalterable using the CARS10 software. The funding years are hardwired into the system and this table cannot be entered for editing.

17. (U) Production Rate Data:
a. (U) Annualized Production Rates --

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1984	19	14	19	48
1985	28	24	21	48
1986	30	17	12	48
1987	48	14	12	48

Funded delivery period is 13 months for FY 84. Peacekeeper missile is produced as a combined effort of at least 10 major associate contractors. These rates are the end product of all the associate contractors.

11. [redacted] Production Rate Data (Cont'd):

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum * Economic
1988	48	34	12	0
1989	48	48	12	0
1990	0	48	12	0
1991	0	48	12	0
1992	0	0	12	0
1993	0	0	12	0
1994	0	0	12	0
1995	0	0	12	0
1996	0	0	11	0
1997	0	0	0	0
1998	0	0	0	0
1999	0	0	0	0
2000	0	0	0	0
2001	0	0	0	0

* At the maximum economic rate of 48 per month, the program would have bought out the current program quantity in FY87.

b. (U) Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Acq. Cost (BY $)	N/A	N/A	14914.2	+2804.5	12109.7
(TY $)	N/A	N/A	19594.2	+5641.5	13952.7
PAUC Cost (BY $)	N/A	N/A	86.209	+16.211	69.998
(TY $)	N/A	N/A	113.261	+32.610	80.631

c. (U) Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	JAN 84	N/A	JAN 84	N/A	JAN 84
Duration (in mon)	+112	+72	+184	+23	+161
nd Date (Mo/Yr)	MAY 93	+72	MAY 99	+23	JUN 87

d. (U) Deliveries (Plan/Actual) --

	To Date
RDT&E	20/20
Procurement	65/65
MILCON	0/0
O & M	0/0

e. (U) Approved Design-to-Cost Goal --

	Development Estimate	Current Estimate	Latest Approved Threshold
	(Average Unit Flyaway Cost)		
@ Qty 0 - @ Peak Rate: 0/mo			
FY Base-Year $	0.0	0.0	0.0
Then Year $	0.0	0.0	0.0
@ Qty 0 (1st three years) - @ Peak Rate: 0/mo			
FY Base-Year $	0.0	0.0	0.0
Then Year $	0.0	0.0	0.0

Paragraph 17 Comments:
Start date refers to First contract award date. End date refers to last missile delivery.

17. (U) Production Rate Data (Cont'd):

The Program Acquisition Unit Cost has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully configured end items for the purposes of this calculation.

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules --

Not Available.

b. (U) Costs -- None.

c. (U) Contractor Support Costs -- (Current (Then-Year) Dollars in Millions)

Funding	FY1990 & Prior	FY1991	FY1992	Balance To Complete	Total
O&M	37.0	32.5	---	---	69.5
Industrial Fund	2.0	1.1	---	---	3.1
Total	39.0	33.6	---	---	72.6

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SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: OVER-THE-HORIZON BACKSCATTER RADAR (OTH-B)

AF-22 OTH-B

AS OF DATE: December 31, 1989

SAF/PAS

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MAR 1 1990 18
DIRECTORATE FOR FREEDOM OF INFORMATION
AND SECURITY REVIEW (DASD-PA)
DEPARTMENT OF DEFENSE

1. Designation/Nomenclature (Popular Name): AN/FPS-118/OTH-B Radar

2. DOD Component: U.S. Air Force

3. Responsible Office and Telephone Number:
[redacted]
OTH-B Program Office
Electronic Systems Division
Hanscom AFB, MA 01731-5000

Program Director: Col John O. Lenz
Assigned: September 12, 1988
AV 478-5980, MITRE Ext 5387
Comm (617) 271-5387

4. Program Elements:

RDT&E: PE 0102417F
PROCUREMENT: PE 0102417F APPN 3080 ICN 83312D
MILCON: PE 0102417F

5. Related Program: NONE

6. Mission and Description:
The OTH-B radar system satisfies requirements for tactical early warning of an attack on North America by bombers and air-to-surface missiles. It will detect and track airborne vehicles at ranges between approximately 500-1800 nautical miles from the radar. OTH-B increases warning time for survival of retaliatory forces and provides decision time for the National Command Authority consistent with ballistic missile warning requirements. The OTH-B will provide surveillance coverage of the East, West, Northwest and Southern approaches to North America. The OTH-B does not replace any existing radar systems.

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7. **Program Highlights:**

a. Significant Historical Developments — Following the successful demonstration of the Experimental Radar System, a fixed price incentive firm contract was awarded to General Electric Company for the Initial Operating Sector (IOS) of the East Coast Radar System (ECRS) in June 1982. Procurement contracts for Sectors 2 and 3 of the East Coast Radar System were awarded on 29 June 84 and 28 October 84, respectively. The West Coast Radar System (WCRS) of three 60 degree sectors; a Central Radar System (CRS), of four 60 degree sectors; and an Alaskan Radar System (ARS), of two 60 degree sectors were programmed in 1984. Planning and site surveys for CRS and ARS were initiated in 1985. The draft Environment Impact Statement (EIS) for the CRS and the ARS were filed in August 1986, followed by the proposed siting of the two systems. The Initial Capability Verification (ICV) testing for the Initial Operating Sector was completed in November 1986. A fixed price incentive firm contract was awarded to General Electric Company for the first sector of the WCRS in December 1986. The options on the WCRS contract for the second sector (Sector 5) and Modular Automatic Test Equipment (MATE) were exercised in February and April, 1987. The final Environmental Impact Statements for ARS and CRS were filed on 30 January 1987 and 22 May 1987. The option on the WCRS contract for the final sector (Sector 6) was exercised in November 1987. Limited operations of the ECRS began on 1 December 1987. Planning and preparation was completed in Dec 87 for Remotely Piloted Vehicle (RPV) tests. RPV tests were completed in March 1988; final test report issued in April 1989. The final ECRS sector was integrated into a three sector limited operations capability in November 1988. Deletion of two CRS sectors due to budget constraints. Sectors 4 and 5 of the WCRS began radiating in June 1989. The ECRS started Development Test and Evaluation (DT&E) on 21 Aug 1989.

b. Significant Developments Since Last Report --

The funds requested in FY 89 and FY 90 are inadequate to procure two ARS segments due to the significantly high contractor cost estimates. The FY 90 Appropriation and Authorization bills allow the Air Force to procure the first ARS segment using both FY 89 and FY 90 funds. Therefore, the quantity has been reduced from two ARS segments to one ARS segment.

The OTH-B Radar Program is expected to satisfy mission requirements.

c. Changes Since "As Of" Date — None

8. **Threshold Breaches:** The Central IOC date has breached the milestone date established in the DAE Baseline (dated December 1988). The absolute accuracy and speed resolution current estimate values exceed the approved program thresholds as shown.

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9. (U) Schedule:

(U) Milestones —	Development Estimate	Approved Program	Current Estimate
(U) System Definition Complete	Nov 73	Nov 73	Nov 73
(U) Prototype Contract Award	Mar 75	N/A	Mar 75
(U) Initiate Program Restructure	Dec 76	N/A	Dec 76
(U) Conclude Technical Feasibility Test	Feb 81	Feb 81	Feb 81
(U) Conclude IOT&E	Jun 81	Jun 81	Jun 81
(U) AFSARC Review	Nov 81	N/A	Nov 81
(U) Development Decision	Jan 82	N/A	Jan 82
(U) Development Contract Award	Jun 82	N/A	Jun 82
(U) SAF/AL Program Review	Dec 83	N/A	Dec 83
(U) Award First Production Contract (ECRS)	May 84	May 84	May 84
(U) SAF/AL Program Review	Dec 85	N/A	Dec 85
(U) Award WCRS Production Contract	Jul 86	Dec 86	Dec 86
(U) Start of limited operations	Dec 87	Dec 87	Dec 87
(U) Start RPV testing	Jan 88	N/A	Jan 88
(U) Start ECRS Initial Operational Test & Evaluation (IOT&E)	-	N/A	May 90 (CH-1)
(U) ARS Production Contract Award	-	N/A	Sep 90 (CH-2)
(U) Complete ECRS IOT&E	-	N/A	Nov 90 (CH-3)
(U) CRS Production Contract Award	-	N/A	Mar 91 (CH-3)
(U) ECRS/WCRS Program Management Responsibility Turnover (PMRT)	-	N/A	Aug 91 (CH-3)
(U) ARS Critical Design Review (CDR) Complete	-	N/A	Apr 92 (CH-3)
(U) ARS Mission Software Complete	-	N/A	Aug 93 (CH-3)
(U) CRS PMRT	-	N/A	May 94 (CH-3)
(U) ARS PMRT	-	N/A	Sep 94 (CH-3)
(U) Initial Operational Capability (IOC);			
(U) East	(b)(1)		
(U) West			
(U) Alaskan			
(U) Central			
(U) Full Operational Capability (FOC)	(b)(1)		(CH-7)
(U) ARS Power Plant Completion	-		(CH-8)
(U) Last Delivery	-		(CH-8)
(U) Full Mission Capable Parameter	-		(CH-8)

b. (U) Previous Change Explanations —

(U) Congressional action to defer initial procurement of WCRS from FY85 to FY86 caused a slip in WCRS and CRS IOC dates. The ARS was added to the OTH-B program in 1984.

(U) The WCRS IOC changed from (b)(1) and the CRS IOC changed from (b)(1).

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9. (U) Schedule (Cont'd): SECRET

(U) Milestones added since 31 December 1984 — SAF/AL Program Review and Award WCRS Production Contract.

(U) The IOC for ECRS was changed from (b)(1) as a result of delays experienced in computer software integration and testing.

(U) The IOC for the CRS was changed from (b)(1) due to budget constraints. This caused a delay in CRS procurement of the first sector, and a stretch out of procurement for the fourth CRS sector to FY92 from FY89.

(U) West Coast contract award was changed from Jul 86 to Dec 86 due to receipt of only one proposal and the resulting additional time required to complete pricing analysis and negotiations on a single source basis.

(U) The IOC for the WCRS was changed from (b)(1) due to Congressional reduction in FY87 from two sectors to one sector, deferring procurement of third sector from FY87 to FY88.

(U) The IOC for the CRS was changed from (b)(1) due to procurement of the final sector in FY91 rather than FY92.

(U) Milestone added since 31 Dec 86 — reflects the start of limited operations. Provides early operational use of system capability in advance of final system completion.

(U) The IOC for the ECRS was changed from (b)(1) due to delays in completing final auxiliary functions for performance monitoring and fault location, and automatic computer system switchover to backup computers.

(U) Milestone added since 30 Jun 87 — reflects the start of RPV testing

(U) The IOC for the CRS was changed from (b)(1) due to budget constraints.

(U) Milestones added for ARS Contract Award; ECRS IOT&E; ARS Power Plant completion and FOC since 31 Dec 87.

(U) The ARS IOC date must be extended by 18 months to provide for schedule impacts associated with a better understanding of this specific construction in Alaska on permafrost.

(U) The ARS production contract-award milestone has been changed from May 89 to Oct 89. The delay was related to (1) a change in acquisition strategy from competition to sole source, (2) fluctuation in requirements due to revised performance estimates, and (3) changes in acquisition approach and schedule for capabilities originally in the ARS baseline.

(U) The ARS power plant (an Alaskan Air Command action using third-party financing has been delayed from Sep 91 to Oct 93 due to delays associated with the land-acquisition and environmental-assessment process.

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9. (U) Schedule (Cont'd):

(U) The ECRS Initial Operational Test & Evaluation (IOT&E) was changed from Oct 89 to Mar 90 due to delays in the start of DT&E and AFOTEC's need for pre-IOT&E preparation.

(S) The ECRS IOC date changed from (b)(1) due to delays in DT&E and reassessment of the time required to conduct IOT&E.

(S) The WCRS IOC date changed from (b)(1) based upon Government suspension of prime contractor product acceptance due to deficiencies in the quality assurance system and impacts of continued software development and testing delays on ECRS.

c. (U) Current Change Explanations —

(U) (CH-1) The ECRS IOT&E was changed from Mar 90 to May 90 due to contractor delays completing DT&E.

(U) (CH-2) The ARS production contract-award has been changed from Oct 89 to Sep 90 due to the approval to use FY 89 and FY 90 funds to procure one segment; descoping requirements to reduce overall cost on the program; and the need for re-release of the Request for Proposal (RFP).

(U) (CH-3) Milestones added for Complete ECRS IOT&E; CRS Production Contract Award; ECRS/WCRS PMRT; ARS CDR complete; ARS Mission Software complete; CRS PMRT and ARS PMRT.

(U) (CH-4) The ECRS IOC date changed from (b)(1) due to delays associated with DT&E.

(U) (CH-5) The ARS IOC date changed from (b)(1) due to the delay in contract award.

(U) (CH-6) The CRS IOC date changed from (b)(1) due to revised program schedule.

(U) (CH-7) The FOC date changed from (b)(1) due to the change in both ARS and CRS IOCs.

(U) (CH-8) Milestones no longer applicable for reporting purposes - ARS Power Plant completion; Last Delivery; and Full Mission Capable Parameter.

d. (U) References —

(U) Development Estmate: DCP #49, Revision 2, dated 18 January 1982, Subject: "CONUS OTH-B Radar Program".

(U) Approved Program: DAE Baseline, 31 Dec 88.

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10. (U) Technical/Operational Characteristics:

		Dev Est	Approved Program Goal/Threshold*	Demonstrated Perf 2/	Current Estimate*	
a. (U)	Technical —					
(U)	Detection/Tracking Range (nm)	500-1800	500-1800/ 500-1800	500-1800	500-1800	
(S)	Absolute Accuracy (rms) (nm) 1/ 3/	(b)(1)				
(S)	Speed Resolution (kts) 4/	(b)(1)				
b. (U)	Operational —					
(S)	Raid Detection Probability 5/	(b)(1)				
(S)	Availability					(CH-1)
(U)	Mean Time Between Failures (hrs)	40	40/20	TBD	70	(CH-2)
(U)	Mean Corrective Time (hrs)	N/A	N/A / N/A	TBD	0.6	

1/ (U) rms = root mean square.

2/ (U) The better than expected performance of operational and technical characteristics is derived from Experimental Radar System (ERS) test program results.

3/ (S) (b)(1)
(S)
(S)

4/ (S) (b)(1) (b)(1)

5/ (U) Probability/confidence level.

6/ (S) (b)(1)

c. (U) Previous Change Explanations — Absolute Accuracy, Speed Resolution and Mean Time Between Failure current estimate values are based on analysis of to date East Coast Radar System performance capabilities.

(U) Mean Corrective Time added since 31 Dec 87.

(U) Program Manager's current estimates have been revised based upon the best information available from a variety of sources.

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10. (U) Technical/Operational Characteristics (Cont'd): ~~SECRET~~

d. (U) Current Change Explanations --

(U) (CH-1) (b)(1)
(b)(1)

(U) (CH-2) The PM's estimate has been updated to account for contractor information on hardware reliability (for 3 segments).

e. (U) References —

(U) Development Estimate: DCP #49, Revision 2, dated 18 Jan 1982, Subject: "CONUS OTH-B Radar Program".

(U) Approved Program: DAE Baseline, 31 Dec 88.

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11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. Cost—	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	$327.3	$400.1	$422.9
Procurement	710.9	1075.2	1030.6
East Coast	(199.0)	(184.3)	(184.5)
West Coast	(263.0)	(287.7)	(301.9)
Central	(184.8)	(248.2)	(244.6)
Alaskan	(—)	(267.1)	(251.4)
P3I *	(7.2)	(31.6)	(0.0)
Spares	(56.9)	(56.3)	(48.2)
Construction (MILCON)	107.1	78.8	74.3
Total FY82 Base Year $	1145.3	1554.1	1527.8
Escalation	274.1	432.6	462.6
Development (RDT&E)	(51.1)	(71.6)	(91.2)
Procurement	(191.3)	(336.0)	(346.5)
Construction (MILCON)	(31.7)	(25.0)	(24.9)
Total Then-Year $	$1419.4	$ 1986.7	$1990.4
b. Quantities—			
Development (RDT&E)	1	1	1
Procurement	7	9	8
Total	8	10	9

* Preplanned Product Improvement (P3I)

c. Foreign Military Sales — None

d. Nuclear Costs — None

e. References —

Development Estimate: DCP #49, Revision 2, dated 18 January 1982, Subject: "CONUS OTH-B Radar Program".

Approved Program: DAE Baseline, 31 Dec 88.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

		Current Est Dec 89 SAR	UCR Baseline Dec 88 SAR	UCR Baseline Dec 89 SAR
a.	Program Acquisition—			
	(1) Cost	1990.4	1986.7	1990.4
	(2) Quantity	9	10	9
	(3) Unit Cost	221.156	198.670	221.156*

		Current Year (FY 1990)	Current Year (FY 1990 APPN)	Budget Year (FY 1991)
b.	Current Procurement—			
	(1) Cost	364.6 *	364.6 ***	212.8 **
	Less CY Adv Proc	0	0	0
	Plus PY Adv Proc	0	0	0
	Net Total	364.6 *	364.6	212.8 **
	(2) Quantity	1	1	1
	(3) Unit Cost	364.600 *	364.600	212.800 **

* The FY 90 Appropriation and Authorization bills allow the Air Force to procure the first ARS segment using both FY 89 and FY 90 funds.

** The FY 91 procurement funds were moved from the Air Force program by OSD to a DoD counter-narcotics account.

*** Adjusted to reflect FY 90 Appropriation Act in accordance with Congressional change to SAR law.

13. Cost Variance Analysis:

a. Summary — (Current(Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	378.4	902.2	138.8	1419.4
Previous Changes:				
Economic	-10.8	-68.3	-11.3	-90.4
Quantity	-	+265.5	+147.4	+412.9
Schedule	-	+50.1	+5.4	+55.5
Engineering	+54.5	+135.6	-	+190.1
Estimating	+46.7	+113.8	-176.5	-16.0
Other	-	-	-	-
Support	-	+7.3	-	+7.3
Subtotal	+90.4	+504.0	-35.0	+559.4
Current Changes:				
Economic	+2.7	+30.5	+1.7	+34.9
Quantity	-	-127.0	-	-127.0
Schedule	-	+6.3	+0.2	+6.5
Engineering	-	-	-	-
Estimating	+42.6	+73.4	-6.5	+109.5
Other	-	-	-	-
Support	-	-12.3	-	-12.3
Subtotal	+45.3	-29.1	-4.6	+11.6
Total Changes	+135.7	+474.9	-39.6	+ 571.0
Current Estimate	514.1	1377.1	99.2	1990.4

(FY 1982 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	327.3	710.9	107.1	1145.3
Previous Changes:				
Quantity	-	+184.5	+107.0	+291.5
Schedule	-	+6.1	-	+6.1
Engineering	+37.5	+92.0	-	+129.5
Estimating	+33.0	+78.5	-135.3	-23.8
Other	-	-	-	-
Support	-	-0.6	-	-0.6
Subtotal	+70.5	+360.5	-28.3	+402.7
Current Changes:				
Quantity	-	-92.4	-	-92.4
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+25.1	+59.7	-4.5	+80.3
Other	-	-	-	-
Support	-	-8.1	-	-8.1
Subtotal	+25.1	- 40.8	-4.5	-20.2
Total Changes	+ 95.6	+ 319.7	- 32.8	+ 382.5
Current Estimate	422.9	1030.6	74.3	1527.8

13. Cost Variance Analysis (Cont'd):

b. Previous Change Explanations—

(1) RDT&E

Economic:	revised escalation indices
Estimating:	increased costs associated with 4 additional radar sectors
	operating the Program Office for 2 additional years
	reductions due to Congressional actions and reprogramming actions
	increase due to technical support
	escalation change on all fiscal years
Engineering:	change in P3I efforts towards improved small target detection capabilities and a one time correction to a previous SAR, 31 Dec 1984

(2) Procurement

Economic:	revised escalation indices
Quantity:	increased program by 4 radar sectors
	deletion of two radar sectors
Schedule:	rescheduled Sector 4 from FY85 to FY86
	increased costs due to re-scheduling procurement over 7 years instead of 5 years and a two year delay in P3I implementation
	increased costs due to stretchout of WCRS acquisition
	costs decreased with P3I implementation starting in FY88 instead of FY90
	rephasing of P3I from FY88-91 to FY92
	budget constraints caused deferral of CRS acquisition
Estimating:	increased costs due to cost area factors for the ARS
	corrections to previous SARs, 31 Dec 1984 and 31 Dec 1986
	decrease in costs due to WCRS negotiated contract
	cost increase due to negotiated engineering change proposals for WCRS
	nonprogrammatic pricing reduction
	cost increase for technical support
	reductions due to reprogramming actions
	escalation changes on all fiscal years
Engineering:	change in P3I efforts towards improved small target detection capabilities, reduced life cycle costs and a one time correction to previous SARs, 31 Dec 1984 and 31 Dec 1986
	decrease of P3I requirements
Support:	increase for spares and Other Weapons System cost to support 4 additional sectors and two added years in the program schedule
	increase to cost due to re-phasing spares to the current schedule profile
	corrections to previous SARs, 31 Dec 1984 and 31 Dec 86
	decrease in costs due to reduced spare requirements
	escalation changes on all fiscal years

13. Cost Variance Analysis (Cont'd):

(3) MILCON

Economic: revised escalation indices

Quantity: increase in facilities costs to support 4 additional sectors

Schedule: reduction in costs due to re-phasing the procurement of the ARS
costs increased due to re-phasing ARS and CRS to current procurement profile
budget constraints caused rephasing of ARS power plant from FY89 to FY90
budget constraints caused rephasing of Alaskan Air Command (AAC) non-technical support facility from FY 90 to FY 91

Estimating: reduction in West Coast Radar System facilities cost and the CRS from two to one operation centers
increased costs due to revised estimates for a technical support facility
decreased costs due to reductions and downscoping of facilities for ARS and CRS
deletion of ARS power plant to third party financing
escalation changes on all fiscal years

c. Current Change Explanations —

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E —		
Revised economic escalation indices (Economic)	N/A	+2.7
Increase due to extending Program Office support through FY 97 (Estimating)	+28.1	+47.1
Increase due to reprogramming actions (Estimating)	+1.2	+1.5
Reductions due to program budget decision pricing (Estimating)	-4.1	-5.9
Adjustment for current and prior years escalation (Estimating)	-0.1	-0.1
(2) Procurement		
Revised economic escalation indices (Economic)	N/A	+30.5
Deletion of ARS segment two	-115.6	-159.0
(Quantity)	(-92.4)	(-127.0)
(Estimating)	(-23.2)	(-32.0)

13. Cost Variance Analysis (Cont'd):

Budget constraints caused deferral of second ARS segment (Schedule)	N/A	+6.3
Revised cost estimates for ARS (Estimating)	+115.6	+152.7
Reduction due to program budget decision for contract advisory and assistance service (Estimating)	-4.4	-6.9
Increase due to extending Program Office support through FY 97 (Estimating)	+1.8	+3.1
Reductions due to Congressional actions (Estimating)	-9.0	-12.9
Reductions due to reprogramming actions (Estimating)	-5.5	- 8.0
Decrease initial spares requirements (Support)	-7.8	-11.9
Adjustment for current and prior years escalation		
(Estimating)	-7.5	-10.4
(Support)	-0.3	-0.4
Reduced estimate to absorb increases resulting from Jan 90 economic escalation indices (Estimating)	-8.1	-12.2

(3) MILCON --

Revised economic escalation indices (Economic)	N/A	+1.7
Budget constraints caused rephasing of CRS Land from FY90 to FY91 (Schedule)	N/A	+0.2
Program budget decision pricing (Estimating)	-4.3	-6.2
Adjustment for current and prior years escalation (Estimating)	-0.2	-0.3

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

a. Initial SAR Estimate/Development Estimate to Current Estimate —

Development Estimate PAUC (INITIAL SAR)	Changes (Then-Year Dollars in Millions)								Current Estimate PAUC
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
177.425	-6.167	+12.054	+6.889	+21.122	+10.389	-0.556		+43.731	221.156

15. Contractor Information: (Then-Year Dollars in Millions)

a. RDT&E: None

b. Procurement

(1) Sector 4:	Initial Contract Price Target	Ceiling	Qty
General Electric Co., Syracuse, NY F19628-86-C-0174, FPIF, Award: December 19, 1986 Definitized: December 19, 1986	$145.2	$155.8	1

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$184.6	$198.3	1	$184.6	$184.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances (As of 06 Aug 89)	$-2.5	$-5.3
Cumulative Variances to Date (As of 05 Nov 89)	$-5.1	$-6.4
Net Change	$-2.6	$-1.1
Cumulative Variance Change Percent	-104.0%	-20.8%

Explanation of Change: The negative net change in cost variance is attributed to communication subsystem; MATE tasks; transmit and receiver subsystems. The negative net change in schedule variance is mainly attributed to MATE delays on automatic test sets (ATS) and test program sets (TPS) efforts; and delays system test & evaluation.

Impact: Resolution of the quality assurance issues occurred on 6 Oct 89. The GFE prime power was delivered six months late, and resolution of the radiation restriction was resolved on 16 Nov 89. The contract was restructured on 15 Dec 89 incorporating the revised delivery schedule with no change in the contract target price.

15. Contractor Information (Cont'd): (Then-Year Dollars in Millions)

(2) Sector 5:	Initial Contract Price Target	Ceiling	Qty
General Electric Co., Syracuse, NY F19628-86-C-0174, FPIF, Award: February 24, 1987 Definitized: February 24, 1987	$ 52.3	$ 56.1	1

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$ 52.3	$ 56.1	1	$ 52.3	$ 52.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances (As of 06 Aug 89)	$+2.7	$-2.1
Cumulative Variances to Date (As of 05 Nov 89)	$+3.1	$-2.6
Net Change	$+0.4	$-0.5
Cumulative Variance Change Percent	+14.8%	-23.8%

Explanation of Change: The net change in cost variance is associated with system/project management; system test & evaluation; prime mission equipment; site activation and data. The net change in schedule variance is associated with system test & evaluation due to delays related to the quality assurance suspension and radiation restriction at the transmit site.

Impact: See Sector 4.

(4) Sector 6:	Initial Contract Price Target	Ceiling	Qty
General Electric Co., Syracuse, NY F19628-86-C-0174, FPIF, Award: November 7, 1987 Definitized: November 7, 1987	$ 56.5	$ 60.7	1

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$ 56.5	$ 60.7	1	$ 56.5	$ 56.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances (As of 06 Aug 89)	$+3.1	$-2.8
Cumulative Variances to Date (As of 05 Nov 89)	$+2.4	$-4.0
Net Change	$-0.7	$-1.2
Cumulative Variance Change Percent	-22.6%	-42.9%

Explanation of Change: The net change in cost variance is associated with the receiver subsystem. The net change in schedule variance is associated with system test & evaluation due to delays related to quality assurance suspension; prime mission equipment; and site activation.

Impact: See Sector 4

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status —

(1) Percent Program Completed: 56.25% (9yrs/16yrs)

(2) Percent Program Cost Appropriated: 73.60% 1465.0/1990.4

b. Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-97)	Total
RDT&E	387.3	20.2	12.9	93.7	514.1
Procurement	799.1	199.4	212.8	165.8	1377.1
MILCON	59.0	0.0	40.2	0.0	99.2
Total	1245.4	219.6	265.9	259.5	1990.4

c. Annual Summary —

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1982				16.3	16.7	16.7	16.7	9.2
1983				72.1	77.2	77.2	77.2	4.9
1984				86.9	96.5	96.5	95.5	3.8
1985				53.0	60.7	60.7	60.1	3.4
1986				50.5	59.4	59.4	58.8	2.8
1987				26.1	31.7	31.7	28.1	2.7
1988				21.3	26.7	24.0	21.0	3.1
1989				14.0	18.4	17.8	12.8	4.2
1990				14.8	20.2	2.0	0.2	4.0
1991				9.1	12.9	N/A	N/A	4.2
1992				10.2	15.0	N/A	N/A	4.0
1993				10.2	15.5	N/A	N/A	3.7
1994				10.2	16.1	N/A	N/A	3.4
1995				9.5	15.4	N/A	N/A	3.1
1996				9.4	15.7	N/A	N/A	3.1
1997				9.3	16.0	N/A	N/A	3.1
Subtotal	1			422.9	514.1	386.0	370.4	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary —

Fiscal Year	Qty	Flyaway FY82 Dollars Nonrec	Flyaway FY82 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: Procurement								
1984	1		81.5	86.4	98.7	98.7	97.2	3.8
1985	1		103.0	109.2	128.6	128.6	126.3	3.4
1986	1		130.5	144.4	175.7	175.7	130.0	2.8
1987	1		84.7	89.5	112.9	112.7	60.1	2.7
1988	1		86.7	90.0	118.0	82.8	54.6	3.1
1989			115.6	120.1	165.2	9.8	4.8	4.2
1990	1		135.8	139.6	199.4	5.5	0.1	4.0
1991	1		141.2	143.6	212.8	N/A	N/A	4.2
1992	1		101.3	105.7	162.2	N/A	N/A	4.0
1993			0.2	0.2	0.3	N/A	N/A	3.7
1994			0.1	0.1	0.2	N/A	N/A	3.4
1995			0.1	0.1	0.1	N/A	N/A	3.1
1996			0.9	0.9	1.5	N/A	N/A	3.1
1997			0.8	0.8	1.5	N/A	N/A	3.1
Subtotal	8		982.4	1030.6	1377.1	613.8	473.1	
Appropriation: MILCON								
1983				1.1	1.2	1.2	1.2	4.9
1984				8.8	10.1	10.1	10.1	3.8
1985								3.4
1986				7.1	8.6	7.6	7.6	2.8
1987				11.4	14.3	14.3	14.3	2.7
1988				5.6	7.3	7.3	6.9	3.1
1989				12.9	17.5	0.0	0.0	4.2
1990								4.0
1991				27.4	40.2	N/A	N/A	4.2
1992								4.0
1993								3.7
1994								3.4
1995								3.1
1996								3.1
1997								3.1
Subtotal				74.3	99.2	40.5	40.1	
Total	9		982.4	1527.8	1990.4	1040.3	883.6	

Reflects Program's Office Records as of 17 Dec 89.

17. Production Rate Data: N/A — OTH-B is not a typical unit production program. Sectors are site unique and vary in costs; therefore production rate data is not applicable.

18. Operating and Support Costs:

A. Assumptions and Ground Rules — Not Available

B. Costs — Not Available

C. Contractor Support Costs - Not Applicable

(1) N-9 CV HELO

SAR-89-012

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SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: Aircraft Carrier Inner Zone Anti-Submarine Warfare Helo (SH-60F)

AS OF DATE: December 31, 1989

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1. (U) Designation and Nomenclature (Popular Name): Aircraft Carrier Inner Zone Anti-Submarine Warfare Helo (SH-60F)

2. (U) DoD Component: U.S. Navy

3. (U) Responsible Office and Telephone Number:

Commander, Naval Air Systems Command
Naval Air Systems Command Headquarters
PMA-266
Washington, DC 20361-1266

PM: CAPT B.D. Strong
Assigned: August 8, 1988
AV 286-1534; COMM (202)746-1534

4. (U) Program Elements/Procurement Line Items:

RDT&E,N: PE 0604228N PE 0604229N
PROCUREMENT: APPN 1506 ICN 0183 PE 0204233N, PE 0204262N
MILCON: PE 0204696N (Shared funding)

5. (U) Related Programs: Army UH-60A BLACK HAWK; Army EH-60A Quickfix; Air Force HH-60A NIGHT HAWK; Navy SH-60B SEAHAWK; SH-60F Trainer; Navy HH-60H Helicopter Combat Support Aircraft; Coast Guard HH-60J Medium Range Recovery Helicopter.

90-C-0657

(b)(1)

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6. Mission and Description: The CV Inner Zone Anti-Submarine (ASW) Helicopter p[redacted]s Aircraft Carrier Battle Groups (CVBG) with quick reaction Inner Zone ASW protection (up to 50 NM). This vehicle will replace the aging SH-3H. Primary mission is Inner Zone ASW. Secondary missions include: Anti Air Warfare (CHAFF); Command, Control and Communication; Fleet Support Operations (including plane guard, MEDEVAC and Search and Rescue); logistics support and surveillance. All mission requirements are satisfied.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- From the full and open competition held in FY 1984, Sikorsky Aircraft Division of United Technologies was selected as the prime contractor for the CV Inner Zone ASW Helo. A letter contract consisting of Not-To-Exceed (NTE) prices for development and options for five lots of production aircraft was signed on February 28, 1985. The firm fixed price contract for the development portion was definitized August 1986. The U.S. Navy accepted delivery of the first SH-60F aircraft in June 1987 and the second aircraft in September 1987. Sikorsky demonstrated the entire avionics system and the AQS-13F integration at the Hardware/Software Integration Facility (HSIF) in Stratford, Connecticut and at the test facility in West Palm Beach, Florida in June 1987 (DT-IID). In October 1987, Naval Air Test Center (NATC) conducted ground and flight tests at NATC to evaluate the ability to meet technical thresholds and on the USS Theodore Roosevelt (CVN-70) to demonstrate CV compatibility (DT-IIE/Phase 1). NATC and Commander, Operational Test and Evaluation Force (COMOPTEVFOR) performed ground and flight tests in November 1987. VX-1 and NATC tested operational effectiveness and operational suitability of the SH-60F Weapons System on two fully integrated aircraft at Atlantic Underwater Test and Evaluation Center (DT-IIE/Phase 2 and OT-IIB combined). On completion o[redacted]hnical Evaluation (TECHEVAL) in November 1987, the SH-60F was certified ready to p[redacted]d to Operational Evaluation (OPEVAL). In January 1988 OPEVAL (OT-IIC) was completed b[redacted]OPTEVFOR aboard the USS Dwight D. Eisenhower (CVN-69). In February 1988, phase 3 of DT-IIE was started by NATC personnel. The Defense Acquisition Board (DAB) granted approval for full production to the SH-60F on March 25, 1988. The Acquisition Decision Memorandum (ADM) was signed on April 28, 1988. The Lot III option (18 aircraft) was definitized in September 1988. In October 1988, NATC completed DT-IIE/F which evaluated contractor corrective actions of aircraft and avionics deficiencies noted during prior DT/OT periods.

b. (U) Significant Developments Since Last Report -- Follow-On Test and Evaluation (FOT&E), OT-IIIA, was completed in March 1989. Initial test results prompted an OSD decision to hold FY89 procurement funds for aircraft and delete all FY90 (Lot V) aircraft funding for the program until additional testing could be completed. After further examination of the test results by the Conventional Systems Committee in July 1989, FY89 funds were released and partial support and spares funding was restored in FY90. The Lot V option of the contract will be exercised for the FY91 procurement. In September 1989 Lot II deliveries were completed and Initial Operating Capability was attained as scheduled. DT-IIG was started in September 1989 by NATC personnel to verify corrections to deficiencies from previous DT/OT periods. The joint SH-60F/SH-60B multi- year procurement was approved by Congress in October 1989. Four Lot III aircraft had been delivered by December 1989.

8. (U) Threshold Breaches: The DAE Baseline of 31 Dec 88 is breached in the development threshold. The development threshold breach was caused entirely by the inclusion of the A[redacted]ne Low Frequency Sonar (ALFS) costs in the SH-60F funding profile starting with this [redacted].

c. (U) Schedules --

a. (U) Milestones	Prod Estimate	Approved Program	Current Estimate
(U) Justification for Major System New Start (JMSNS) Submitted	Aug 82	N/A	Aug 82
(U) SECDEF Approved FY 1984 New Start	Aug 82	N/A	Aug 82
(U) Milestone I (DSARC)	Jun 83	N/A	Jun 83
(U) SECDEF Decision Memoradum (SDDM) MS I Approval	May 84	N/A	May 84
(U) Request for Proposal Release	Jun 84	N/A	Jun 84
(U) Proposals Received	Aug 84	N/A	Aug 84
(U) Milestone II (DSARC)	Jan 85	N/A	Jan 85
(U) SDDM Milestone II Approval	Feb 85	N/A	Feb 85
(U) Contract Award for SH-60F	Feb 85	N/A	Feb 85
(U) Award Production Lots I & II Long Lead Contracts	Jan 86	N/A	Jan 86
(U) Award Lot III Long Lead Contract	Jan 87	N/A	Mar 87
(U) Operational Evaluation	Nov 87-Dec 87	Nov 87-Jan 88	Nov 87-Jan 88
(U) Milestone III (DAB)	Mar 88	Mar 88	Mar 88
(U) Initial Operating Capability (IOC)	4 Qtr 89	4 Qtr 89	4 Qtr 89

b. (U) Previous Change Explanations --

None.

c. (U) Current Change Explanations --

None.

d. (U) References --

Production Estimate: DCP, "CV Inner Zone ASW Helicopter (SH-60F)", Rev 1, dated March 1, 1988.

Approved Program: DAE Baseline 31 December 1988.

10. (U) Technical/Operational Characteristics

	Prod Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
a. (U) Technical --				
(U) Air Vehicle				
(U) Endurance, ASW mission (Hrs) 1/, 2/				
(U) Dash speed (KTAS) 1/, 2/				
(U) CV spotting factor 4/				
(U) Mission System - (AQS-13F)				
(U) Range accuracy				
(U) Bearing accuracy (S/N=+10db)				
(U) Source level 5/				
(U) Minimum detectable S/N ratio 6/				
(U) Reliability & Maintainability				
(U) Elapsed maintenance time per maintenance action (hrs)				
(U) Mission capable rate (MC)				
(U) Full mission capable rate (FMC)				
(U) Mean flight hours between critical failures (MFHBCF):				
(U) ASW - weapons system				
(U) ASW - avionics including sonar				
(U) Mean time to repair - avionics				
(U) - sonar, O level				
(U) - weapons system				
(U) Time to launch - Condition I 7/				
(U) - Condition II 7/				
(U) - Condition III 7/				
b. (U) Operational --				
(U) Prob. of detection given detectability (P_d) 8/				
(U) Prob. of redetection (P_{dr}): 9/ (time late (TL) in minutes) (speed of advance (SOA) in kts)				
(U) TL = 10 / Sub SOA = 5				
(U) TL = 10 / Sub SOA = 15				
(U) TL = 10 / Sub SOA = 30				
(U) TL = 20 / Sub SOA = 5				
(U) TL = 20 / Sub SOA = 15				
(U) TL = 20 / Sub SOA = 30				
(U) TL = 30 / Sub SOA = 5				
(U) TL = 30 / Sub SOA = 15				
(U) TL = 30 / Sub SOA = 30				

(b)(1)

(U) Technical/Operational Characteristics: (Cont'd)

	Prod Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
b. (U) Operational (Cont'd)				
(S) Prob. of correct classification (sub or non-sub) given detection				
(S) Prob. of completing attack within 10 minutes, given correct classification				
(S) Prob. of proper weapon placement, given correct classification				
(S) Prob. of properly completing reattack within 8 minutes of initial attack				
(S) Prob. of proper weapon placement during reattack				
(S) Time to launch to first dip at 50 nm from CV (min) 10/				
(S) Time to relocate between dip stations 50 nm apart (min) 10/				
(S) Minimum time on station (hrs) 11/				
(U) Reliability 12/				
Inner Zone Helicopter System				
(S) Prob. of completing a 4 hour mission without a critical failure				
(S) MFHBCF - ASW (weapons system)				
(S) - ASW (avionics, including sona				
AN/AQS-13F Sonar Subsystem				
(S) Prob. of completing 4 hour mission without a critical failure				
(U) Maintainability				
(S) Mean time to Repair - airframe				
(S) - engine				
(S) - avionics				
(S) - sonar				
(S) Direct maintenance manhours per flight hour (weapon system)				
(U) Availability 13/				
(S) $A_o = \frac{\text{Uptime}}{\text{Uptime + Downtime}}$				

(b)(1)

1. Technical/Operational Characteristics: (Cont'd)

NOTES:

( ) All effectiveness probabilities assume an operable aircraft and operations in sea states through 5.

1/ ( ) ASW configuration (Crew of 4, 2 Mk 50 torpedoes, one external fuel tank) 40% time in hover, sea level, 90°F day, no wind.

2/ ( ) Mission time is reduced t(b)(1) hours for SH-60F in ASW configuration with 14 sonobuoys. Due to maximum TOGW considerations carrying 14 "A" size sonobuoys requires removal of external fuel tank and LH pylon.

3/ ( ) ASW gross weight and configuration, maximum continuous power.

4/ ( ) Folded, relative to A-7 airplane.

5/ ( ) Referenced to 1 micropascal at 1 yard.

6/ ( ) Referenced to 1 micropascal using 700 ms transmit pulse length at 100 Hz bandwith, P_d=50%, P_{fa}= 1.5 x 10^{-6}.

7/ ( ) Condition I. The aircraft shall be spotted for immediate launch. It shall be headed into the relative wind, with rotor blades spread, starting equipment plugged in, and a Landing Signalman (LSE), starting crewman, plane captain, and required plane handlers standing by. Unless otherwise directed by the aircraft handling officer, at least four tiedowns shall be attached to the aircraft. The flight crew shall be ready for launch in all respects, with all personal equipment attached and adjusted as in flight. When the air officer passes the word to stand by to launch the Condition I helicopter(s), engines shall be started without further instructions; however, rotor engagement and launch shall be positively controlled by PRI-FLY.

( ) Condition II. The same condition apply as for Condition I, except that flight crews shall stand by in the ready rooms.

( ) Condition III. Main rotor blades may be folded and the aircraft need not be in position for immediate launch; however, it must be parked to allow direct access to a suitable launch spot. A towbar shall be attached to the aircraft and specific LSE, tractor driver, handling crew, and starting crewman shall be designated and assigned to each helicopter. Flight crews should be briefed for launch and be standing by in a designated location.

(b)(1)

8/ ( )

9/ ( )

10/ ( ) Sea level, tropical day, ASW configuration, ASW gross weight, transiting at maximum continuous power, no wind.

11/ ( ) Time-on-station does not include transit time to and from CV. Fifty percent of on-station time is spent in no-wind hovering operations.

1. (U) Technical/Operational Characteristics: (Cont'd)

NOTES: (Cont'd)

12. (U) Hardware and software failures are defined as follows:

Critical. Prevents the system from performing its mission.

Major. Causes the system to lose some operational capability, and degrades mission accomplishment. If detected before the mission, would probably be mission aborting.

Minor. Affects performance but can be worked around to avoid impacting the mission.

(b)(1)

c. ( ) Previous Change Explanations -- None.

d. ( ) Current Change Explanations -- None.

e. ( ) References --

Production Estimate: DCP, "CV Inner Zone ASW Helicopter (SH-60F)", Rev 1, dated March 1, 1988.

Approved Program: DAE Baseline 31 December 1988.

1. a. Program Acquisition Cost: (Current Estimate in Millions of Dollars)
Cost --

	Production Estimate	Approved Program	Current Estimate
Development (RDT&E,N)	$59.5	$59.6	$131.3
Procurement	2606.4	2587.9	2613.9
Airframe	(1668.5)	(1711.3)	(1733.1)
Engine	(156.4)	(157.7)	(146.8)
Avionics	(51.9)	(56.2)	(49.5)
Total Flyaway	(1876.8)	(1925.2)	(1929.4)
Other Wpn Sys Cost	(555.4)	(525.0)	(500.0)
Initial Spares	(174.2)	(137.7)	(184.5)
Construction (MILCON)	25.9	24.3	24.3
Total FY 88 Base-Year $	2691.8	2671.8	2769.5
Escalation	482.0	446.8	731.2
Development (RDT&E,N)	(-4.2)	(-3.8)	(10.6)
Procurement	(484.4)	(448.9)	(718.9)
Construction (MILCON)	(1.8)	(1.7)	(1.7)
Total Then-Year $	$3173.8	3118.6	$3500.7

	Production Estimate	Approved Program	Current Estimate
b. Quantities --			
Development (RDT&E,N)	(b)(1)		
Procurement			
Total			

c. Foreign Military Sales -- None

d. Nuclear Costs -- None.

e. References --

Production Estimate: DCP, "CV Inner Zone ASW Helicopter (SH-60F)", Rev 1, dated March 1, 1988.

Approved Program: DAE Baseline 31 December 1988.

Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

		Current Year		Budget Year
		SAR Current Estimate Dec 89	UCR Baseline Estimate Dec 88	UCR Baseline Estimate Dec 89
a.	Program Acquisition --			
	(1) Cost	3500.7	3118.6	3500.7
	(2) Quantity	(b)(1)		
	(3) Unit Cost			
b.	Current Procurement --	(FY 1990)	(FY 1990) APPN ACT	(FY 1991)
	(1) Cost	107.2	107.2	288.0
	Less CY Adv Proc	-54.0	-54.0	-39.6
	Plus PY Adv Proc	+ 0.0	+ 0.0	+15.9
	Net Total	53.2	53.2	264.3
	(2) Quantity	0	0	18
	(3) Unit Cost	N/A	N/A	14.7

13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E,N	PROC	MILCON	TOTAL
Production Estimate	55.3	3090.8	27.7	3173.8
Previous Changes:				
Economic	+0.3	-32.5	-	-32.2
Quantity	-	-	-	-
Schedule	-	-4.3	-	-4.3
Engineering	-	+39.6	-	+39.6
Estimating	+0.2	+12.2	-1.7	+10.7
Other	-	-	-	-
Support	-	-69.0	-	-69.0
Subtotal	+0.5	-54.0	-1.7	-55.2
Current Changes:				
Economic	-	+200.4	-	+200.4
Quantity	-	-	-	-
Schedule	-	+39.0	-	+39.0
Engineering	+86.1	-	-	+86.1
Estimating	-	+17.6	-	+17.6
Other	-	-	-	-
Support	-	+39.0	-	+39.0
Subtotal	+86.1	+296.0	0.0	+382.1
Total Changes	+86.6	+242.0	-1.7	+326.9
Current Estimate	141.9	3332.8	26.0	3500.7

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13. Cost Variance Analysis: (Cont'd)

(FY 88 Constant (Base-Year) Dollars in Millions)

	RDT&E,N	PROC	MILCON	TOTAL
Production Estimate	59.3	2606.4	25.9	2691.8
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	+2.4	-	+2.4
Engineering	-	+33.7	-	+33.7
Estimating	+0.1	+12.3	-1.6	+10.8
Other	-	-	-	-
Support	-	-66.9	-	-66.9
Subtotal	+0.1	-18.5	-1.6	-20.0
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-9.0	-	-9.0
Engineering	+71.7	-	-	+71.7
Estimating	-	+13.0	-	+13.0
Other	-	-	-	-
Support	-	+22.0	-	+22.0
Subtotal	+71.7	+26.0	0.0	+97.7
Total Changes	+71.8	+7.5	-1.6	+77.7
Current Estimate	131.3	2613.9	24.3	2769.5

Previous Change Explanations --

(1) RDT&E,N -
Economic: Revised escalation indices.
Estimating: Revised cost estimates for testing.

(2) Procurement -
Economic: Revised escalation indices.
Schedule: Revised procurement schedule.
Engineering: Incorporation of HEELS, GPS, Sonobuoy Launcher and FIR.
Estimating: Increase in flyaway costs in FY-88 through FY-90 with no increase in total contract NTE
Support: Decrease in support areas in FY-88 through FY-90 contract NTEs; reduction of spares funding.

(3) MILCON -
Estimating: P-138 (Mod to Engine Maintenance Facility) not funded.

c. Current Changes Explanations --

	BY 88$	TY$
(1) RDT&E,N -		
Development and integration of Airborne Low Frequency Sonar (ALFS) (Engineering)	+71.7	+86.1

13. Cost Variance Analysis: (Cont'd)

c. Current Changes Explanations -- (Cont'd)

	BY $M	TY$
(2) Procurement -		
Revised escalation indices. (Economic)	-	+200.4
Revised procurement schedule due to FY-90 aircraft being procured in FY-98. (Schedule)	-9.0	+39.0
Increase in negotiated overhead rates of major contractor. (Estimating)	+13.0	+17.6
Increase due to delay in procurement of support items and increased funding for existing spares requirements. (Support)	+22.0	+39.0

(3) MILCON - None.

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

a. Initial SAR Estimate/Development Estimate to Production Estimate --

PAUC (Initial/Dev SAR Est)	Changes								PAUC (Prod Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
(b)(1)									

b. Production Estimate to Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Curr Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
(b)(1)									

c. References --

Production Estimate: DCP, "CV Inner Zone ASW Helicopter (SH-60F)", Rev 1, dated March 1, 1988.

Approved Program: DAE Baseline 31 December 1988.

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1[redacted]) Contract Information: (Then-Year Dollars in Millions)

a. RDT&E,N -- Not Applicable.

b. APN --

Airframe:	Initial Contract Price Target	Ceiling	Qty
Sikorsky Aircraft Division, Stratford CT, N00019-85-C-0148, Lot III Award: February 28, 1985 Definitized: September 29, 1988	$235.6	N/A	18

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$235.6	N/A	18	$240.9	$240.9

Cost/Schedule Variance is not applicable to firm fixed price contract.

Airframe:	Initial Contract Price Target	Ceiling	Qty
Sikorsky Aircraft Division, Stratford CT, N00019-85-C-0148, Lot IV Award: February 28, 1985 Definitized: August 9, 1989	$296.0	N/A	18

Current Contract Price [redacted]arget	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
296.0	N/A	N/A	$296.0	$296.0

Cost/Schedule Variance is not applicable to firm fixed price contract.

c. MILCON -- Not Applicable.

16. [redacted] Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 41.2% (7 yrs/17 yrs)
(2) Percent Program Cost Appropriated: 31.5% (1101.2/3500.7)

[redacted] Program Funding Summary:

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY84-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-2000)	Total
RDT&E,N	55.8	11.8	12.7	61.6	141.9
Procurement	900.4	107.2	288.0	2,037.2	3,332.8
MILCON	26.0	-	-	-	26.0
Total	982.2	119.0	300.7	2,098.8	3,500.7

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY88 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E,N								
1984		20.3		20.3	18.4	18.4	15.8	3.8
1985		20.4		20.4	19.1	19.1	18.4	3.4
[redacted]6		12.1		12.1	11.6	11.6	11.2	2.8
[redacted]7		6.8		6.8	6.7	6.7	5.6	2.7
1988		0.0		0.0	0.0	-	-	3.0
1989		0.0		0.0	0.0	-	-	4.2
1990		10.6		10.6	11.8	-	-	4.0
1991		11.0		11.0	12.7	-	-	4.2
1992		22.8		22.8	27.3	-	-	4.0
1993		18.1		18.1	22.5	-	-	3.7
1994		9.2		9.2	11.8	-	-	3.4
Subtotal		131.3		131.3	141.9	55.8	51.0	
Appropriation: Procurement								
1986				29.8	30.5	30.5	29.8	2.8
1987	7	18.4	112.5	158.2	163.1	163.1	141.3	2.7
1988	18		208.0	310.6	333.4	332.4	140.8	3.0
1989	18	2.8	206.1	333.4	373.4	364.4	12.3	4.2
1990	0		-	89.4	107.2	2.9	-	4.0
1991	[redacted]	2.5	187.7	237.8	288.0	-	-	4.2
1992	(b)(1)		127.4	144.7	181.2	-	-	4.0
1993			124.5	141.7	182.8	-	-	3.7
1994			122.1	143.2	190.8	-	-	3.4
1995			139.4	196.1	269.1	-	-	3.1
1996			181.6	242.3	343.1	-	-	3.1
1997			243.6	291.9	425.8	-	-	3.1
[redacted]8			247.7	253.5	379.7	-	-	3.1
[redacted]9				21.5	33.2	-	-	3.1
2000				19.8	31.5	-	-	3.1
Subtotal		23.7	1900.6	2613.9	3332.8	893.4	324.2	

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16. (U) Program Funding Summary: (Cont'd)

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY88 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: MILCON								
1988		16.2		16.2	17.2	17.2	12.2	3.0
1989		8.1		8.1	8.8	8.8	1.6	4.2
1990		-		-	-	-	-	-
Subtotal		24.3		24.3	26.0	26.0	13.8	
TOTAL				2769.5	3500.7			

17. (U) Production Rate Data:

a. Annual Production Rates -- The maximum economic production rate of 60 aircraft per year is the total of SH-60B, SH-60F, HH-60H, HH-60J, S-70C(M) (Taiwan) and S-70B-2 (Australia) that can be produced with existing tooling and facilities.

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1987	7	7	7	60
1988	18	18	18	60
1989	18	18	18	60
1990	18	18	0	0
1991	12	12	18	0
1992	12	12	(b)(1)	0
1993	12	12		0
1994	12	12		0
1995	11	11		0
1996	24	24		0
1997	24	24		0
1998	7	7		0

b. Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE Less PdE)	Current Estimate	Variance (CE Less Max)	Maximum Economic
Prog Acq Cost (BY $)	2691.8	77.7	2769.5	104.6	2664.9
(TY $)	3173.8	326.9	3500.7	468.9	3031.8
(BY $)	15.4	0.4	(b)(1)		15.2
(TY $)	18.1	1.9			17.3

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[redacted] Production Rate Data (Cont'd):

[redacted]c. Schedule Variance --

Item	Production Estimate	Variance (CE Less PdE)	Current Estimate	Variance (CE Less Max)	Maximum Economic
Start Date (mo/yr)	7/87	N/A	7/87	N/A	7/87
Duration (in months)	149	-	149	-109	40
End Date (mo/yr)	12/99	N/A	12/99	N/A	10/90

d. Deliveries --

	Deliveries to Date
RDT&E,N	N/A / N/A
Procurement	11 Planned / 11 Actual

18. [redacted] Operating and Support Costs:

a. Assumptions and Ground Rules -- This O&S estimate is based on each aircraft flying 660 hours, or an operational squadron, of 6 aircraft, flying 3960 hours a year. The maintenance concept for both the SH-60F and the antecedent system is for organic support at all three levels of maintenance. Estimates for the SH-60F avionics assume a 50% increase in the reliability of the AQS-13F over the AQS-13E onboard the SH-3H.

[redacted]nnel costs are for all people assigned to the squadron required to operate and [redacted]ain the aircraft according to the Preliminary Squadron Manning Document of September 1987 and are prepared using the Billet Cost Model. This cost also includes the cost of administrative and staff personnel required for the operational control of the squadron. The O&S consumable cost is for fuel, training expendables and other consumables used in the direct support of the weapons system. Direct depot maintenance contains the cost of Scheduled Depot Level Maintenance (SDLM), engine repair/rework and components repair. The sustaining investment cost is for replenishment spares, support equipment maintenance, simulator maintenance, trainer maintenance and software support. Indirect costs are for base operating and health care support personnel and the materials required by these two groups.

Assumptions and ground rules for the SH-60F and the SH-3H are the same, unless otherwise annotated.

(4) Operating and Support Costs (Cont'd):

b. Costs --

(FY 1988 Constant (Base-Year) Dollars in Millions)		
Cost Element	Avg Annual Cost Per SH-60F Squadron	Avg Annual Cost Per SH-3H Squadron (Antecedent)
Personnel	7.189	8.114
O&S Consumables	1.340	1.945
Direct Depot Maintenance	1.831	2.131
Sustaining Investment	.627	.782
Other Direct Costs		
Indirect Costs	.337	.349
Total	11.324	13.320

Source: SH-60F: Naval Air Systems Command Cost Analysis Division Operating and Support Cost Estimates for SH-60F dated January 21, 1988 and updated January 26, 1990 to reflect new escalation indices.
SH-3H: Naval Air Systems Command Cost Analysis Division Operating and Support Cost Estimates for SH-3H dated January 21, 1988 and updated January 26, 1990 to reflect new escalation indices.

Contractor Support Services --

	(Then-Year Dollars in Millions)				
	FY 1989 & Prior*	FY 1990 Year	FY 1991 Year	Balance to Complete	Total
O&M,N	0.8	1.5	2.2		4.5
Industrial Fund	0.0	0.0	0.0		0.0
Total	0.8	1.5	2.2		4.5

* Includes FY 1988 and FY 1989 only. FY 1987 and prior years not available.

SAR-87-127

A-24 SINCGARS

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)

PROGRAM: SINGLE CHANNEL GROUND AND AIRBORNE RADIO SYSTEM (SINCGARS)

AS OF DATE: December 31, 1989

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1. Designation/Nomenclature (Popular Name):

AN/PRC-119()(V); AN/VRC-87()(V) thru AN/VRC-92()(V) and AN/ARC-201() / Single Channel Ground and Airborne Radio System (SINCGARS)

2. DoD Component: U.S. Army

3. Responsible Office and Telephone Number:

Project Manager, SINCGARS
PEO, Communications Systems
Fort Monmouth, NJ 07703

PM: COL Domenic F. Basile
Assigned: 1 August 1986
AUTOVON: 995-3063
Commercial: 201-544-3063

4. Program Elements/Procurement Line Items:

RDTE:	PE 63746A	Project D555	(Shared Funding)
	PE 64805A	Project D282	
PROCUREMENT:	APPN 2031	SSN AZ3500	
	APPN 2031	SSN AA0974	(Shared Funding)
	APPN 2035	SSN B00500	
	APPN 2035	SSN B00508	
	APPN 2035	SSN Z16800	
	APPN 2035	SSN BA9520	(Shared Funding)
	APPN 2035	SSN B45500	(Shared Funding)
	APPN 2035	SSN T99500	(Shared Funding)

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1

5. Related Programs: None.

6. Mission and Description:

SINCGARS is a new family of VHF-FM combat net radios which provides the primary means of command and control for Infantry, Armor and Artillery Units. The SINCGARS system is designed on a modular basis to achieve maximum commonality among the various ground and airborne system configurations. A common receiver-transmitter (RT) is used in the manpack and all vehicular configurations. The SINCGARS family of radios has the capability to transmit and receive voice, tactical data and record traffic messages and is consistent with NATO interoperability requirements. The system will operate on any of the 2320 channels between 30-88 Megahertz and is designed to survive in a nuclear environment. Communication Security (COMSEC) for the basic radio is provided by use of the VINSON device. An Integrated COMSEC (ICOM) version of the SINCGARS is currently being developed. The SINCGARS system will be operable in a hostile environment through use of electronic counter-counter measures (ECCM). SINCGARS will replace the currently standard manpack and vehicular radios, the AN/PRC-77 and the AN/VRC-12 family, respectively. An airborne version of the SINCGARS radio is now in production and will replace the currently standard aircraft radios, the AN/ARC-114 and AN/ARC-131.

7. Program Highlights:

a. Significant Historical Developments — DA approved the SINCGARS ROC in Dec 74. In Jun 77, the VCSA direction resulted in a decision to proceed from AD directly into production. The decision was made Dec 81 to further accelerate delivery of Advanced Development Models (ADMs) for limited DT/OT. The SINCGARS ground radio production hardware was type classified standard at ASARC III in Sep 83. A single year production contract was awarded in Dec 83, Option 1 in Nov 84 and Option 2 in May 85 to International Telephone and Telegraph (ITT) Aerospace/Optical Div. (A/OD), Ft. Wayne, IN. The initial SINCGARS airborne radio production contract (single year plus three options) was awarded to ITT in May 85. First Article Test (FAT) on the ground radio surfaced problems causing a stretch-out of the test schedule and delays in production deliveries. Reliability problems caused additional delay and prompted the PM to pursue a rebaselining of the contract which was accomplished in November 1987. A Test-Analyze and Fix (TAAF) effort was implemented by ITT which corrected failures and improved reliability. An evaluation of potential NDI candidates revealed that no suitable sources were available for an interim/replacement combat net radio. The alternative source strategy was approved and documented in a February 12, 1987 Secretary of Defense Decision Memorandum (SDDM) and was to independently select and manage a second source which would be form, fit, function equivalent to ITT A/OD Integrated COMSEC (ICOM) SINCGARS at the Line Replaceable Unit (LRU) level. In January 1988, First Article Test on the ground radio was successfully completed and accepted. Deliveries of fully compliant production radios began with the shipment of radios for the Follow-on Test and Evaluation (FOT&E). The SINCGARS Program Baseline was approved by the Defense Acquisition Executive (DAE) on February 26, 1988. The ICOM Engineering Change Proposal (ECP) was incorporated into the ground production contract on May 26, 1988. On April 21, 1988, Option I for 720 airborne radios was exercised. Award of the second source ground production contract was made to General Dynamics on July 15, 1988. The ground radio FOT&E was successfully completed at Fort Sill, OK in early May 1988. An Airborne SINCGARS Early User Test and Evaluation (EUTE) was conducted concurrent with the Ground FOTE to facilitate evaluation of all areas which could be tested at this stage of the airborne production. Mutual Interference Test (MINT) field data collection phase was concluded June 14, 1988 with the final report to be briefed to the Milestone IIIB Defense Acquisition Board (DAB). Fielding of the SINCGARS radio was made to Fort Sill, Oklahoma (160 radios) in July, and Fort Gordon, Georgia, (130 radios) in August 1988. Airborne First Article Testing was completed in late September

1988. Reliability achieved was 944 hours (80% Lower Confidence Level (LCL)) against a 750 hour (80% LCL) contractual requirement. Formal Airborne FAT report has been accepted.

b. Significant Developments Since Last Report — The Army has been authorized to proceed with final production of the non-ICOM radio. Deliveries of ICOM radios were capped by the Defense Acquisition Executive (DAE) memo of 14 Jun 89. The cap on ICOM deliveries requires that the ITT ground and airborne contract delivery schedules be revised to reduce monthly deliveries and extend the delivery period. The program being pursued by the Army is to defer procurement of airborne radios until FY 91 and use those funds for program stretch. The second source ground radio production contract with General Dynamics is not affected by the DAE memo at this time. Airborne radio contract option 2 was awarded to ITT in April 1989 and ground radio contract option 3 was awarded to ITT in June 1989. Full fielding to Korea of the non-ICOM radio began in November 1989 and is proceeding well.

The SINCGARS is expected to satisfy mission requirements.

c. Changes Since the As of Date: As a result of a Milestone IIIB (non-ICOM) decision, a revised Program Baseline was submitted and approved by the DAE on March 6, 1990. The SINCGARS Test and Evaluation Master Plan (TEMP) was approved on January 19, 1990.

8. Threshold Breaches: There are no DAE Baseline (dated March 6, 1990) breaches.

9. Schedule:

a. Milestones —

	Production Estimate	Approved Program	Current Estimate	
Milestone 0 (ROC Approval)	Dec 74	NA	Dec 74	
ASARC I	Oct 75	NA	Oct 75	
Milestone I (DSARC I)	Feb 76	NA	Feb 76	
Award AD Contracts	Apr 78	NA	Apr 78	
Milestone IIIA (ASARC III)	Sep 83	Sep 83	Sep 83	
Complete DT/OT - I/II	Dec 83	NA	Dec 83	
Complete Limited DT/OT	Dec 82	NA	Dec 82	
Complete Maturity DT/OT	Dec 83	NA	Dec 83	
Initial Production (Ground ITT) Contract Award	Dec 83	Dec 83	Dec 83	
Initial Airborne Production Contract Award	N/A	May 85	May 85	
JRMB-Level Program Review	N/A	Dec 86	Dec 86	
Ground (ITT) FAT Complete	Jun 85	Jan 88	Jan 88	
Ground (ITT) Production Delivery Begins	Aug 85	Jan 88	Jan 88	
Airborne Option I Award	N/A	Apr 88	Apr 88	
Complete Ground (ITT) Follow-on Evaluation				
Operational Test: Start	N/A	N/A	N/A	(Ch-1)
Complete	N/A	N/A	N/A	(Ch-1)
Ground (ITT) Option 1 Delivery Begins	N/A	May 88	May 88	
Initial Ground Second Source (General Dynamics) (GD) Award	N/A	Jul 88	Jul 88	
Airborne First Article Test Complete	N/A	Sep 88	Sep 88	
Airborne Production Delivery Begins	N/A	Nov 88	Nov 88	
Integrated COMSEC (ICOM) EUTE	N/A	Nov 88	Nov 88	
Milestone IIIB (DAB) (Non-ICOM)	N/A	Mar 89	Mar 89	(Ch-2)
Airborne Option 2 Award	N/A	Apr 89	Apr 89	(Ch-3)
Ground (ITT) Option 3 Award	N/A	Jun 89	Jun 89	(Ch-4)
Ground (ITT) Option 2 Delivery Begins	N/A	Jun 89	Jun 89	
Airborne Option 1 Delivery Begins	N/A	Aug 89	Aug 89	(Ch-5)
Airborne Option 2 Delivery Begins	N/A	May 90	May 90	
ICOM IOTE (ITT)	N/A	Jun 90	Jun 90	(Ch-6)
Ground (ITT) Option 3 Delivery Begins	N/A	Jul 90	Jul 90	
Milestone IIIB (ICOM) - ITT Full Rate and GD Low Rate Option 1	N/A	Sep 90	Sep 90	(Ch-6)
Ground (GD) Option 1 Award (Low Rate)	N/A	Sep 90	Sep 90	(Ch-7)
Airborne Option 3 Award	N/A	Nov 90	Nov 90	(Ch-6)
Ground (ITT) Option 4 Award	N/A	Nov 90	Nov 90	(Ch-6)
IOC (1st Div Equipped)	Oct 87	Dec 90	Dec 90	
ICOM FOTE (GD)	N/A	Mar 91	Mar 91	(Ch-6)
Milestone IIIB (DAB) - GD Full Rate	N/A	Jul 91	Jul 91	(Ch-6)
Ground (GD) First Article Test Complete	N/A	Jul 91	Jul 91	(Ch-7)
Ground (GD) Production Delivery Begins	N/A	Jul 91	Jul 91	(Ch-7)
Ground (GD) Option 2 Award	N/A	Jul 91	Jul 91	(Ch-7)
Ground (GD) Option 1 Delivery Begins	N/A	Dec 91	Dec 91	
Airborne Option 3 Delivery Begins	N/A	Jan 92	Jan 92	(Ch-6)
Ground (ITT) Option 4 Delivery Begins	N/A	Jan 92	Jan 92	(Ch-6)
Ground (GD) Option 2 Delivery Begins	N/A	Nov 92	Nov 92	

b. Previous Change Explanations —
Late start of First Article Test (FAT) plus problems encountered during the first phase of testing indicated that previous estimates of FAT completion and start of Production Delivery would not be met. FAT Completion, First Production Deliveries, Third Option Award and IOC were revised in accordance with the schedule presented at the December 1986 Joint Requirements and Management Board (JRMB) (program review). As a result of the contract rebaselining modification signed in November 1987, hardware delivery schedules were revised causing the IOC to be rescheduled from December 1989 to December 1990. DA directed PM SINCGARS to loan 334 radios to the Marine Corps and issue 104 radios to Panama supporting an early fielding.

c. Current Change Explanations -
(Ch-1) These milestones will be deleted in the next SAR.

(Ch-2) Milestone IIIB decision was accomplished in Mar 89 (vs Apr 89) as part of the Command, Control, Communications and Intelligence (C3I) Committee meeting and the formal Defense Acquisition Board (DAB) was not held. The results of the decision were documented in a May DAE memo supplemented by the 14 Jun 89 DAE memo.

(Ch-3) Airborne Option 2 was awarded in Apr 89 (vs Feb 89) as a result of a 30 Nov 88 DAE memo which restricted contractual actions until after the Milestone IIIB decision review.

(Ch-4) Ground (ITT) Option 3 slipped from May 89 to Jun 89 as a result of a 16 May 89 DOD Inspector General (IG) report on Operational Test. The 14 Jun 89 DAE memo permitted the award with certain conditions.

(Ch-5) Airborne Option 1 Delivery began in Aug 89 (vs Jul 89) due to late completion of Production Reliability Acceptance Test (PRAT).

(Ch-6) The ICOM IOTE was rescheduled from Apr 91 to Jun 90 as a result of the 14 Jun 89 DAE memo which capped deliveries of ICOM RTs at 730 per month until completion of additional operational testing. A Milestone IIIB (ICOM: ITT Full Rate and GD Low Rate) was added in Sep 90 and an ICOM Follow-on Test and Evaluation (FOTE) (GD) was added in Mar 91. The decision review scheduled for Jul 91 was changed from a Milestone IIIC (Follow-on Competition) to a Milestone IIIB (GD Full Rate). Airborne Option 3 Award was rescheduled from Feb 90 to Nov 90 with start of Option 3 deliveries rescheduled from May 91 to Jan 92. Ground (ITT) Option 4 Award was rescheduled from May 90 to Nov 90 with Option 4 deliveies beginning in Jan 92 (vs Aug 91).

(Ch-7) Ground Radio (GD) option award and delivery milestones were rescheduled to reflect current Army plans rather than option expiration dates. The new dates are: Ground (GD) Option 1 Award (Low Rate) in Sep 90 (vs Dec 90), Ground (GD) First Article Test Complete in Jul 91 (vs Aug 91), Ground (GD) Production Delivery Begins in Jul 91 (vs Aug 91), and Ground (GD) Option 2 Award in Jul 91 (vs Sep 91).

d. References —
Production Estimate: Draft Decision Coordinating Paper (DCP) #156, dated September 1983, for the Single Channel Ground and Airborne Radio System (SINCGARS).
Approved Program: DAE Baseline, March 6, 1990.

10. Technical/Operational Characteristics: 1/

a. Technical —	Prod Estimate	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
Frequency Band	30-87.975 MHz	30-87.975 MHz/ 30-87.975 MHz	30-87.975 MHz 2/	30-87.975 MHz
Number of Channels	2320	2320/2320	2320 2/	2320
Channel Spacing	25 KHz	25 KHz/25KHz	25 KHz 2/	25 KHz
Weight (Manpack w/COMSEC)	22.5 Lbs	22.5 Lbs/ 22.5 Lbs	22.5 Lbs	22.5 Lbs
Power Requirements	28 Vdc	28 Vdc/28Vdc	28 Vdc 2/	28 Vdc
Communications Range:				
(Voice & Data @ 16 Kbps @ 10^{-1} Ber)				
Manpack	8 KM	8 KM/8 KM	8 KM 3/	8 KM
Vehicular	35 KM	35 KM/35 KM	35 KM 4/	35 KM
Airborne	TBD	35 KM/35 KM	60 KM 5/	35 KM
(Data @ 16 Kbps @ 10^{-3} Ber)				
Manpack	4.5 KM	4 KM/4 KM	2 KM 3/	4 KM
Vehicular	17.5 KM	17 KM/17 KM	27 KM 3/	17 KM
Airborne 6/	N/A	N/A / N/A	N/A	N/A

b. Operational —

Mean Time Between Failure Operational Environment (MTBFOE):				
Ground				
Non-ICOM (less ECCM,DRA)	N/A	1250 Hrs/ 1250 Hrs	2838 Hrs 7/	1250 Hrs
ICOM	N/A	1250 Hrs/ 1250 Hrs		1250 Hrs
Airborne	750 Hrs	750 Hrs/ 750 Hrs	944 8/	750 Hrs
ECCM	3500 Hrs	N/A / N/A	5227 Hrs	3500 Hrs
Mean Time To Repair (MTTR):				
Organizational Level	15 Min	15 Min/15 Min	4.2 Min 9/	15 Min
Intermediate Direct Support (IDS)				
Non-ICOM	N/A	60 Min/ 60 Min	52.2 Min	45 Min/ 60 Min 10/
ICOM	N/A	45 Min/45 Min		45 Min
General Support (GS)	2 Hrs	N/A / N/A	1.78 Hrs 7/	2 Hrs

c. Previous Change Explanations — None.

d. Current Change Explanations — None.

e. References —

Production Estimate: Draft Decision Coordinating Paper (DCP) #156, dated September 1983, for the Single Channel Ground and Airborne Radio System (SINCGARS).

Approved Program: DAE Baseline, March 6, 1990.

10. Technical/Operational Characteristics: (Continued)

FOOTNOTES:

1/ Technical/operational characteristics as displayed above are subject to the following conditions:

a. Technical/operational demonstrated performance is not yet available for the ICOM radio.
b. Data for specified technical and operational demonstrated performance on production models is available from First Article Tests and Follow-on Evaluations.
c. Technical/Operational paramenters are point values not ranges.
d. Measurement conditions for Communications Range: rolling plains; antenna not buried in foliage; average ground; 25% circuit reliability; environmental noise of 17db @ 50 MHz.
e. Since Manpack and Vehicular have the same value for MTBFOE, they have been combined and designated as Ground.
f. The SINCGARS reliability requirement as approved in 1974 has no MTBOMF requirement or DCP threshold. Rather, the requirement is specified as a 1250 hour MTBF under operational conditions. This means that only radio hardware failures are counted, but under field test rather than in a lab.
g. Direct Support Mean Time To Repair (MTTR) is not a cumulative requirement and does not include Organizational Level MTTR.

2/ First Article Test (FAT) models were used.

3/ Demonstrated in the Operational Assessment by Army Development and Employment Agency (ADEA) at Ft. Lewis, WA, Sep 87.

4/ Follow-on Operational Test & Evaluation, Ground non-ICOM, May-Jun 1988, Ft. Sill, OK.

5/ Early User Test and Evaluation, Airborne non-ICOM, May-Jun 1988, Ft.Sill, OK.

6/ The Airborne radio is not used for Data @ 16 Kbps @ 10^{-3} Ber. This parameter is not contained in the DAE Baseline and will be deleted in future SARs.

7/ Demonstrated Production Reliability Acceptance Test (PRAT) results of Sep 88.

8/ Airborne First Article Test Oct-Dec 1988, Ft. Wayne, IN.

9/ Demonstrated in the Maintainability Demonstration (M-Demo) at Ft. Wayne, IN, Jun 87.

10/ This value was changed from 45 to 60 minutes for the non-ICOM radio when it was recognized that the current version of the TMDE required excessive manual intervention during the diagnostic process. It remains 45 minutes for the ICOM radio. Automatic Test Equipment will be used for the ICOM radio, which is not currently available for the non-ICOM version.

11. Program Acquisition Cost: 1/ (Current Estimate in Millions of Dollars)

a. Cost —	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	154.4	190.5	190.5
Procurement	4013.3	3969.2	3969.2
Weapon System	(3609.5)	(3920.1)	(3920.1)
Flyaway	(3583.6)	(3876.5)	(3876.5)
Major System Equip	(3151.8)	(3719.5)	(3719.5)
Ancillary Equip	(431.8)	(157.0)	(157.0)
Other Weapon System	(25.9)	(43.6)	(43.6)
Initial Spares	(403.8)	(49.1)	(49.1)
Construction (MILCON)	0.0	0.0	0.0
Total FY 84 Base-Year $	4167.7	4159.7	4159.7
Escalation	1444.0	2367.6	2367.6
Development (RDT&E)	(-19.0)	(-7.4)	(-7.4)
Procurement	(1463.0)	(2375.0)	(2375.0)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Total Then-Year $	5611.7	6527.3	6527.3

1/ Reflects Army requirements only. Other service requirements include:

	Quantity (RTs)	FY 84 Base-YR $	Then-Year $
USAF	4,476	32.8	44.0
USMC	35,682	258.3	353.3
USN	2,216	15.8	20.4
Total	42,374	306.9	417.7

b. Quantities (RTs) —	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	62	123	123
Procurement	292,853	364,802	364,802
Total	292,915	364,925	364,925

c. Foreign Military Sales — None.

d. Nuclear Costs — None.

e. References -

Production Estimate: Draft Decision Coordinating Paper (DCP) #156, dated September 1983, for the Single Channel Ground and Airborne Radio System (SINCGARS).

Approved Program: DAE Baseline, March 6, 1990.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current [Then Year] Dollars in Millions)

	Current Estimate	UCR Baseline Current Year	UCR Baseline Budget Year
a. Program Acquisition 1/ —	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	6527.3	5831.6	6527.3
(2) Quantity	364,802	364,802	364,802
(3) Unit Cost	.0179	.0160	.0179

1/ This value excludes RDT&E units that are not planned to be part of the inventory objective. Such RDT&E units are not considered fully-configured end items for purposes of this calculation.

b. Current Procurement —	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	101.8	101.8	311.3
Less CY Adv Proc	0	0	0
Plus FY Adv Proc	0	0	0
Net Total	101.8	101.8	311.3
(2) Quantity	1,725	1,725	19,011
(3) Unit Cost	.0590	.0590	.0164

13. Cost Variance Analysis:
a. Summary — (Current [Then Year] Dollars in Millions)

	RDT&E	PROC	TOTAL
Production Estimate	135.4	5476.3	5611.7
Previous Changes:			
Economic	-1.7	-487.5	-489.2
Quantity	+11.3	+1218.1	+1229.4
Schedule	+1.4	+699.3	+700.7
Engineering	+16.3	—	+16.3
Estimating	+39.2	-746.2	-707.0
Other	—	—	—
Support	—	-530.3	-530.3
Subtotal	+66.5	+153.4	+219.9
Current Changes			
Economic	+ 1.5	+ 591.0	+ 592.5
Quantity	—	—	—
Schedule	+ 0.8	+ 181.3	+ 182.1
Engineering	—	—	—
Estimating	- 21.1	- 83.0	- 104.1
Other	—	—	—
Support	—	+ 25.2	+ 25.2
Subtotal	-18.8	+714.5	+695.7
Total Changes	+47.7	+867.9	+915.6
Current Estimate	183.1	6344.2	6527.3

13. Cost Variance Analysis: (Continued)

(FY 84 Constant [Base Year] Dollars in Millions)

	RDT&E	PROC	TOTAL
Production Estimate	154.4	4013.3	4167.7
Previous Changes:			
Quantity	+ 9.7	+754.2	+763.9
Schedule	—	+20.3	+20.3
Engineering	+13.8	—	+13.8
Estimating	+27.6	-413.8	-386.2
Other	—	—	—
Support	—	-389.0	-389.0
Subtotal	+51.1	-28.3	+22.8
Current Changes			
Quantity	—	—	—
Schedule	—	+ 23.6	+23.6
Engineering	—	—	—
Estimating	- 15.0	- 59.1	- 74.1
Other	—	—	—
Support	—	+ 19.7	+ 19.7
Subtotal	-15.0	-15.8	-30.8
Total Changes	+36.1	-44.1	-8.0
Current Estimate	190.5	3969.2	4159.7

b. Previous Change Explanations —

RDT&E

Economic: Revised escalation indices.
Schedule: Effort rescheduled to later years due to funding shortfall.
Quantity: Addition of 45 prototypes for integrated COMSEC (ICOM).
Engineering: Redesign radio and COMSEC device for integrated COMSEC. Increased scope of work for P3I effort.
Estimating: Reduction in FY 86 and FY 87 Program Budget Guidance for engineering development effort, revised estimate for ICOM effort and Installation Kit (IK) development. Adjustment of prior year amounts to actuals. Increased effort for IK and Second Source Test Program Set (TPS) development. Additional effort for product improvement studies and SINCGARS Remote Control Unit (SRCU) development.

PROC

Economic: Revised escalation indices.
Quantity: Reduced requirement for airborne radios; additional radios required due to redefinition of force structure requirement.
Schedule: Stretch-out in procurement due to funding constraints and problems encountered in FAT. Reduced cost in then-year dollars resulting from shortened schedule due to increased annual quantities.

13. Cost Variance Analysis: (Continued)

PROC

Estimating: Revised estimates for warranty, COMSEC module, installation kits, BECS, KGV-10, and revised cost-quantity relationship. Additional requirement for KGV-10s and BECS Electronic Notebooks, OE-254 antennas, and tooling based on increased annual quantities. Revised estimate for airborne radio ICOM production. Revised average unit cost of Army ground radios based on including other service quantities in learning curve calculations. Reduced estimate for warranty based on WARM model and AMC warranty guidance. Reduced hardware cost resulting from applying learning curve through end of production instead of stopping learning after a specified quantity. Adjustment in FY88-89 budget resulting in change to FY98. FY 83-86 program adjusted to actuals. Revised estimate for ground radio production based on prices in second source contract. Reduced requirement for SRCU.

Support: Reduced requirement for radio spares, reclassification of initial spares from procurement to Army Stock Fund (OMA), elimination of spares requirement for KGV-10 and reduced estimate for data. Reduced estimate for initial spares based on requirement identified by SESAME model and reduced hardware cost. Revised estimate for initial spares based on increased cost for spares components.

c. Current Change Explanations —

	(Dollars in Millions) Base Year	Then Year
(1) RDT&E		
Revised escalation indices (Economic)	—	+ 1.5
Effort rescheduled to later years due to shortfall in FY89-91 (Schedule)	—	+0.8
FY76-88 program adjusted to actuals (Estimating)	-0.3	-0.3
Revised estimate for P3I cost studies (Estimating)	-0.5	-0.8
Removal of out year funding designated for SINCGARS follow-on system (Estimating)	-14.2	-20.0
(2) PROCUREMENT		
Revised escalation indices (Economic)	—	+591.0
ICOM deliveries capped pending completion of additional operational testing; additional cost is to revise and extend contract delivery schedules and to reschede balance of program (Schedule) ✓	+23.6	+88.3
Production quantities moved to later years due to shortfall in FYDP period (Schedule)	—	+ 93.0
Increased estimate for initial spares based on increased cost for spares components (Support)	+19.7	+ 25.2
FY 83-88 program adjusted to actuals (Estimating)	-8.9	-10.4
Reduced requirement for the Battlefield Electronics Communications Electronics Operating Instructions (CEOI) System (BECS) due to revised distribution plan (Estimating)	-42.3	-60.3
Revised estimate for ground radio based on revised procurement mix of ITT and GD radios (Estimating)	- 7.9	-12.3

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then Year Dollars)
Initial SAR Estimate to Current Estimate —

PAUC (Production Estimate)	CHANGES								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
.0192	+.0003	-.0005	+.0024	.0000	-.0022	-.0013	.0000	-.0013	.0179

15. Contract Information: (Then Year Dollars in Millions)

a. RDT&E —

SINCGARS Development:

ITT Corp., A/OD, Ft. Wayne, IN,
DAAB07-78-C-0150, CPIF,
Award: 4 April 1978

Initial Contract Price		
Target	Ceiling	Qty
$5.4	N/A	43

Definitized: N/A since scope of contract continues to change.

Current Contract Price 1/			Estimated Price at Completion 1/	
Target	Ceiling	Qty	Contractor	Program Manager
$66.9	N/A	73	$66.9	$66.9

	Cost Variance 2/	Schedule Variance 2/
Previous Cum Variances	0	0
Cumulative Variances to Date (10/31/89)	0	0
Net Change	0	0

Explanation of Change: N/A

b. Procurement —

SINCGARS (Ground):

ITT Corp., A/OD, Ft. Wayne, IN, 3/
DAAB07-84-C-K503, FFP,
Award: 2 December 1983

Initial Contract Price		
Target	Ceiling	Qty
$53.8	N/A	650

Definitized: N/A since all negotiations were definitized at time of award.

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$507.3	N/A	28,100	$507.3	$507.3

SINCGARS (Airborne):

ITT Corp., A/OD, Ft. Wayne, IN, 3/
DAAB07-85-C-K561, FFP,
Award: 31 May 1985

Initial Contract Price		
Target	Ceiling	Qty
$19.5	N/A	150

Definitized: N/A since all negotiations were definitized at time of award.

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$72.4	N/A	2070	$72.4	$72.4

15. Contract Information: (Continued)

1/ Price includes $2M negative fee. This contract is Cost Plus Incentive Fee and includes a negative fee with maximum liability of $2M. The cost sharing portion began at $6M and was "shared" in the ratio of 60(PM)/40(contractor) up to a maximum negative liability of $2M. After that point, any additional cost growth is 100(PM)/0(contractor) sharing. The negative fee ceiling was reached in 1980.

2/ Costs of work scheduled, performed and paid have been the same; therefore, there has not been a variance reported in the CPR.

3/ Cost Performance Report (CPR) is not required for FFP contracts; therefore, there is no variance analysis.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status —

(1) Percent Program Completed : 58.4% (15 yrs/31 yrs)

(2) Percent Program Cost Appropriated: 13.8% ($898.9M/$6527.3)

b. Appropriation Summary — (Then Year Dollars in Millions)

Appropriation	Prior Years (FY 76-89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance To Complete (FY 92-03)	Total
RDT&E	162.6	11.7	1.4	7.4	183.1
Procurement	622.8	101.8	311.3	5308.3	6344.2
APA	19.2	0	0	0	19.2
OPA	603.6	101.8	311.3	5308.3	6325.0
Total	785.4	113.5	312.7	5315.7	6527.3

16. Program Funding Summary: (Continued)

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY 84 Dollars		Total Base Year $	Total Then Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1976	0			.7	.4	.4	.4	6.6
197T	0			.3	.2	.2	.2	2.9
1977	0			3.2	2.0	2.0	2.0	2.6
1978	0			9.4	6.2	6.2	6.2	6.8
1979	0			17.3	12.4	12.4	12.4	8.4
1980	0			25.3	20.0	20.0	20.0	10.6
1981	0			27.8	24.4	24.4	24.4	10.6
1982	8			14.0	13.2	13.2	13.2	7.6
1983	54			12.0	11.8	11.8	11.8	4.9
1984	0			10.1	10.3	10.3	10.3	3.8
1985	8			9.8	10.4	10.4	9.2	3.4
1986	0			11.0	12.0	12.0	11.6	2.8
1987	0			13.2	14.8	14.8	14.5	2.7
1988	0			13.2	15.3	15.3	15.3	3.0
1989	34			7.7	9.2	9.2	5.0	4.2
1990	19			9.4	11.7	2.0	0.7	4.0
1991	0			1.1	1.4			4.2
1992	0			0.0	0.0			4.0
1993	0			0.0	0.0			3.7
1994	0			0.0	0.0			3.4
1995	0			5.0	7.4			3.1
Subtotal	123			190.5	183.1	164.6	157.2	N/A

16. Program Funding Summary: (Continued)

Fiscal Year	Qty	Flyaway FY 84 Dollars		Total Base Year $	Total Then Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: Procurement (APA) 1/								
1985	150	5.5	8.1	17.2	19.2	19.2	17.8	3.4
Subtotal	150	5.5	8.1	17.2	19.2	19.2	17.8	

FOOTNOTE:

1/ OPA inflation indices were used since the airborne radios are communications-electronics equipment. All requirements for the airborne radio will be funded in the OPA appropriation beginning in FY 88.

16. Program Funding Summary: (Continued)

Fiscal Year	Qty	Flyaway FY 84 Dollars		Total Base Year $	Total Then Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
				Appropriation: Procurement (OPA)				
1983	175	1.3	16.0	18.4	18.4	18.4	18.1	4.9
1984	1325	3.5	54.2	61.1	66.1	66.1	60.6	3.8
1985	10268	4.7	114.9	123.9	138.5	138.5	119.2	3.4
1986	400	1.0	72.6	76.8	88.2	84.3	41.0	2.8
1987	0	0.0	4.5	11.0	13.0	13.0	4.7	2.7
1988	720	0.0	23.4	26.3	32.2	28.9	11.9	3.0
1989	14800	0.5	189.3	195.3	247.2	212.5	6.5	4.2
1990	1725	2.6	64.2	77.4	101.8			4.0
1991	19011	1.9	225.5	228.2	311.3			4.2
1992	19831	0.1	233.1	235.8	332.9			4.0
1993	19045	0.4	226.8	231.8	337.9			3.7
1994	20078	0.1	228.0	232.7	349.7			3.4
1995	22887	0.1	263.1	268.2	415.6			3.1
1996	22892	0.1	262.9	267.2	426.8			3.1
1997	28650	0.1	292.9	297.0	489.4			3.1
1998	27300	0.1	268.7	272.8	463.2			3.1
1999	27300	0.0	265.0	268.8	470.6			3.1
2000	27300	0.0	247.9	251.6	454.1			3.1
2001	27300	0.1	219.9	223.5	415.8			3.1
2002	27300	0.0	219.4	222.7	427.5			3.1
2003	27300	0.0	208.2	211.5	418.4			3.1
2004	19045	0.0	141.9	144.7	295.1			3.1
2005	0	0.0	2.0	2.7	5.7			3.1
2006	0	0.0	1.9	2.6	5.6			3.1
Subtotal	364652	16.6	3846.3	3952.0	6325.0	561.7	262.0	
Total Proc	364802	22.1	3854.4	3969.2	6344.2	580.9	279.8	
Total Program	364925	22.1	3854.4	4159.7	6527.3	745.5	437.0	

17. Production Rate Data:

a. Annualized Production Rates -- (NOTE: The annualized production rates shown differ from the annual funded buy quantities because the funded delivery period is 3 months for FY 85, 20 months for FY 89, and 9 months for FY 97.)

Fiscal Year	Production Rates (Quantity/Year) - Airborne Radio			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1985 (APA)	N/A	600	600	600
1986	N/A	720	0	720
1987	N/A	1200	0	1200
1988 (OPA)	N/A	1800	720	1800
1989 (OPA)	N/A	2400	720	2400
1990 (OPA)	N/A	2400	0	2400
1991 (OPA)	N/A	2400	1800	2400
1992 (OPA)	N/A	2400	1800	2400
1993 (OPA)	N/A	0	1800	2400
1994 (OPA)	N/A	0	1800	2400
1995 (OPA)	N/A	0	1800	2400
1996 (OPA)	N/A	0	1800	N/A
1997 (OPA)	N/A	0	1800	N/A

17. Production Rate Data: (Continued)

a. Annualized Production Rates (Continued) — (NOTE: The annualized production rates shown differ from the funded buy quantities because the funded delivery period is 2 months for FY 83, 6 months for FY 84, 16 months for FY 85, 8 months for FY 86, 18 months for FY 89, 11 months for FY 90, and 9 months for FY 04. Also, the attainment of the maximum economic production rate may be limited by other service customers.)

Fiscal Year	Production Rates (Quantity/Year) - Ground R/Ts			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1983	N/A	1050	1050	1050
1984	N/A	2650	2650	2650
1985	N/A	8250	8250	8250
1986	N/A	16870	600	16870
1987	N/A	23430	0	23430
1988	N/A	21993	0	23430
1989	N/A	33000	10667	33000
1990	N/A	33000	1882	33000
1991	N/A	33000	17211	33000
1992	N/A	33000	18031	33000
1993	N/A	33000	17245	33000
1994	N/A	33000	18278	33000
1995	N/A	0	21087	33000
1996	N/A	0	21092	33000
1997	N/A	0	27300	33000
1998	N/A	0	27300	33000
1999	N/A	0	27300	33000
2000	N/A	0	27300	33000
2001	N/A	0	27300	33000
2002	N/A	0	27300	33000
2003	N/A	0	27300	N/A
2004	N/A	0	27300	N/A

17. Production Rate Data: (Continued)

b. Cost Variance — Dollars in Millions — (NOTE: Subject to limitations on production rates above.)

Item - SINCGARS (Army Dollars Only)	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost (BY $)	$ 4167.7	$ -8.0	$ 4159.7	N/A	$ 4159.7
(TY $)	5611.7	+915.6	6527.3	+128.7	6398.6
PAUC (BY $)	$ .0142	$ -.0028	$.0114	N/A	$ .0114
(TY $)	.0192	-.0013	.0179	+.004	.0175

NOTE: Neither producer has reached expected full production rate at this time. The maximum economic rate is based on contractors' facilitization plans. Upon attainment of planned full production rate, a determination of the true economic rate can be made. It is expected that due to the large monthly production quantities, there will be a range of monthly deliveries within which the unit price will not vary with quantity changes.

c. Schedule Variance —

Airborne Radio	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	12/84	+ 5 mo	05/85	N/A	05/85
Duration (in Months)	121	+42 mo	163	+ 14 mo	149
End Date (Mo/Yr)	01/95	+47 mo	12/98	N/A	10/97

Ground Radio	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	12/83	N/A	12/83	N/A	12/83
Duration (in Months)	150	+122 mo	272	+ 30 mo	242
End Date (Mo/Yr)	06/96	+122 mo	08/06	N/A	02/04

d. Deliveries (Plan/Actual) —
Planned deliveries reflect the rebaselined production contracts.

	To Date
RDT&E	104/104
Procurement	8,237/8,020

e. Approved Design to Cost Goal: N/A

18. Operating and Support Costs:

a. Assumptions and Ground Rules — SINCGARS is the VHF-FM radio communications system which provides the primary means of command and control for infantry, artillery and armor units. Since SINCGARS will be fielded to every type of unit in the Army, there is no "typical" division set; however, 4,500 receiver-transmitters (RTs) are used as an average division quantity. Fifty-five per cent of the total buy will be fielded; costs shown in paragraph b. are based on fielded divisions. SINCGARS does not require a dedicated operator. Operating tempo (peacetime) varies depending on the theater in which the radio is deployed and ranges from 195 hours per year for Reserve Units to 1800 hours per year for Europe. No depot overhaul is scheduled. Operating and Maintenance (O&M) (consumable) repair parts includes batteries. Maintenance includes depot maintenance, civilian field maintenance labor, and interim contractor support. Other Operating and Support (O&S) costs include training, transportation, System/Project Management and other sustaining support costs. The operating life of SINCGARS is 20 years. No operating and support cost data is currently available for the antecedent system, AN/PRC-77 and AN/VRC-12 family of radios.

b. Costs — (FY 1984 Constant (Base-Year) Dollars in Millions, source: August 1988 SINCGARS Baseline Cost Estimate)

Cost Element	Average Annual Cost Per SINCGARS Division (4,500 RTs)	Average Annual Cost Per AN/PRC-77, AN/VRC-12 (Antecedent)
O&M Repair Parts	3.7	
Procurement Funded Mat'l	0.2	
Maintenance	0.3	
Military Personnel	0.1	
Other Operating & Support	0.3	
TOTAL	4.6	Not Available

c. Contractor Support Costs —

(Then-Year Dollars in Millions)

	FY 1989 & PRIOR 1/	FY 1990	FY 1991	BALANCE TO COMPLETE	TOTAL
O & M	1.4	8.9	9.9	—	20.2

1/ Includes FY 88 - FY 89.

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SAR-89-045

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: STANDARD Missile (SM-2 MR/ER)

-38 STD MSL 2

AS OF DATE: December 31, 1989

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602-1970

1. Designation and Nomenclature (Popular Name): STANDARD Missile 2 Block II Medium Range (AEGIS)-(SM-2 Blk II MR (AEGIS)/RIM-66G), STANDARD Missile 2 Block II Medium Range (Vertical Launch)-(SM-2 Blk II MR (VL)/RIM-66H), STANDARD Missile 2 Block II Medium Range (TARTAR)-(SM-2 Blk II MR (TARTAR)/RIM-66J), STANDARD Missile 2 Block II Extended Range (TERRIER)-(SM-2 Blk II ER (TERRIER)/RIM-67C), STANDARD Missile 2 Block III Medium Range (AEGIS VLS)-(SM-2 Blk III MR (AEGIS VLS)/RIM-66M), STANDARD Missile 2 Block III Medium Range (TARTAR)-(SM-2 Blk III MR (TARTAR)/RIM-66K), STANDARD Missile 2 Block III Extended Range (TERRIER)-(SM-2 Blk III ER (TERRIER)/RIM-67D), STANDARD Missile 2 Block IIIA Medium Range (AEGIS VLS)-(SM-2 Blk IIIA MR (AEGIS VLS)/RIM-66L), STANDARD Missile 2 Block IIIA Medium Range (TARTAR)-(SM-2 Blk IIIA MR (TARTAR)/RIM-66K), STANDARD Missile 2 Block IIIA Extended Range (TERRIER)-(SM-2 Blk IIIA ER (TERRIER)/RIM-67D), STANDARD Missile-2 Block IIIB Medium Range (SM-2 Blk IIIB MR/RIM-66X), and STANDARD Missile 2 Block IV (AEGIS)-(SM-2 Blk IV AEGIS/RIM-67X).

2. DoD Component: Department of the Navy

3. Responsible Office and Telephone Number:

Program Manager, STANDARD Missile/
Vertical Launching Systems Program
Management Office (PMS422)
Naval Sea System Command
Department of the Navy
Washington, D.C. 20362-5101

CAPT W. C. Stark, USN
ASSIGNED: July, 1989
AUTOVON: 222-0663
COMMERCIAL: (202) 602-0663

4. Program Elements/Procurement Line Items:

Procurement:	P.E. 0204229N, APPN 1507	ICN 2233
	STANDARD MR SM-2	2234
	STANDARD ER SM-2	2239

AS AMENDED

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4. Program Elements/Procurement Line Items (Cont'd):

RDT&E: P.E. 0604366N
0603318N proj. S1632
0603321N proj. S1671 (shared funding)
0604365N

5. Related Programs: FFG-7, Frigate, CG 47 AEGIS Cruiser, and DDG 51 AEGIS Destroyer Ship Classes, and TERRIER CG/NTU, TARTAR CGN/NTU, Vertical Launch System, and High Performance IR Seeker.

6. Mission and Description: (U) The STANDARD Missile Medium Range (SM-2 MR) is a solid propellant, tail controlled surface-to-air and surface-to-surface missile with mid-course guidance, semi-active homing guidance and home-on jam capability. The Block I production, initiated in FY 80, incorporated command guidance, inertial reference system and monopulse receiver to improve range, accuracy and electronic countermeasure (ECM) resistance. The SM-2 Block II MR missile began Pilot Production in FY 83 and incorporates all digital guidance, new ordnance and new dual thrust rocket motor to further improve range, speed and system fire power. The STANDARD Missile-2 Block II (MR) is deployed on TARTAR New Threat Upgrade ships and AEGIS CG-47/51 Cruisers, and will be deployed on AEGIS DDG-51 Destroyers.

(U) The STANDARD Missile Extended Range (SM-2) Block I (ER) (67B produced FY 76 through FY 83) and Block II (67C production began in FY 82 and continues) are planned for deployment in all 31 TERRIER Guided Missile Destroyers and Cruisers. The SM-2 Block II missile incorporates improved propulsion, fuze, warhead and guidance designs to cope with the more stringent anti-ship missile (ASM) threats.

(U) The STANDARD Missile-2 Block III, IIIA and IIIB provide improved low [illegible]titude performance over SM-2 Block II. (b)(1) (b)(1) (b)(1) SM-2 Block IIIA is essentially a Block III missile with a new ordnance section. An (b)(1) warhead to provide increased lethality throughout the engagement (b)(1) envelope. A (b)(1) is also included in the fuze design to permit engagement of (b)(1) cruise missiles. The SM-2 Blk IIIB Missile Homing Improvement Program (MHIP) encompasses improvements to the SM-2 Blk IIIA for continued evolution in SM guidance capability with incorporation of dual mode IR/RF guidance. These versions of the STANDARD Missile will be employed on ships capable of firing SM-2 Block III. (b)(1) (b)(1)

(U) STANDARD Missile-2 Block IV will provide dramatic increases in performance for AEGIS/VLS ships. Block IV incorporates a new separable booster with thrust vector control, a new guidance section, all digital autopilot, and the ordnance section and dual thrust rocket motor of Block IIIA. The Block IV missile will be capable of supporting the entire SPY 1B/D envelope and will have improved capability at very high altitudes and at large crossranges. Block IV will also retain the (b)(1) (b)(1) performance of Block III/IIIA. (b)(1) (b)(1)

7. Program Highlights:

a. Significant Historical Developments -- The STANDARD Missile-2 Block I (RIM-67C), Extended Range Development program was initiated in August 1976. The Block II is an improved missile with capability to counter high speed, higher altitude anti-ship missiles in an advanced ECM environment. Based upon TECHEVAL and OPEVAL results the CNO recommended approval of limited production in May 1983. The Block II improvements are required to meet the Advanced Anti-Ship Missile (ASM) threats of the mid 1980s.

The STANDARD Missile-2, Medium Range, Block II (RIM/66H) is a derivative of the STANDARD Missile-2, Block II Extended Range that incorporated a new rocket motor and a modified airframe for compatibility with the vertical launcher system. Initial pilot production of 30 medium range rounds was approved for FY 83 in order to provide missiles for CSSQT and FOT&E testing in the CG 47 AEGIS Cruisers, the first medium range Block II ship. The Block II improvements are required to meet the Advanced Anti-Ship Missile (ASM) threats of the mid 1980s.

The Milestone IIIC ARB was conducted 20 February 1985. On 8 June 1985, SECNAV approved limited production (Lot #3) for a FY 85 buy of 255 ER missiles and 529 MR missiles.

The Milestone IIID Decision Memordandum was signed on 15 May 1986. SECNAV approved limited production for a FY 86 buy of 470 ER missiles and 846 MR missiles.

The Milestone IIIE ARB was conducted October 1986 and the Navy Program Decision Meeting was held on 26 November 1986. As a result, the Approval for Full Production Decision Memorandum was signed 17 December 1986. Follower producer sources selection of the GC&A was awarded to Raytheon Company on 6 June 1986. Second sources were selected for all STANDARD Missile components and all contracts were competitively bid in FY 88 except the MK 30 Sustainer which will remain single source due to small procurement quantities. Second sources selected for qualification were Raytheon (Guidance, Control, and Airframe); ATI (MK 115 Warhead Case); Bendix (Target Detecting Device); ARC (MK 104 Dual Thrust Rocket Motor); and Hercules (MK 70 Booster).

Approval for production of the Block III was received 12 May 1988 by the Navy Acquisition Review Board.

b. Significant development since last report -- The Missile Homing Improvement Program was approved for Rapid Development Capability in January 1989.

c. Changes Since "As Of" Date -- None.

8. Threshold Breaches: There are threshold breaches to the DAE Baseline dated 31 December 1988.

9. Schedule:

SM-2 Block I/Block II MR (RIM-66 G/H/J)

a. Milestones --	Production Estimate	Approved Program	Current Estimate
(U) First Flight Test (Development Tests)	Feb 83	Feb 83	Feb 83
(U) MR Pilot Production Approved (Block II)	Jun 83	Jun 83	Jun 83
(U) (Lot #1) Approval for Limited Production	Feb 84	Feb 84	Feb 84
(U) DT/OT and OPEVAL	Sep 84	Sep 84	Sep 84
(U) (Lot #2) Approval for Limited Production	Jun 85	Jun 85	Jun 85
(U) FOT&E USS VINCENNES CG 49	Nov 85	Nov 85	May 86
(U) (Lot #3) ALP	Apr 86	Apr 86	May 86
(U) FOT&E Vertical Launch Cruiser CG 54 USS ANTIETAM	Dec 86	N/A	Apr 88
(U) Milestone IIIE (AFP)	Dec 84	Dec 86	Dec 86

b. Previous Change Explanations --
FOT&E in USS VINCENNES slipped from April 86 to May 86 to accommodate ship availability schedules.
Lot #3 ALP slipped from April 86 to May 86 due to ASN scheduling.
FOT&E in USS BUNKER HILL slipped from December 86 to September 87 to accommodate ship availability schedules. The FOT&E was then changed to USS ANTIETAM (CG 54) and rescheduled to April 88 to accommodate ship availability.
Approval for Full Production slipped from September 86, the last reported approved program, to December 86 due to rescheduling of the ARB to October 86 and completion of the NPDM in December 86.

c. Current Change Explanations -- None.

d. References --
Production Estimate: Milestone IIIE NPDM of 17 December 1986.
Approved Program: DAE Baseline of 31 December 1988.

SM-2 Block I/Block II ER (RIM-67C)

a. Milestones -	Production Estimate	Approved Program	Current Estimate
(U) OPEVAL Completed (Block II)	Mar 83	Mar 83	Mar 83
(U) ER Pilot Production Approved	Apr 82	Apr 82	Apr 82
(U) (Lot #1) Approval for Limited Production	Jun 83	Jun 83	Jun 83
(U) (Lot #2) Approval for Limited Production	Feb 84	Feb 84	Feb 84

SM-2 Block I/Block II ER (RIM-67C) (Cont'd)

a. Milestones --	Production Estimate	Approved Program	Current Estimate
(U) (Lot #3) Approval for Limited Production	Mar 85	Mar 85	Mar 85
(U) FOT&E USS MAHAN DDG 42	Mar 85	Mar 85	Mar 85
(U) (Lot #4) Approval for Limited Production	Apr 86	Apr 86	May 86
(U) FOT&E (NTU)/USS BIDDLE CG 34	Dec 86	N/A	Apr 88
(U) Milestone IIIE (AFP)	Dec 84	Dec 84	Dec 86
(U) FOT&E USS SCOTT DDG 995	Dec 89	N/A	Dec 89 (CH-1)

b. Previous Change Explanations --

(U) Lot #4 ALP slipped from April 86 to May 86 due to ASN scheduling.

(U) T&E in USS BIDDLE slipped from December 86 to April 88 due to ship designation changes and ship availability.

(U) Approval for Full Production slipped from September 86, the last reported approved program, to December 86 due to rescheduling of the ARB to October 86 and completion of the NPDM in December 86.

c. Current Change Explanations --

(U) (CH-1) Added milestone for USS SCOTT DDG 995 FOT&E.

d. References --

Production Estimate: Milestone IIIE NPDM of 17 December 1986.
Approved Program: DAE Baseline of 31 December 1988.

SM-2 BLOCK III MR/ER (RIM-66M/K/RIM-67D)

a. Milestones --	Development Estimate	Approved Program	Current Estimate
(U) Preliminary Design Review	Jun 85	N/A	Jun 85
(U) Critical Design Review	May 86	N/A	May 86
(U) First Flight Test (DT)	Apr 88	N/A	Apr 88
(U) Production Release Appr (ARB)	May 88	N/A	May 88
(U) At Sea Development Test	(b)(1)		(CH-2)
(U) First Production Delivery			(CH-3)
(U) IOC			(CH-4)
(U) OPTEVFOR Testing Concurrent With Block IIIA OPEVAL			(CH-2)

b. Previous Change Explanations --

Milestones for the SM-2 Block III are incorporated.

c. Current Change Explanations --

(U) (CH-2) Added milestone for At Sea Development Tests and changed milestone "OPTEVFOR Testing concurrent with Block IIIA OPEVAL" to correspond with Block IIIA milestone change.

(U) (CH-3) First production delivery has been rescheduled from Mar 90 to Jun 90 due to resolution of MK-45 Mod 8 producibility issues.

(U) (CH-4) IOC has slipped (b)(1)

d. References --

Development Estimate: NDCP of 10 May 1988.
Approved Program: There are no approved DAE baseline elements for Blocks III, IIIA, IIIB, and IV.

SM-2 BLOCK IIIA MR/ER (RIM-66L/K/RIM-67D)

a. Milestones --	Development Estimate	Approved Program	Current Estimate	
(U) Preliminary Design Review	Mar 88	N/A	Mar 88	
( ) Critical Design Review	(b)(1)			(CH-4)
( ) First Flight Test (DT)				(CH-5)
( ) OPEVAL				(CH-6)
( ) Milestone III (NPDM) (AFP)				(CH-7)
( ) First Production Delivery				(CH-8)
( ) IOC				

b. Previous Change Explanations --
Milestones for the SM-2 Block IIIA are incorporated.

c. Current Change Explanations --
(CH-4) thru (CH-8) The production contract for the Block IIIA has been rescheduled causing a corresponding slip of approximately one year in IOC.

d. References --
Development Estimate: NDCP of 10 May 1988.
Approved Program: There are no approved DAE baseline elements for Blocks III, IIIA, IIIB, and IV.

SM-2 BLOCK IIIB MR (RIM-66X)

a. Milestones --	Development Estimate	Approved Program	Current Estimate
( ) Preliminary Design Review	(b)(1)		
( ) Advanced/Engineering Develop Readiness Review			
( ) Critical Design Review			
( ) First Flight Test			
( ) OPEVAL			
( ) Milestone IIIA ALP			
( ) Milestone IIIB AFP			
( ) First Production Delivery			
( ) IOC			

b. Previous Changes Explanations -- None.

c. Current Changes Explanations -- Milestones for the SM-2 Block IIIB incorporated.

d. References --
Development Estimate:
Approved Program: There are no approved DAE baseline elements for Blocks III, IIIA, IIIB, and IV.

SM-2 BLOCK IV AEGIS (RIM-67X)

a. Milestones --

		Development Estimate	Approved Program	Current Estimate	
(U)	Milestone II (NPDM)	Aug 86	N/A	Aug 86	
(U)	FSED Contract	Jul 87	N/A	Jul 87	
(U)	Preliminary Design Review	Dec 88	N/A	Dec 88	
( )	Critical Design Review	(b)(1)			(CH-9)
( )	First Flight Test (WSMR DT)				(CH-10)
( )	Milestone IIIA (NPDM) Pilot Production				
( )	OPEVAL				(CH-11)
( )	Milestone IIIB (Full Production)				(CH-12)
( )	First Production Delivery				(CH-13)
( )	IOC				(CH-14)

b. Previous Change Explanations --
Milestones for SM-2 Block IV AEGIS are incorporated.

c. Current Change Explanations --
(CH-9) thru (CH-14) Program milestones have been restructured causing a four month slip in Block IV IOC.

d. References --
Development Estimate: January 1989 Congressional Data Sheets.
Approved Program: There are no approved DAE baseline elements for Blocks III, IIIA, IIIB, and IV.

10. Technical/Operational Characteristics:
SM-2 MR Block II

a. Technical --

		Production Estimate	Appr Program Goal/Threshold	Demonstrated Performance	Current Estimate
( )	Maximum Range (NM)	(b)(1)			
( )	Minimum Range (NM)				
( )	Maximum Altitude (KFT)				
( )	Miss Distance (FT)				

10. Technical/Operational Characteristics (Cont'd):
SM-2 MR Block II

b. Operational --	Production Estimate	Appr Program Goal/Threshold	Demonstrated Performance	Current Estimate
(U) P(MR) Probability of Successful Engagement (%)	(b)(1)			
(U) Flight Reliability (%)				
(U) Launch Availability				

c. Previous Change Explanations --
(U) MR Minimum Range Current Estimate changed (b)(1) based on missile flight data.
(U) MR Maximum Altitude Current Estimate changed (b)(1) based on missile flight data.
(U) MR Miss Distance Current Estimate changed (b)(1) based on missile flight data.
(U) P(MR) Probability of Successful Engagement Current Estimate changed (b)(1) (b)(1) based on missile flight data.
(U) MR Flight Reliability Current Estimate changed (b)(1) based on missile flight data.

d. Current Change Explanations -- None.

e. References --
Production Estimate: Milestone IIIE NPDM of 17 December 1986.
Approved Program: DAE Baseline of 31 December 1988.

10 Technical/Operational Characteristics:
SM-2 ER Block II

a. Technical --	Production Estimate	Appr Program Goal/Threshold	Demonstrated Performance	Current Estimate
(U) Maximum Range (NM)	(b)(1)			
(U) Minimum Range (NM)				
(U) Maximum Altitude (KFT)				
(U) Miss Distance (FT)				
b. Operational --				
(U) P(MR) Probability of Successful Engagement (%)				
(U) Flight Reliability (%)				
(U) Launch Availability				

c. Previous Change Explanation
(U) Pilot production missiles fired 26 February - 1 March 1985 in USS MAHAN DDG 42. Simulations verify production estimate.
(U) Demonstrated flight reliability performance of 81% in ground and flight tests.
(U) ER Maximum Range Current Estimate changed from (b)(1) based on missile flight data.
(U) ER Minimum Range Current Estimate changed (b)(1) based on missile flight data.
(U) ER Miss Distance Current Estimate changed based on missile flight data.

c. Previous Changes Explanations (Cont'd):

(2) ER Flight Realibility Current Estimate changed (b)(1) based on missile flight data.

d. Current Change Explanations -- None.

e. References --
Production Estimate: Milestone IIIE NPDM of 17 December 1986.
Approved Program: DAE Baseline of 31 December 1988.

SM-2 MR BLOCK III/IIIA/IIIB

	Dev. Estimate/ Appr Program BLK III IIIA/B	Demonstrated Performance BLK III IIIA/B	Current Estimate BLK III IIIA/B
a. Technical -			
( ) Maximum Range (NM)	(b)(1)		
( ) Minimum Range (NM)			
( ) Maximum Altitude (KFT)			
( ) Minimum Altitude (FT)			
b. Operational -			
( ) P(MR) Probability of Successful Engagement (%)			
( ) Flight Reliability (%)			
( ) Launch Availability (%)			

c. Previous Change Explanations --
Technical/Operational Characteristics for the SM-2 MR Block III/IIIA are incorporated.

d. Current Change Explanations --
Technical/Operational Characteristics for the SM-2 Block IIIB are incorporated which are identical to Block IIIA.

e. References --
Development Estimate: NDCP of 10 May 1988.
January 1989 Congressional Data Sheets.
Approved Program: There are no approved DAE baseline elements for Blocks III, IIIA, IIIB, and IV.

SM-2 ER BLOCK III/IIIA

	Dev. Estimate/ Appr Program BLK III BLK IIIA	Demonstrated Performance BLK III BLK IIIA	Current Estimate BLK III BLK IIIA
a. Technical -			
( ) Maximum Range (NM)	(b)(1)		
( ) Minimum Range (NM)			
( ) Maximum Altitude (KFT)			
( ) Minimum Altitude (FT)			
b. Operational -			
( ) P(MR) Probability of Successful Engagement (%			
( ) Flight Reliability (%)			
( ) Launch Availability (%)			

c. Previous Change Explanations -- Technical/Operational Characteristics for the SM-2 ER Block III/IIIA are incorporated.

d. Current Change Explanations -- None.

e. References --
Development Estimate: NDCP of 10 May 1988.
January 1989 Congressional Data Sheets.
Approved Program: There are no approved DAE baseline elements for Blocks III, IIIA, IIIB, and IV.

SM-2 BLOCK IV AEGIS

	Dev. Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. Technical -			
(S) Maximum Range (NM)	(b)(1)		
(S) Large Target Max Range (NM)			
(S) Minimum Range (NM)			
(S) Maximum Altitude (KFT)			
(S) Minimum Altitude (FT)			
b. Operational -			
(S) P(MR) Probability of Successful Engagement (%)			
(S) Flight Reliability (%)			
(S) Launch Availability (%)			

c. Previous Change Explanations -- Technical/Operational Characteristics for the SM-2 Block IV AEGIS are incorporated.

d. Current Change Explanations -- None.

e. References --
Development Estimate: January 1989 Congressional Data Sheets.
Approved Program: There are no approved DAE baseline elements for Blocks III, IIIA, IIIB, and IV.

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. Cost --	Dev/Prod Estimate	Approved Program	Current Estimate
Development (RDT&E)	$ 648.4	$ 1035.8	$ 1017.9
Procurement	5923.1	7349.4	7016.5
All-Up-Round	(4510.5)	(5489.9)	(5174.4)
Other (Proc Support)	(500.0)	(869.0)	(817.3)
TOTAL FLYAWAY	(5010.5)	(6358.9)	(5991.7)
Non-Recurring Prod Support	(388.9)	(498.4)	(516.6)
Fleet Support	(330.9)	(355.0)	(368.4)
Initial Spares	(192.8)	(137.1)	(139.8)
Construction	-	42.4	49.0
TOTAL: FY 84 Base-Year $	6571.5	8427.6	8083.4
Escalation	$ 1481.3	$ 1485.7	$ 1640.2
Development (RDT&E)	(53.2)	(116.6)	(121.2)
Procurement	(1428.1)	(1357.2)	(1504.0)
Construction	-	(11.9)	(15.0)
TOTAL Then-Year $	$ 8052.8	$ 9913.3	$ 9723.6

11. Program Acquisition Cost (Cont'd): (Current Estimate in Millions of Dollars)

b. Quantities --	Dev/Prod Estimate	Approved Program	Current Estimate
RDT&E	88	88	88
Procurement	10,778	14,677	14,677
TOTAL	10,866	14,765	14,765

c. Foreign Military Sales -- Currently on contract.

Country	Qty	Block	Cost
Japan	64	II/III	38.7
Canada	96	II/III	40.8
	160		79.5

d. Nuclear Costs -- None.

e. References --
Production Estimates: Milestone IIIE NPDM of 17 December 1986.
Approved Program: FY 1990/1991 President's Budget.

12. Program Acquisition/Current Procurement Unit Cost Summary:
Current (Then-Year) Dollars in Millions)

	Current Year (FY 89)		Budget Year (FY 90)
	Current Estimate Dec 89 SAR	UCR Baseline Dec 88 SAR	UCR Baseline Dec 89 SAR
a. Program Acquistion --			
(1) Cost	9723.6	9913.3	9723.6
(2) Quantity *	14677	14677	14677
(3) Unit Cost *	0.663	0.675	0.663
		(Appropriated)	
b. Current Procurement --	(FY 1990)	(FY 1990)	(FY 1991)
(1) Cost	394.6	394.6	613.8
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	394.6	394.6	613.8
(2) Quantity	940	940	900
(3) Unit Cost	0.420	0.420	0.682

* The program acquisition quantity baseline has been revised from 14,765 to 14,677 to exclude 88 R&D missiles which were not planned to be part of the inventory objective. These missiles were expended during earlier test and evaluation programs.

13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Dev/Prod Estimate	701.6	7351.2	0.0	8052.8
Previous Changes:				
Economic	- 35.9	- 852.0	-	- 887.9
Quantity	-	+2398.5	-	+2398.5
Schedule	-	+ 110.5	-	+ 110.5
Engineering	+ 365.1	+ 199.1	-	+ 564.2
Estimating	+ 121.6	- 654.5	+ 54.3	- 478.6
Other	-	-	-	-
Support	-	+ 153.8	-	+ 153.8
Subtotal	+ 450.8	+1355.4	+ 54.3	+1860.5

	RDT&E	PROC	MILCON	TOTAL
Current Changes:				
Economic	+ 9.3	+ 294.5	+ 1.5	+ 305.3
Quantity	-	-	-	-
Schedule	-	- 104.5	-	- 104.5
Engineering	-	-	-	-
Estimating	- 22.6	- 430.9	+ 8.2	- 445.3
Other	-	-	-	-
Support	-	+ 54.8	-	+ 54.8
Subtotal	- 13.3	- 186.1	+ 9.7	- 189.7
Total Changes	+ 437.5	+1169.3	+ 64.0	+1670.8
Current Estimate	1139.1	8520.5	64.0	9723.6

(FY 84 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Dev/Prod Estimate	648.4	5923.1	0.0	6571.5
Previous Changes:				
Economic	-	-	-	-
Quantity	-	+1848.7	-	+1848.7
Schedule	-	- 106.7	-	- 106.7
Engineering	+ 311.4	+ 158.0	-	+ 469.4
Estimating	+ 76.0	- 551.2	+ 42.4	- 432.8
Other	-	-	-	-
Support	-	+ 77.5	-	+ 77.5
Subtotal	+ 387.4	+1426.3	+ 42.4	+1856.1

13. Cost Variance Analysis (Cont'd):

	RDT&E	PROC	MILCON	TOTAL
Current Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	- 68.2	-	- 68.2
Engineering	-	-	-	-
Estimating	- 17.9	- 299.0	+ 6.6	- 310.3
Other	-	-	-	-
Support	-	+ 34.3	-	+ 34.3
Subtotal	- 17.9	- 332.9	+ 6.6	- 344.2
Total Changes	+ 369.5	+1093.4	+ 49.0	+1511.9
Current Estimate	1017.9	7016.5	49.0	8083.4

b. Previous Change Explanations --

(1) RDT&E

Economic: Revised escalation indices.
Engineering: Increase reflects program restructuring caused by decision to pursue AEGIS missiles and addition of Missile Homing Improvement Program.
Estimating: Increase in FY 87-90 funds to continue and extend (for 2 years) the Blk IIIA/IV development program.

(2) Procurement

Economic: Revised escalation indices.
Quantity: Increase reflects addition of program year as a continuing program.
Schedule: Decrease due to a shift of 160 missiles in FY 92 to FY 88. Increase due to shift of 310 FY 89-91 missiles to FY 92-94 to procure more advanced missiles.
Estimating: Decrease associated with Gramm/Rudman budget cuts, NIF and DPSD reductions, reduced hardware costs due to competition for all major components in FY 88 and outyears and increase due to changes in missile mix.
Support: Decrease due to annualization and realignment of support costs and cost savings on initial spares hardware components due to competition. Increase due to additional program years and to support new missile configurations being procured.

(3) MILCON

Estimating: Milcon funds added for construction of ENCAN/DECAN facilities, for construction of additional magazines and for improved facilities at the Naval Weapons Stations.

c. Current Change Explanations --

	(Dollars in Millions) Base Year	Then-Year
(1) RDT&E		
Revised escalation indices. (Economic)	N/A	+ 9.3
Adjustment for current and prior year inflation. (Estimating)	- 7.0	- 9.3
Miscellaneous reprogramming (GRE/SBIR) in FY 90. (Estimating)	- 11.9	- 14.6
Revised FY 91-94 requirements. (Estimating)	+ 1.0	+ 1.3
(2) Procurement		
Revised escalation indices. (Economic)	N/A	+294.5
Adjustment for current and prior year inflation. (Estimating)	-127.5	-191.5
Additional funding added by Congress for procurement of 350 additional missiles in FY 90. Inventory objective did not change. (Schedule)	+ 61.1	+ 79.8
Outyear schedule and cost adjusted to reflect savings due to planned change in acquisition strategy from dual source to single source competitive procurement. (Estimating)	-162.5	-225.4
Miscellaneous reprogramming as follows: (-0.2 FY90; -5.3 FY91; -3.8 FY92; -4.8 FY93; -7.9 FY 94) due to production efficiencies and from DMR, CALS, CAAS, and MIF rate reductions. (Estimating)	- 15.4	- 22.4
Increase in GC&A procurement cost in contract over estimated amount. (Estimating)	+ 6.4	+ 8.0
Support cost increases to support more complex missiles (Block IIIA/B/IV) with required new test equipment and to fully fund support requirements. (Support)	+ 34.3	+ 54.8
Decrease in FY 92-93 controls for reallocation of missile quantities. (Schedule)	-129.3	-184.3
(3) MILCON		
Revised escalation indices. (Economic)	N/A	+ 1.5
Revised requirements at NWS Seal Beach and Concord. (Estimating)	+ 0.4	+ 0.6

(3) MILCON (Cont'd)

Adjustment for current and prior year inflation. (Estimating)	- 1.1	- 1.5
Increase due to Actual Contract Awards in FY 89. (Estimating)	+ 7.3	+ 9.1

14. Program Acquisition Unit Cost (PAUC) History: (Millions of then-year dollars)
a. Initial SAR Estimate to Current Baseline Estimate --

PAUC (Prod Est)	Changes								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
0.747	-0.040	-0.033	+0.000	+0.038	-0.063	0.00	+0.014	-0.084	0.663

15. Contract Information: (Then-Year Dollars in Millions)
a. RDT&E --

SM-2 Block IV Development	Initial Contract Price Target	Ceiling	Qty
Raytheon Company Bedford, Massachusetts N00024-87-C-5321, FFP Awarded: 30 July 1987 Definitized: 30 July 1987	$222.1	N/A	N/A

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$231.0	N/A	N/A	N/A	N/A

Cost/Schedule Variances: CPR data not required on FFP contracts.

b. PROCUREMENT --

SM-2 FY 87 GC&A Production	Initial Contract Price Target	Ceiling	Qty
General Dynamics Pomona, California N00024-87-C-5300, FFP/PI Awarded: 18 December 1987 Definitized: 18 December 1987	$336.5	N/A	1194

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$355.3	N/A	1235	$355.3	$355.3

Cost/Schedule Variances: CPR data not required on FFP contracts.

15. Contract Information (Cont'd): (Then-Year Dollars in Millions)

SM-2 FY 86 GC&A Production	Initial Contract Price Target	Ceiling	Qty
General Dynamics Pomona, California N00024-86-C-5301, FFP/PI Awarded: 23 September 1986 Definitized: 23 September 1986	$330.5	N/A	1071

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$336.2	N/A	1071	N/A	N/A

Cost/Schedule Variances: CPR data not required on FFP contracts.

Explanation of Change: The General Dynamics FFP contract was previously increased to cover the additional cost necessary to correct a problem with the dorsal fin design and composition. There are no current changes.

SM-2 FY 85 GC&A Production	Initial Contract Price Target	Ceiling	Qty
General Dynamics Pomona, California N00024-85-C-5501, FPI Awarded: 4 September 1985 Definitized: 4 September 1985	$248.1	$279.9	730

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$289.8	$323.7	730	$290.2	$323.7

	Cost Variance	Schedule Variance
Previous Cumulative Variance:	-10.1	- 6.4
Cumulative Variance To Date: (12/89)	- 4.1	- 4.1
Net Change:	+ 6.0	+ 2.3
Cumulative Variance Change Percent:	59.4%	35.9%

Explanation of Change: Prior contract price change of $41.7M is due to modifications to the contract to incorporate engineering change proposals and to add telemetry units and fault isolation test equipment cost. The program manager's assessment is at the ceiling price and is within approved funding. There are no current changes.

SM-2 FY 88 AUR Production	Initial Contract Price Target	Ceiling	Qty
General Dynamics Pomona, California N00024-88-C-5300, FFP/PI Awarded: 15 January 1988 Definitized: 15 January 1988	$168.1	N/A	801

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$168.8	N/A	801	$168.1	$168.1

Cost/Schedule Variances: CPR data not required on FFP contracts.

15. Contract Information (Cont'd): (Then-Year Dollars in Millions)

SM-2 FY86/87 MK 104 Production	Initial Contract Price Target	Ceiling	Qty
Morton Thiokol, Inc. Brigham City, UT N00024-87-C-5331, FFP/PI Awarded: 30 September 1987 Definitized: 30 September 1987	$167.4	N/A	1594

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$167.4	N/A	1594	$167.4	$167.4

Cost/Schedule Variances: CPR data not required on FFP contracts.

c. MILCON: None

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 68.2% or 15 out of 22 years

(2) Percent Program Cost Appropriated: 60.7% or 5,906.3/9,723.6

b. Appropriation Summary --

(Then-Year Dollars in Millions)

appropriation	Current & Prior Yrs (FY76-89)	Budget Year (FY90)	Budget Year (FY91)	Balance FYDP (FY92-97)	Total
RDT&E	763.8	145.0	88.4	141.9	1139.1
Procurement	4560.5	394.6	613.8	2951.6	8520.5
MILCON	29.3	13.5	-	21.2	64.0
TOTAL	5353.6	553.1	702.2	3114.7	9723.6

16. Program Funding Summary (Cont'd): Current Estimate in Millions of Dollars)
c. Annual Summary --

Fiscal Year	Qty	Flyway FY 84 Dollars Nonrec	Flyway FY 84 Dollars Rec	Total Base Year$	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: RDT&E								
1982				324.1	305.0	305.0	305.0	7.6
1983				23.6	23.2	23.2	23.2	4.9
1984				17.0	17.3	17.3	17.3	3.8
1985				27.8	29.2	29.2	29.2	3.4
1986				56.8	61.4	61.4	56.8	2.8
1987				66.0	73.5	72.6	63.1	2.7
1988				84.9	97.8	97.8	75.3	3.0
1989				130.6	156.4	154.3	85.1	4.2
1990				116.3	145.0	84.2	2.6	4.0
1991				68.2	88.4	-	-	4.2
1992				48.6	65.4	-	-	4.0
1993				27.3	38.1	-	-	3.7
1994				26.7	38.4	-	-	3.4
Subtotal				1017.9	1139.1	845.0	657.6	
Appropriation: MILCON								
1989				23.6	29.3			4.2
1990				10.4	13.5	-	-	4.0
1991				0.0	0.0	-	-	4.2
1992				8.7	12.1	-	-	4.0
1993				6.3	9.1	-	-	3.7
1994				0.0	0.0	-	-	3.4
Subtotal				49.0	64.0	0.0	0.0	

16. Program Funding Summary (Cont'd): Current Estimate in Millions of Dollars)
c. Annual Summary --

Fiscal Year	Qty	Flyaway FY 84 Dollars Nonrec	Flyaway FY 84 Dollars Rec	Total Base Year$	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: PROCUREMENT								
1984 & Prior	2053		1281.6	1656.3	1506.2	1504.8	1425.6	13.3
1985	784		394.5	442.4	479.7	475.2	391.6	3.4
1986	1271		581.3	652.0	729.6	732.6	558.6	2.8
1987	1194		504.2	584.1	676.2	631.9	238.6	2.7
1988	1310		435.6	475.6	573.5	564.6	228.9	3.0
1989	1310		435.4	474.4	595.3	529.9	81.1	4.2
1990	940		264.0	302.4	394.6	46.5	0.7	4.0
1991	900		413.3	453.2	613.8	-	-	4.2
1992	900		376.8	419.2	587.7	-	-	4.0
1993	900		359.6	422.1	611.1	-	-	3.7
1994	1083		422.1	504.3	752.8	-	-	3.4
1995	678		179.8	216.6	333.4			3.1
1996	677		174.3	210.1	333.3			3.1
1997	677		169.2	203.8	333.3			3.1
Subtotal	14677		5991.7	7016.5	8520.5	4485.5	2925.1	
Total	14677		5991.7	8083.4	9723.6	5330.5	3582.7	

17. Production Rate Data:

a. Annual Production Rates -- (Note: The annualized production rate shown in the maximum economic column for FY 96 differs from the annual funded quantity because the funded delivery period is for 7 months in FY 96.)

	Production Rates (Quantity/Year)			
Fiscal Year	Development Estimate	Production Estimate	Current Estimate 1/	Maximum 2/
1982	35	35	375	1080
1983	170	170	500	1080
1984	490	490	490	1080
1985	730	730	784	1080
1986	1330	1330	1271	1440
1987	2160	2160	929	1800
1988	1990	1990	1161	2160
1989	2495	2495	1231	2160
1990			1201	2160
1991			1027	2160
1992			1125	1080 3/
1993			900	1080
1994			1080	1080
1995			681	
1996			677	
1997			677	

1/ Quantity shown is projected production quantities for the FY periods.

2/ FY 86 was first year of second source G,C&A procurement. Maximum economic indicates second source producing 30 missiles per month in FY 88 increasing to 60 per month in FY 89 and 90 per month in FY 90. (Both contractors at maximum economic rate).

3/ FY 94 reflects planned shift in acquisition strategy from dual source procurement to single source procurement commencing with the FY 92 contracts.

17. Production Rate Data (Cont'd):

b. Cost Variance --

Item		Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY $)	6571.5	1511.9	8083.4	778.6	7304.8
	(TY $)	8052.8	1670.8	9723.6	1028.0	8695.6
PAUC	(BY $)	0.610	- 0.059	0.551	0.053	0.498
	(TY $)	0.747	- 0.084	0.663	0.071	0.592

c. Schedule Variance --

SM-2 MR

Item	Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	7/83	N/A	7/83	N/A	7/83
Duration(in Months)	96 mos.	96 mos.	192 mos.	36 mos.	156 mos.
End Date (Mo/Yr)	7/91	N/A	7/99	N/A	7/96

SM-2 ER

Item	Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	7/82	N/A	7/82	N/A	7/82
Duration (in Months)	108 mos.	96 mos.	204 mos.	36	168 mos.
End Date (Mo/Yr)	7/91	N/A	7/99	N/A	7/96

d. Deliverables (Plan/Actual) --

	To Date
Procurement	5078/5078

e. Approved Design To Cost Goal -- No design-to-cost goals apply to the SM-2 program, as this program was initiated in 1966, prior to design-to-cost implementation.

18. Operating and Support Costs:

a. Assumptions and Ground Rules -- N/A.

b. Costs -- N/A.

c. Contractor Support Costs --

	FY 1989 & Prior	FY 1990 Year	FY 1991 Year	Total
O&M,N	48.8	19.4	21.9	90.1
Industrial Fund	0.0	0.0	0.0	0.0
Total	48.8	19.4	21.9	90.1

N-1 AN/BSY-1 CONFIDENTIAL SAR-89-007

(6)

~~UNCLASSIFIED~~

SELECTED ACQUISITION REPORT (RCS DD-COMP [O&A] 823)
PROGRAM: AN/BSY-1 Submarine Combat System (U)

AS OF DATE: 31 December 1989

INDEX

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AS AMENDED
MAR 22 1990

1. (U) Designation/Nomenclature (Popular Name): AN/BSY-1

2. (U) DoD Component: U.S. Navy

3. (U) Responsible Office and Telephone Number:

AN/BSY-1(V) Submarine Combat System Project, PMS417
Naval Sea Systems Command
Washington, DC 20362

CAPT Ronald L. Koontz
Assigned: March 1989
Area Code: (703) 602-0029
AUTOVON: 332-0029

4. (U) Program Elements:

RDT&E:

PE0603524 S1346 SUBACS (FY82 and Prior)
PE0604524 S1347 AN/BSY-1
PE0604503 S0219 TAC 110 Arrays
TAC 120 TBX Integration
TAC 270 High Frequency (HF) Transmit
PE0603504 S0223 Submarine Active Detection Sonar (SADS)
PE0204281 S0239 MIDAS (Mine and Ice Detection and Avoidance Sonar)

5. (U) Related Programs: None

91-C-1681

(b)(1)

~~Classified by: OPNAVINST S5513.3B~~
~~Declassify on: OADR~~

~~UNCLASSIFIED~~

~~CONFIDENTIAL~~

6. (C) Mission and Description

a. (U) Mission Area -- The SSN 688 Submarine Combat System supports the SSN mission to conduct prompt and sustained combat operations. The fundamental warfare tasks supporting this mission are: Anti-Submarine Warfare (ASW), Anti-Surface Warfare, Strike Warfare, and Mine Warfare. Supporting warfare tasks for the SSN are: Special Warfare; Ocean Surveillance; Intelligence/Reconnaissance; Command, Control, and Communications (C^3); and Electronic Warfare.

b. (C) Mission Role -- Within the foregoing mission areas, attack submarines perform tasks of barrier operations, area clearance, direct support, vectored intercept, surveillance/reconnaissance, and far-forward operations. In addition, the SSN 688 Class must provide a land-strike and an under-ice capability for operations. (b)(1)

(b)(1)

7. (U) Program Highlights

a. (U) Significant Historical Developments -- The AN/BSY-1 Program was initiated in response to the Mission Element Needs Statement (MENS) for a Submarine Advanced Combat System and was designated as a Major System Acquisition Category (ACAT I) Program by Secretary of Defense on 28 November 1980. The acquisition strategy was approved by Defense Systems Acquisition Review Council (DSARC) Milestone I/IIA by SECDEF on 5 October 1983. The program underwent a major restructure in September 1985, creating two separate combat systems, AN/BSY-1 and AN/BSY-2, because of projected funding shortfalls. The restructured program was approved by SDDM of 16 May 1986. To date, 23 shipsets have been approved for production, full scale development is essentially complete and TECH/OPEVAL is scheduled for the summer and fall of 1990.

b. (U) Significant Developments (Since Last Report) -- Since the last report 3 product baseline systems, 2 upgrade kits and the Maintenance Trainer, New London, were delivered on time.

Maintainability Demonstration was completed satisfactorily - Mean Time to Repair (MTTR) demonstrated was 20.3 minutes, the TEMP requirement is 30 minutes.

OT-IIB land based testing (assessment) was successful and the letter forwarding the official assessment report was received on 13 December 1989 (Ser 436B/C256). Testing involved 120 hours of Battle Stations/selected tracking scenarios and was conducted using 37 sailors representing 7 different commands.

Supported a demanding shipyard installation schedule which included 5 ship installations and 2 upgrade kits. AN/BSY-1(V) was not a contributor to ship construction or PSA delays; all deliveries, installation support, and field engineering support met shipyard schedule requirements.

Achieved outstanding performance during WSAT, Test targets are being tracked at ranges in excess of AN/BQQ-5 performance.

The AN/BSY-1 program continues excellent progress in preparation for TECH/OPEVAL. A functional upgrade (H/W and S/W) was installed on the SSN 751 2-15 January 1990. Longevity upgrade (H/W and S/W) is on schedule for March 1990 installation.

The program continues excellent progress in the development of shore based trainers. 2 WLSOT systems were delivered to NAVSUBSCOL, New London and Pearl Harb.

Buyout contracts were awarded for FY89 with options for FY90 and FY91. The Conventional Systems Committee review was held on 28 November 1989 and was signed on 22 December by DAE Betti. This approved procurement of the last shipset in FY90 and the Software Maintenance Facility (SMF) in FY91.

The SSN751 successfully completed PSA sea trials on 20 December 1989. This was the First Product Baseline at sea. There were very few problems and excellent performance.

TECHEVAL will begin in April 1990 and OPEVAL will begin in November 1990.

Four additional ships and 2 kits will be delivered this year.

c. (U) Changes Since "As Of" Date. None

8. Threshold Breaches: There are currently no DAE baseline (dated 30 June 1989) threshold breaches.

AN/BSY-1(V) is expected to satisfy all current mission requirements.

9. (U) SCHEDULE

a. (U) Milestones
(U) Program Initiated (MENS Approved)

(U) DSARC I
Approved Design Definition SUBACS A and Concept Development SUBACS B

(U) DSARC II
Approve FSD SUBACS BASICS

(U) Award FSD Contract SUBACS BASIC

	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
AN/BSY-1(V) Program Status Review	(b)(1)		CH-1
AN/BSY-1(V) Program Status Review			
AN/BSY-1(V) Program Status Review			
SSN 751 System Delivery			
SSN 752-754 System Delivery			
SSN 755-758 System Delivery			CH2
SSN 759-766 System Delivery			CH2
SSN 767-769 System Delivery			CH2
SSN 770-771 System Delivery			CH2
SSN 772-773 System Delivery			CH2
Start TECH/OPEVAL AN/BSY-1(V)			CH3
(U) DSARC III Review of TECH/OPEVAL Results			CH3
(U) IOC IOC AN/BSY-1(V)			CH3

b. (U) Previous Change Explanations: Previous changes reflect shipyard and program for AN/BSY-1(V).

c. (U) Explanation of Current Changes: CH-1 reflects actual dates. CH-2 reflects shipyard revised desired delivery dates for AN/BSY-1(V). CH-3 reflects changes in the ships operating schedule.

d. (U) References -- Development Estimate: DCP SUBACS BASIC, dated 15 November 1985

Approved Program: DAE baseline approved 30 June 1989

10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS AN/BSY-1(V):

	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	DEMONSTRATED PERFORMANCE	CURRENT ESTIMATE	NO
a. (U) TECHNICAL --					
(U) Acoustic Subsystem Figure of Merit					
(1) Detection:					
- Passive Broadband Spherical Array					
- Passive Broadband Towed Array (TB-16D)					
- [redacted] Towed Array (TB-23)					
- MF Active Search (Sector Search)					
- MF Active Search OMNI-MCC					
- HF Moored-Mine Avoidance					
- HF ASW Search/ Collision Avoidance					
- [redacted] Delineation					
- HF Ice Keel Avoidance					
(2) Tracking:					
- Passive Broadband Spherical Array					
- Passive Broadband Towed Array					
- [redacted] Towed Array (TB-23)					

(U)

[redacted]

* All characteristics are TEMP references for AN/BSY-1(V) configuration. It is the policy of the Department of the Navy to specify performance values in terms of threat only.

10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS AN/BSY-1(V):

	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	DEMONSTRATED PERFORMANCE	CURRENT ESTIMATE	NOT
a. (U) TECHNICAL -- (Cont'd)					
(U) Acoustic Subsystem Figure of Merit (Cont'd)	(b)(1)				
- MF Active (18 deg.)					
- HF ASW Search Collision Avoidance					
(U) Classification: - Low Frequency Analysis and Recording (LOFAR)/Towed Array (TB-23)					
- DEMON/Spherical Array					
(C) Combat Control Subsystems					
(1) Localization					
- Targets o Active ATF o Passive ATF o Non-ATF Auto TMA (MPKAST) Concurrent					
- MPKAST/MATE/FLIT Accuracy o Range o Course o Speed o Nominal Time to Accurate Solution					
- D/E Range o Accuracy o Nominal Time to obtain D/E Range					

10. (C) TECHNICAL/OPERATIONAL CHARACTERISTICS AN/BSY-1(V):

	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	DEMONSTRATED PERFORMANCE	CURRENT ESTIMATE	NOT
a. (C) TECHNICAL -- (Cont'd)					
(C) Combat Control Subsystems (Cont'd)					
- Towed Array TMA Accuracy					
o Range					
o Course					
o Speed					
o Nominal Time to obtain Solution - Ekelund					
o Accuracy					
o Nominal Time to Obtain Range					
(2) Weapon Order Generation					
- Max Number of Weapons That Can Be Preset Concurrently					
o Mk 48 Mods 3/4 or					
o HARPOON or					
o TOMAHAWK or					
o ADCAP					
- Max Number of Weapons That May Be Post-Launched Controlled Concurrently					
o Mk 48 Mods 3/4 or					
o ADCAP					
- Max Number of Targets For Which Orders May Be Generated					

(C)

10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS AN/BSY-1(V):

	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	DEMONSTRATED PERFORMANCE	CURRENT ESTIMATE	NOT
a. (U) TECHNICAL -- (Cont'd)					
(2) Weapon Order Generation (Cont'd)					
o Mk 48 Mods 3/4 or o HARPOON or o TOMAHAWK or o ADCAP					
- Time to Snapshot a Mk 48 Mods 3/4 Mk 48 ADCAP					
(3) Over-The-Horizon					
- Submarine Operational Data Link o Tracks					
- Submarine Tactical Data Link o Tracks o Special Points					
b. (U) OPERATIONAL --					
(U) Acoustic Subsystem Detection Ranges, Yards					
- Passive Broadband/ Spherical Array					
- Passive Broadband Towed Array					
- (b)(1) Towed Array (TB-23)					
- Active - Medium Freque					
o Sector, Direct Path					
o OMNI, Direct Path					

(b)(1)

10. (C) TECHNICAL/OPERATIONAL CHARACTERISTICS AN/BSY-1(V):

	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	DEMONSTRATED PERFORMANCE	CURRENT ESTIMATE	NO

b. (C) OPERATIONAL -- (Cont'd)

(C) Acoustic Subsystem Detection Ranges, Yards (Cont'd)

- Active - High Frequency

  - o Moored Mine Avoidance
  - o ASW Search/Collision Avoidance
  - o (b)(1) Delineation
  - o Ice Keel Avoidance

(C) Target Motion Analysis

- Mean time for System to achieve a standard solution
- Simultaneous Tracks Using Ship Sensors Frame Casualty
- Detection of Target Zigs
- D/E Range
  - o Number of Contacts
  - o Range Accuracy
  - o Nominal Time to Obtai D/E Range

(C) Weapon Order Generation

- Max Number of Weapons Th Can Be Present Concurren
  - o Mk 48 Mods 3/4
    or
  - o HARPOON
    or
  - o TOMAHAWK
    or
  - o ADCAP

(b)(1)

10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS AN/BSY-1(V):

	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	DEMONSTRATED PERFORMANCE	CURRENT ESTIMATE	NOT
b. (U) OPERATIONAL -- (Cont'd)					
- Max Number of Weapons That May Be Post-Launch Controlled Concurrently					
o Mk 48 Mods 3/4 or o ADCAP					
- Max Number of Targets For Which Orders May Be Gener					
o Mk 48 Mods 3/4 or o HARPOON or o ADCAP					
- Time to Snapshot a Mk 48 Mod 3/4 and ADCAP					
(U) Over-The Horizon Targeting					
- Submarine Operational Data Link Tracks					
- Submarine Tactical Data Link Tracks					
(U) Readiness/Supportability					
- Mean Time Between Failure (MTBF) (hrs))					
o Full-up (70 day mission)					
o Self-Protect (70 day mission)					
- Mean Time to Repair (MTTR), Hardware					

(b)(1)

** These parameters will be assessed using test measurements and a computer simulation model. The model inputs for the GFE are based on fleet usage data and represent the most realistic information available.

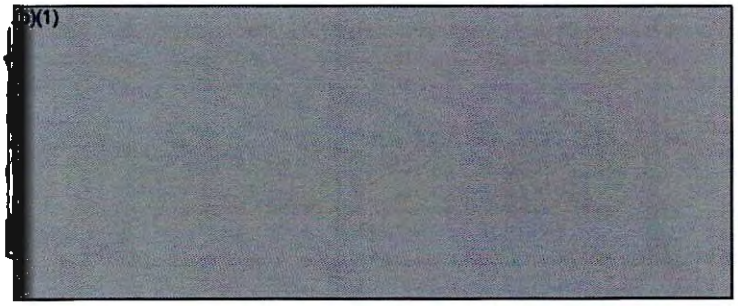
10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS AN/BSY-1(V):

	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	DEMONSTRATED PERFORMANCE	CURRENT ESTIMATE	NOTE

b. (U) OPERATIONAL -- (Cont'd)

- Operational Availability (Ao)
  - o ASW Mission
  - o Anti-Surface Mission
  - o Strike Warfare Mission
- Probability of Parts availability given a 90-day supply loadout

(b)(1)



c. (U) Previous Change Explanations: Reflect earlier changes in the AN/BSY-1(V) TEMP.

d. (U) References --

- o SUBACS BASIC CC/A Top Level Requirements dated 25 October 1985
- o TEMP 908-1 Rev 3 for AN/BSY-1(V) dated June 1987.
- o Development Estimate: DCP SUBACS BASIC, 15 November 1985.
- o Approved Program: DAE Baseline, 30 June 1989.

(U) Notes for Technical/Operational Characteristics

NOTE 1: The Technical/Operational characteristics are based on the conditions specified in AN/BSY-1(V) TEMP 908-1 Rev 3 dated June 1987. Variances between actual conditions and specified conditions will be factored into the comparison of these characteristics.

11 Program Acquisiton Cost (Current Estimate in Millions of Dollars)

A. Cost - -	DEVELOPMENT* ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
Development (RDT&E)	2027.5	1135.3	1135.9
Procurement (OPN)	944.9	513.1	291.5
Construction (MILCON)			
Total FY84 Base-Year $	2972.4	1648.4	1427.4
Escalation			
Development (RDT&E)	319.4	70.8	69.1
Procurement (OPN)	535.8	157.0	97.5
Construction (MILCON)			
Total Then-Year $	3827.6	1876.2	1594.0

B. Quantities - - ** N/A
Development (RDT&E)
Procurement (OPN)
Total

C. Foreign Military Sales - - None

D. Nuclear Costs - - None

E. References - -
DEVELOPMENT ESTIMATE: DCP SUBACS BASIC, dated 15 November 1985.

APPROVED PROGRAM: DAE Baseline dated June 30, 1989.

* Development estimate includes all approved technical requirements before AN/BSY-1 was separated from AN/BSY-2.

** Production systems for new construction ships fall under the SCN appropriation and are reported in the SSN 688 SAR. Support equipment procurement is reported in this SAR.

12 Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
A. Program Acquisition - -	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	1594.0	1876.2	1594.0
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

	Current Year		Budget Year
B. Current Procurement - -	(FY 1990)	(FY 1990) APPN	(FY 1991)
(1) Cost	N/A	N/A	N/A
Less CY Adv Proc	N/A	N/A	N/A
Plus PY Adv Proc	N/A	N/A	N/A
Net Total	N/A	N/A	N/A
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

NOTE: Not Applicable. Production systems for new construction ships are under the SCN appropriation and are included in the SSN 688 SAR.

13 Cost Variance Analysis:

A. Summary - - (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	2346.9	1480.7		3827.6
Previous Changes:				
Economic	-51.4	-38.8		-90.2
Quantity	-62.1	108.9		46.8
Schedule	15.5	9.5		25.0
Engineering	34.0	49.7		83.7
Estimating	-25.9	-84.1		-110.0
Other	-1050.9	-1586.7		-2637.6
Support		386.6		386.6
Subtotal	-1140.8	-1154.9		-2295.7
Current Changes:				
Economic	-0.3	13.5		13.2
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating	-0.8	49.7		48.9
Other				0.0
Support				0.0
Subtotal	-1.1	63.2		62.1
Total Changes	-1141.9	-1091.7		-2233.6
Current Estimate	1205.0	389.0		1594.0

13 Cost Variance Analysis (Continued):

FY 1984 Constant Dollars (Base- Year) in Millions

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	2027.5	944.9		2972.4
Previous Changes:				
Quantity	-57.0	82.1		25.1
Schedule	13.2	12.4		25.6
Engineering	29.6	37.4		67.0
Estimating	-11.5	-78.9		-90.4
Other	-866.5	-1051.5		-1918.0
Support		309.6		309.6
Subtotal	-892.2	-688.9		-1581.1
Current Changes:				0.0
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating	0.6	35.5		36.1
Other				0.0
Support				0.0
Subtotal	0.6	35.5		36.1
Total Changes	-891.6	-653.4		-1545.0
Current Estimate	1135.9	291.5		1427.4

B. Previous Change Explanations - -

RDT&E

Economic: Revised Escalation Indices

Quantity: Removed Engineering Development Model and Land Based Test Site

Schedule: Rephasing of chassis and software boot development (CC/A)

Engineering: ECPs to the Combat Control/Acoustic Subsystem Submarine Active Detection Sonar Group (TG) and High Frequency Transmitter (HFT); AN/UYK-43 rearchitecture; revised TECHEVAL/OPEVAL support; upgrade of C4.1 software boot; changes to CC/A configuration; increased OPEVAL support

Estimating: Software, Basic Operator Trainer (BOT) and Weapons Launch System Operator Trainer(WLSOT) cost growth; -$21M correction from previous SAR for administrative effort; CC/A, TG and HFT overrun projections.

Other: Separation of the AN/BSY-1 from the AN/BSY-2

Procurement

Economic: Revised Escalation Indices

Quantity: Addition of MSRA, Team Trainers and associated spares to support an increased number of operational systems.

Schedule: Change of backfit equipment and earlier deliveries to meet accelerated shipbuilding schedule.

Engineering: Configuration changes to enhance capability.

Estimating: Increase in product improvement and overhaul material needs; loss of Software Maintenance Facility due to budget cuts; decrease in number of spares for Maintenance Assisted Modules(MAMS) and Installation and Checkout(I&C. restoration of Software Maintenance Facility(SMF); loss of 2 Team Trainers; additional funding for Wide Aperture Array(WAA) backfits; decrease in product improvement needs; increase in Module Screening and Repair Activity(MSRA) requirements; transfer of funding for Wide Aperture Array (WAA) backfit to AN/BSY-2 program.

13 Cost Variance Analysis (Continued):

B. Previous Change Explanations - -

Procurement

Other: Separation of the AN/BSY-1 from the AN/BSY-2

Support: Redefinition of support requirements for trainers and spares.

C. Current Change Explanations - -

	(Dollars in Millions) Base-Year $	Then-Year $
(1) Procurement		
Increase in Organic Depot and MSRA requirements (Estimating)	35.5	49.7
Revised Jan 89 Economic Escalation Rates (Economic)	N/A	13.5
(2) RDT&E		
Revised funding for TECHEVAL/OPEVAL support (Estimating)	0.6	-0.8
Revised Jan 89 Economic Escalation Rates (Estimating)	N/A	-0.3

14 Program Acquisition Unit Cost (PAUC) History: * (Millions of Then-Year Dollars)

A. Initial SAR Estimate to Current Estimate - - N/A

B. Current Baseline Estimate to Current Estimate - - N/A

* Not Applicable. Production systems for new construction ships are procured under SCN appropriation and are included in the SSN 688 report.

15 Contract Information: (Then-Year Dollars in Millions)

A. RDT&E

All RDT&E contracts are over 90% complete.

B. Procurement

	Initial Contract Price		
TT/ WLSOT	Target	Ceiling	Quantity
IBM Corporation, Manassas, VA	$103.0	$108.4	6
N00024-87-C-6078, FPI			
Award: March 1988			
Definitized: March 1988			

15 Contract Infromation (cont.): (Then-Year Dollars in Millions)

N00024-87-C-6078

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Quantity	Contractor	Program Manager
$103.0	$108.4	6	$103.0	$103.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$7.4	-$2.1
Cumulative Variances To Date (11/30/89)	$6.1	-$2.9
Net Change	-$1.3	-$0.8
Cumulative Variance Change percent	-17.6%	-38.1%

Explanation of Change: The primary cause for the schedule variance was late development of the system engineering functional design, which led to delayed software development as well as development problems at the subcontractors. All subcontractor schedule slips are contained within program planned buffer.

C. MILCON - - N/A

A. Program Status - -

(1) Percent Program Completed : 55.6% (10/18 Years)

(2) Percent Program Cost Appropriated: 84% ($1336.1/$1594)

B. Appropriation Summary - -

	(Then-Year Dollars in Millions)				
Appropriation	Prior Years (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-97)	Total
RDT&E	1179.4	23.6	2.0		1205.0
Procurement	129.8	3.3	90.8	165.1	389.0
MILCON					
Total	1309.2	26.9	92.8	165.1	1594.0

16 Program Funding Summary (Current Estimate in Millions of Dollars)
C. Annual Summary

FISCAL YEAR	QTY	FLYAWAY BASE YEAR 84 $ NONREC	FLYAWAY BASE YEAR 84 $ REC	TOTAL BASE YEAR $	TOTAL THEN -YEAR $ PROGRAM	OBLIGATED	EXPENDED	ESCL. RATE (%)
APPROPRIATION: RDT&E								
PRIOR				252.8	237.5	200.4	199.1	
1984				126.8	129.2	129.2	128.6	3.8
1985				174.3	183.1	183.1	182.1	3.4
1986				184.5	199.4	199.4	189.4	2.8
1987				188.6	209.9	208.5	196.7	2.7
1988				115.6	133.0	130.9	115.1	3.0
1989				72.9	87.3	85.7	58.5	4.2
1990				18.9	23.6	11.5	0.7	4.0
1991				1.5	2.0	0.0		4.2
SUB-TOTAL				1135.9	1205.0	1148.7	1070.2	
APPROPRIATION: OPN								
1986				0.5	0.6	0.6		2.8
1987				58.8	68.4	67.8	28.9	2.7
1988				48.2	58.7	56.5	14.8	3.0
1989				1.7	2.1	2.1		4.2
1990				2.5	3.3			4.0
1991				66.5	90.8			4.2
1992				39.8	56.2			4.0
1993				36.7	53.5			3.7
1994				36.8	55.4			3.4
1995				0.0	0.0			3.1
1996				0.0	0.0			3.1
1997				0.0	0.0			3.1
SUB-TOTAL				291.5	389.0	127.0	43.7	
TOTAL				1427.4	1594.0	1275.7	1113.9	

17 Production Rate Data:

A. Annualized Production Rates - - N/A

18 Operating and Support Cost

A. Assumptions and Ground Rules - - N/A

B. Cost - - N/A

C. Contractor Support Costs --

	FY1989 & Prior	FY1990 Year	FY1991 Year	(1) Balance to Complete	(2) Total
O&M,N	5.4	7.6	9.0	50.4	72.4
Industrial Fund	N/A	N/A	N/A	N/A	N/A
Total	5.4	7.6	9.0	50.4	72.4

A-26 TOW2

~~SECRET/NOFORN~~

SAR-89-124

SELECTED ACQUISITION REPORT (RCS: DD-COMP(O&A)823)
PROGRAM: TOW 2

AS OF DATE: December 31, 1989

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1. [U] Designation and Nomenclature (Popular Name): TOW 2

[U] DoD Component: U.S. Army

3. [U] Responsible Office and Telephone Number:
TOW Project Office — COL Thomas M. Devanney
Program Executive Officer, Fire Support — Assigned: June 29, 1987
Redstone Arsenal, AL 35898-5710 — AV 746-7194; Comm (205) 876-7194

4. [U] Program Elements/Procurement Line Items:
RDT&E:
PE 243802 Project D336
PROCUREMENT:
APPN 2032 ICN SSN C59300 (Army)
APPN 2032 ICN SSN C61700 (Army)
APPN 2032 ICN SSN CA0253 (Army)
APPN 2032 ICN SSN CA0258 (Army)
APPN 2035 ICN SSN BL5295 (Army) - Sunk
APPN 2035 ICN SSN K42500 (Army) - Sunk

AS AMENDED

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MAR 22 1990
21
DIRECTORATE FOR FREEDOM OF INFORMATION
AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

5. [U] Related Programs:
None.

(DOWNGRADE TO ~~UNCLASSIFIED WHEN~~ SEPARATED FROM CLASSIFIED MATERIAL.)

Classified by: TOW SCG Dtd 18 Oct 88
Declassify on: OADR

(THIS PAGE IS ~~UNCLASSIFIED~~)

(b)(1)

OASD(PA) DFOISR 90-T-0713

~~SECRET/NOFORN~~

6. [redacted] Mission and Description: The TOW 2 system is an upgrading of the Basic TOW System necessitated by an existing and postulated future threat. The Basic TOW (tube-launched, optically tracked, wire-guided) System is a crew-portable, heavy anti-tank, assault weapon designed to attack and defeat armored vehicles and other targets such as field fortifications. Concurrent with lethality improvements, the TOW 2 System hardens against obscurants and electro-optical countermeasures which enables the system to be effectively employed in all weather conditions to engage tanks, other armored vehicles, bunkers, crew-served weapons and has a limited self defense capability against helicopters. The launcher consists of a launch tube, traversing unit, optical sight, night sight, missile guidance set, battery assembly, tripod, overpack, shroud, and carrying strap. The missile is encased in a disposable launch container. The TOW system has been incorporated into the improved TOW vehicle (ITV), the high mobility multipurpose wheeled vehicle (HMMWV), the M151 jeep, the armored personnel carrier, and the U.S. Marine Corps (USMC) light armored vehicle (LAV). The TOW subsystems on Bradley Fighting Vehicle Systems are separately funded by the Bradley Project Manager and managed by the TOW PM by agreement. The missiles for all Army platforms, including the COBRA aircraft, are funded in the TOW line and procured by the TOW PM. Missiles and ground support equipment for the USMC are procured by the TOW PM but funded by USMC. An enhancement to the TOW 2 missile to counter the applique armor threat was initiated in December 1984. TOW 2B (formerly the TOW Lethality Improvement Program) was directed by the Vice Chief of Staff for the Army in May 1985 to counter threat evolution. The TOW 2B effort was initiated as a product improvement program for development of a warhead and sensor system and launcher software that would allow the missile to overfly the target and fire down into the target.

[redacted] (b)(1)

7. [redacted] Program Highlights:

a. [redacted] Significant Historical Developments -- The TOW 2 missile was developed under a product improvement program initiated in 1979. TOW 2A is an enhancement to the TOW 2 missile initiated in December 1984 to counter the reactive applique armor threat. The effort added a tip charge to the probe, a redesigned safe and arming device and an electronic timing device to provide delay between the tip and main charge functions. Additional ballast was added to the aft end of the missile to accommodate the extra weight resulting from the probe improvements. Acquisition of TOW 2A was accomplished as an Engineering Change Proposal to the missile production line beginning with the FY86 buy. TOW 2B fly-over shoot-down missile version R&D contract was awarded 24 September 87. Multiyear procurement (FY 88-92) determined not cost effective by OSD. Army was directed to award second source missile contract in FY89 and elected annual procurements with prime producer until the second source is qualified. Six of the 15 TOW 2B telemetry flights were completed. Night Vision Equipment Set (AN/TAS-12C) contract for new production and modification kits with optical improvements was awarded in November 1988 following GAO finding in Army's favor from Brunswick protest. Alternate TOW 2B warhead, improved flight motor and TOW sight improvement (fire control system) programs were added to TOW Project Management mission as product improvements.

7. [redacted] Program Highlights: (Cont'd)

b. [redacted] Significant Developments Since Last Report--

1) Alternate TOW 2B development contract (Phase A) awarded June 1989. Final procurement of night vision equipment sets (AN/TAS-12C) (new production and modification kits with optical improvements) was awarded June 1989. Second source missile contract awarded July 1989. FY89 option to FY88 missile contract definitized 12 September 1989 for 12000 TOW 2A missiles. Additional quantity of 1115 added 30 September 1989 with FY87 reprogrammed funds from foreign military sales (FMS) case. TOW 2B Phase I production implementation contract awarded to Hughes Aircraft Company on 18 August 1989 for $6.4M and $11.9M for Phase II production implementation awarded on 29 December 1989. TOW 2B Phase II engineering flight test began 27 September 1989 with a successful telemetry flight over a multiple target array.

2) The TOW 2 baseline change proposal submitted in February 1989 was approved and signed by the Defense Acquisition Executive (DAE), Mr. John Betti, on 7 November 1989. TOW 2B warhead qualification testing began with static tests at Socoro, NM. Four warhead tests have been successfully completed. Four of the Phase II engineering flights were successfully completed at Redstone Arsenal, AL successfully demonstrating full integration of guidance, missile, sensor, fuze, firing train, and ball marker warheads (miniature warheads which duplicate ballistic characteristics of tactical warheads allowing target impact to be determined without destroying the target).

3) TOW Improved Sight - The TOW Improved Sight Development Program will upgrade the target acquisition/Fire Control Systems for the HMMWV/Ground TOW and Bradley and integrate TOW ground day/night sight. The primary benefits of this upgrade will include increased recognition range, automatic target tracking, reduced target acquisition time, wider field of view for search, increased probability of hit, increased system/crew survivability, improved man-machine interface, and increased probability of kill with multiple missile launch capability.

The TOW 2 System is expected to continue to satisfy mission requirements.

c. [redacted] Changes Since As of Date -- None.

8. [redacted] Threshold Breaches: There are currently no Army Acquisition Executive (AAE) Baseline (dated 26 Feb 1990) breaches.

9. [U] Schedule:

a. [U] Milestones --

	PRODUCTION ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
TOW 2			
Program Go-Ahead	SEP 78	SEP 78	SEP 78
R&D Contract Award	AUG 79	AUG 79	AUG 79
DT/OT Test Start	N/A	MAY 81	MAY 81
DA IPR (Production Approval)	SEP 81	SEP 81	SEP 81
DT/OT Test Complete	N/A	JUL 81	JUL 81
Initial Production Contract Award	DEC 81	DEC 81	DEC 81
Production Contract Deliveries Begin (Missile)	N/A	JAN 83	JAN 83
Initial Operational Capability	SEP 83	SEP 83	SEP 83
Production Contract Deliveries Complete	N/A	APR 87	APR 87
TOW 2A			
Engineering Development Begins	JAN 84	JAN 84	JAN 84
Qualification Test Begins	APR 86	APR 86	APR 86
Qualification Test Complete	JUL 86	JUL 86	JUL 86
Initial Production Contract Award	AUG 86	AUG 86	AUG 86
Warhead Cut-In	MAY 87	MAY 87	MAY 87
Production Contract Deliveries Begin - FY86 Buy	JUN 87	JUN 87	AUG 87 (Ch-1)
FY87 Production Contract Award	JUN 87	AUG 87	AUG 87
Initial Operational Capability	AUG 87	SEP 87	SEP 87
Second Source Educational Buy Contract Award	N/A	MAY 89	JUL 89 (Ch-2)
Production Contract Deliveries Complete-FY90 (1 mo. Delivery)	N/A	MAR 92	MAR 92 (Ch-3)
Prime Source/Second Source Split Buy Contract Award	N/A	DEC91	DEC 91
TOW 2B			
R&D Contract Award	AUG 87	SEP 87	SEP 87
DT/OT Test Complete	JUL 89	APR 90	JUL 90 (Ch-4)
DA IPR	N/A	JUN 90	SEP 90 (Ch-4)

[C] (b)(1) [redacted]

TOW 2 RETROFIT			
Phase I Missile Deliveries	N/A	SEP 90	DEC 90 (Ch-3)
Phase II Contract Award	N/A	MAR 89	JUN 89 (Ch-5)

[S-NF] (b)(1) [redacted]

9. (U) Schedule: (Cont'd)

a. (U) Milestones -- (Cont'd)

	PRODUCTION ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
TOW SIGHT IMPROVEMENT PROGRAM (TSIP)			
Program Go-Ahead	N/A	MAY 89	MAY 89 (Ch-6)
Milestone II Review	N/A	FEB 91	FEB 91 (Ch-6)
FSD Contract Award	N/A	APR 91	APR 91 (Ch-6)

b. (U) Previous Change Explanations --

To correct previous SAR data. IPR and FUED dates deleted per DoD letter 30 Oct 84, Baselining Policy and Selected Acquisition Report.

c. (U) Current Change Explanations --

(Ch-1) FY86 Production Contract Deliveries start date changed from Jun 87 to Aug 87.

(Ch-2) Second Source Educational Buy contract award changed from May 89 to Jul 89.

(Ch-3) Production Contract Deliveries changed from Apr 91 to Mar 92; and Tow 2 Retrofit Phase I Missile Delivery changed from Sep 90 to Dec 90.

(Ch-4) DT/OT changed from Apr 90 to Jul 90 due to delay in availability of test hardware and test facilities; DT/OT changed from Jun 90 to Sep 90 to allow the required 60 days for submittal of AMSAA's independent evaluation; IOC (b)(1) changed from [redacted] based on hardware leadtime resulting from IPR production go ahead.

(Ch-5) Phase II Contract Award changed from Mar 89 to Jun 89.

(Ch-6) New milestones resulting from the 26 Feb 1990 AAE Baseline

d. (U) References --

1) (U) Production Estimate: IPR approved by HQDA message, DAMA-WSM-S, 9 Oct 81.

2) (U) Approved Program: AAE Baseline dated 26 Feb 1990.

10. (U) Technical/Operational Characteristics:

a. (U) Technical	Prod Estimate	Approved Prog Goal/Threshold	Demonstrated Performance	Current Estimate
1. (U) Weight (lbs)				
(a) TOW 2				
(1) Missile Wt. Only	N/A	48/48	48	48
(2) Msl Wt.(encased)	63.4	63.4/63.4	63.4	63.4
(3) Launcher Wt.	216	216/216	216	216
(4) Sys. Ready to Fire	276	279.4/279.4	279.4	279.4

10. [U] Technical/Operational Characteristics: (Cont'd)

a. [U] Technical	Prod Estimate	Approved Prog Goal/Threshold	Demonstrated Performance	Current Estimate
1. [U] Weight (lbs)				
(b) TOW 2A				
(1) Missile Wt. Only	N/A	49.8/49.8	49.8	49.8
(2) Msl. Wt. (Tactical)	N/A	64.5/64.5	64.5	64.5
(3) Launcher Wt.	N/A	216/216	216	216
(4) Sys. Ready to Fire	N/A	280.5/280.5	280.5	280.5
(c) TOW 2B				
(1) Missile Wt. Only	N/A	49.8/51.0	N/A	51.0 (Ch-1)
(2) Msl. Wt. (Tactical)	N/A	64.5/65.7	N/A	65.7 (Ch-1)
(3) Launcher Wt.	N/A	216/216	216	216
(4) Sys. Ready to Fire	N/A	280.5/281.7	N/A	281.7 (Ch-1)

b. [U] Operational	Prod Estimate	Approved Prog Goal/Threshold	Demonstrated Performance	Current Estimate
1. [U] Range (meters).				
(a) TOW 2				
Minimum	65M	65M/65M	65M	65M
Maximum	3750M	3750M/3750M	3750M	3750M
(b) TOW 2A				
Minimum	N/A	65M/65M	65M	65M
Maximum	N/A	3750M/3750M	3750M	3750M
(c) TOW 2B				
Minimum	N/A	65/400 1/	N/A	400 1/
Maximum	N/A	3750M/3750M	N/A	3750M
2. [U] System Reliability (%)				
(a) TOW 2 missile w/launcher	91.6	95/91.6	91.6	91.6 (Ch-1)
(b) TOW 2A missile w/launcher	N/A	95/91.6	91.6	91.6 (Ch-1)
(c) TOW 2B missile w/launcher	N/A	95/91.6	N/A	91.6 (Ch-1)

10. [U] Technical/Operational Characteristics: (Cont'd)

b. [U] Operational	Prod Estimate	Approved Prog Goal/Threshold	Demonstrated Performance	Current Estimate
3. [U] Probability of Kill (PK)				
(a) Benign				
[S] (1) TOW 2 (Target T-72)				
(2) TOW 2A(Target T-80+)				
[S] (3) TOW 2B(Target FST-1)				
[S] (4) ALT TOW 2B(Target)				
(b) Long Wave Jammers				
[S] (1) TOW 2 (Target T-72)				
(2) TOW 2A(Target T-80+)				
(3) TOW 2B(Target FST-1)				
[S] (4) ALT TOW 2B(Target)				

(b)(1)

1/ 200M with reduced PK.
2/ Lethality expressed as RHA penetration vice specific target PK.

10. [ ] Technical/Operational Characteristics: (Cont'd)

c. [ ] Previous Change Explanations -- None.

d. [ ] Current Change Explanations --

(Ch-1) Added to reflect program continuity from 31 Dec 88 SAR to 31 Dec 89 SAR as reported in AAE Baseline dated 26 Feb 1990.

e. [ ] References --

(1) [ ] Production Estimate: IPR approved by HQDA message, DAMA-WSM-S, dated 9 Oct 1981.

(2) [ ] Approved Program: AAE Baseline dated 26 Feb 1990.

11. [ ] Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. [ ] Cost --

	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	107.0	357.9	357.9
Procurement	2195.1	2626.1	2626.1
Heat Missile	(1299.3)	(1649.7)	(1649.7)
Launcher	(7.0)	(0.0)	(0.0)
AN/TAS4/4A Night Sight	(363.2)	(236.8)	(236.8)
Ground Support Retrofit	(325.8)	(605.1)	(605.1)
Night Sight Retrofit	(26.1)	(13.3)	(13.3)
Total Flyaway	(2021.4)	(2504.9)	(2504.9)
Other Weapon System Cost	(103.3)	(34.6)	(34.6)
Peculiar Support	(48.9)	(33.4)	(33.4)
Initial Spares	(21.5)	(53.2)	(53.2)
Construction	0.0	0.0	0.0
Ops. and Maint. (O&M)	0.0	0.0	0.0
Total FY84 Base-Year $	2302.1	2984.0	2984.0
Escalation	321.7	518.3	518.3
Development (RDT&E)	(-15.7)	(60.4)	(60.4)
Procurement	(337.4)	(457.9)	(457.9)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Ops. and Maint. (O&M)	(0.0)	(0.0)	(0.0)
Total Then-Year $	2623.8	3502.3	3502.3

b. [ ] Quantities --

Development (RDT&E)	113	113	113
Procurement	141224	174532	174532
Construction	0	0	0
Total	141337	174645	174645

11. [U] Program Acquisition Cost: (Current Estimate in Millions of Dollars) (Cont'd)

c. [U] Foreign Military Sales -- Sales of TOW 2 and TOW 2A to date consist of over 30,000 TOW 2/2A missiles, value $150 million and over 500 launchers, value $62 million. In addition, 12,442 TOW 2/2A missiles, value $81 million and 160 launchers, value $20 million have been procured with Special Defense Acquisition (SDAF) funds.

Countries committed to TOW 2 upgrade consist of: Canada, Denmark, Germany, Netherlands, Norway, Sweden, Turkey, Portugal, Pakistan, Finland, Saudi-Arabia, Bahrain, Luxembourg, and Thailand. Ratio of missiles to launchers sales is high since majority of FMS customers are electing to purchase modification kits rather than complete launchers.

d. [U] Nuclear Costs -- None.

e. [U] References --

(1) [U] Production Estimate: IPR approved by HQDA message, DAMA-WSM-S, dated 9 Oct 1981.

(2) [U] Approved Program: AAE Baseline dated 26 Feb 1990.

12. [U] Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. [U] Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1) Cost	3502.3	3214.5	3502.3
(2) Quantity 1/	174532	174532	174532
(3) Unit Cost	0.020	0.018	0.020
b. [U] Current Procurement	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	136.0	136.0	264.9
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	136.0	136.0	264.9
(2) Quantity	9455	9455	13284
(3) Unit Cost	0.014	0.014	0.020

1/ This value has been revised to exclude (113) R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully configured end items for the purposes of this calculation.

13. [U] Cost Variance Analysis:

a. [U] Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	91.3	2532.5	0.0	2623.8
Previous Changes:				
Economic	-2.7	-147.4	-	-150.1
Quantity	-	+512.7	-	+512.7
Schedule	-	+102.4	-	+102.4
Engineering	+109.6	+216.7	-	+326.3
Estimating	-	-194.3	-	-194.3
Other	-	-	-	-
Support	-	-6.3	-	-6.3
Subtotal	+106.9	+483.8	-	+590.7
Current Changes:				
Economic	+1.3	+60.4	-	+61.7
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	+218.8	+25.5	-	+244.3
Estimating	-	-18.2	-	-18.2
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+220.1	+67.7	-	+287.8
Total Changes	+327.0	+551.5	-	+878.5
Current Estimate	418.3	3084.0	-	3502.3

13. (U) Cost Variance Analysis (Cont'd):

(FY 1984 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	107.0	2195.1	0.0	2302.1
Previous Changes:				
Quantity	-	+383.4	-	+383.4
Schedule	-	+33.8	-	+33.8
Engineering	+89.3	+163.5	-	+252.8
Estimating	-	-130.0	-	-130.0
Other	-	-	-	-
Support	-	-21.0	-	-21.0
Subtotal	+89.3	+429.7	-	+519.0
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	+161.6	+15.8	-	+177.4
Estimating	-	-14.5	-	-14.5
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+161.6	+1.3	-	+162.9
Total Changes	+250.9	+431.0	-	+681.9
Current Estimate	357.9	2626.1	-	2984.0

b. (U) Previous Change Explanations:

RDT&E --
Economic: Revised escalation indices.
Engineering: Enhancement to TOW 2 warhead.

Approved for TOW 2 retrofit, Flight Motor, TOW Sight Improvement (TSIP), Warhead Test Qualifications.

PROCUREMENT --
Economic: Revised escalation indices.
Quantity: Reduction of TOW 2 missile quantity.
Schedule: Stretch-out of missile procurements.

13. [ ] Cost Variance Analysis (Cont'd):

b. [ ] Previous Change Explanations (Cont'd):

PROCUREMENT --

Engineering: Funding of approved PIP's, enhancement to TOW 2 warhead.
Estimating: Changes in Night Sight acquisition strategy.
Support: Increase in GSE requirement.

c. [ ] Current Change Explanations:

	(Dollars in Millions) Base-Year	Then-Year
RDT&E -		
Revised escalation indices. (Economic)	N/A	+1.3
Requirement increase for following: Tow Sight Improvement Program (TSIP), TOW 2B Development, Alternate TOW 2B Development. (Engineering)	+161.6	+218.8
PROCUREMENT -		
Revised economic escalation indices. (Economic)	N/A	+60.4
Change due to cost estimate update to reflect most recent data. (Estimating)	+15.8	+25.5
Change due to prior year execution data as reflected in Finance and Accounting Records. (Estimating)	-14.5	-18.2

14. [ ] Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year dollars)

a. [ ] Initial SAR Estimate / (PdE) to Current Estimate --

PAUC Initial SAR Estimate (PdE)	Changes								PAUC PRODUCTION ESTIMATE
	ECON	QTY	SCH	ENGR	EST	SPT	OTHER	TOTAL	
.019	-.001	-.001	+.001	+.003	-.001	-0-	-0-	+.001	.020

This value has been revised to exclude (113) R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully - configured end items for the purposes of this calculation.

5. [redacted] Contract Information: (Then-Year Dollars in Millions)

a. [redacted] RDT&E -

TOW 2B Development Hughes Aircraft Co., Tucson, AZ DAAH01-87-C-1184, CPIF Award: 1 Sep 87 Definitized: 1 Sep 87	Initial Contract Price Target	Ceiling	Qty
	$32.4	N/A	N/A

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager	
$38.0	N/A	N/A	$49.4	$51.4	1/

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -0.9	$ -2.3
Cumulative Variances to Date (11/24/89)	$ -4.3	$ -1.6
Net Change	$ -3.4	$ +0.7

Explanation of Change: Unfavorable cost variance and increase in program manager's assessment are due to selection of a sensor development vendor not part of the original development effort. The unfavorable schedule variance is the result of delays in warhead testing. Funding is available to cover cost growth.

ALT TOW 2B Development Hughes Aircraft Co., Tucson, AZ DAAH01-87-C-1184, CPIF Award: 9 Jan 89 Definitized: 31 Mar 90 (Projected)	Initial Contract Price Target	Ceiling	Qty	
	N/A	N/A	N/A	2/

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
0	N/A	N/A	$15.7	$16.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-0-	-0-
Cumulative Variances to Date (11/24/89)	$ -0.5	$ -1.1
Net Change	$ -0.5	$ -1.1

Explanation of Change: Unfavorable cost variances due to the impact of unanticipated armament section design iterations. The unfavorable schedule variance is the result of a delay in delivery of vendor data requirements list from one of the two warhead vendors in addition to the armament section design.

5. [redacted] Contract Information: (Then-Year Dollars in Millions) (Cont'd)

a. [redacted] RDT&E - (Cont'd)

changes. Contract Mod has not been definitized; however, program manager is funded to Not To Exceed (NTE).

b. [redacted] PROCUREMENT -

TOW Missiles (FY88)	Initial Contract Price			
Hughes Aircraft Co., Tucson, AZ	Target	Ceiling	Qty	
DAAH01-87-C-0292, FFP				
Award: 12 Aug 88	$126.2	N/A	15,977	3/
Definitized: Feb 89				

Current Contract Price			Estimated Price at Completion		
Target NTE	Ceiling	Qty	Contractor	Program Manager	
$315.5	N/A	44,747	$315.5	$315.5	4/

c. TOW 2 Bradley Fighting Vehicle Subsystem (FY88) 5/

Hughes Aircraft Co., El Segundo, CA	Initial Contract Price		
DAAH01-87-C-0582, FFP	Target	Ceiling	Qty
Award: 22 Apr 88	$123.0	N/A	437
Definitized: 22 Apr 88			

Current Contract Price			Estimated Price at Completion		
Target	Ceiling	Qty	Contractor	Program Manager	
123.0	N/A	436	$123.0	$123.0	6/

d. TOW 2 Bradley Fighting Vehicle Subsystem Second Source (FY88) 5/

Texas Instruments, Inc. Dallas, TX	Initial Contract Price		
DAAH01-87-C-0991, FFP	Target	Ceiling	Qty
Award: 28 Aug 87	$41.0	N/A	325
Definitized: 28 Aug 87			

Current Contract Price			Estimated Price at Completion		
Target	Ceiling	Qty	Contractor	Program Manager	
$41.0	N/A	325	$41.0	$41.0	6/

15. [redacted] Contract Information: (Then-Year Dollars in Millions) (Cont'd)

e. TOW 2 Bradley Fighting Vehicle Subsystem (FY89) 5/

Texas Instruments, Inc. Dallas, TX
DAAH01-89-C-0207, FFP
Award: 25 Jan 89
Definitized: 28 Apr 89

Initial Contract Price		
Target	Ceiling	Qty
$70.2	N/A	508

Current Contract Price			Estimated Price at Completion		
Target	Ceiling	Qty	Contractor	Program Manager	
$70.2	N/A	508	$70.2	$70.2	6/

1/[redacted] Increase due to selection of sensor development vendor not planned in original effort.
2/[redacted] Phase A only awarded at NTE. Phase B estimated at $34.5M to be awarded 2Q FY90.
3/[redacted] Increase reflects award of FY89 option. 13,115 (U.S. Army), 2,566 (U.S. Marine Corps) and 9,541 (FMS).
4/[redacted] Cost Performance Report (CPR) data not required on Firm Fixed Price (FFP) Contracts.
5/[redacted] This contract also appears in the Bradley SAR.
6/[redacted] Cost Performance Report (CPR) data not required on Firm Fixed Price (FFP) Contracts.

6. [U] Program Funding Summary:

a. [U] Program Status --
(1)Percent Program Completed: 76.5% (13 yrs/17 yrs)

(2)Percent Program Cost Appropriated: 61.5% ($ 2154.1/$ 3502.3)

b. [U] Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Prior Years (FY78-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-94)	Total
RDT&E	150.5	50.8	42.9	174.1	418.3
PROCUREMENT	1816.8	136.0	264.9	866.3	3084.0
MILCON	-	-	-	-	-
O&M	-	-	-	-	-
TOTAL	1967.3	186.8	307.8	1040.4	3502.3

c. [U] Annual Summary -- (Then-Year Dollars in Millions)

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year $	Total Then-Year $			Escl Rate %
		Nonrec	Rec		Program	Obligated	Expended	
APPROPRIATION: 2040 Research, Development, Test & Eval, Army								
1978	-	-	-	8.1	5.3	5.3	5.3	11.1
1979	-	-	-	14.4	10.3	10.3	10.3	12.6
1980	-	-	-	32.5	25.7	25.7	25.7	11.4
1981	-	-	-	25.8	22.5	22.5	22.5	7.6
1982	-	-	-	6.5	6.1	6.1	6.1	7.6
1983	-	-	-	2.2	2.2	2.2	2.2	4.9
1984	-	-	-	4.7	4.8	4.8	4.8	3.8
1985	-	-	-	11.3	11.9	11.9	11.9	3.4
1986	-	-	-	9.7	10.5	10.5	10.5	2.8
1987	-	-	-	5.6	6.3	6.3	6.3	2.7
1988	-	-	-	17.6	20.3	20.3	20.2	3.0
1989	-	-	-	20.5	24.6	24.6	12.9	4.2
1990	-	-	-	40.6	50.8	12.1	0.1	4.0
1991	-	-	-	32.9	42.9	0	0	4.2
1992	-	-	-	56.0	75.7	0	0	4.0
1993	-	-	-	42.4	59.3	0	0	3.7
1994	-	-	-	27.1	39.1	0	0	3.4
Subtotal	113			357.9	418.3	162.6	138.8	

16. [U] Program Funding Summary (Cont'd)

c. [U] Annual Summary -- (Then-Year Dollars in Millions) (Cont'd)

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year $	Total Then-Year $			Escl Rate %
		Nonrec	Rec		Program	Obligated	Expended	
APPROPRIATION: 2032 Missile Procurement, Army								
1981	3875	-	151.9	151.9	117.9	117.9	117.9	11.9
1982	10008	-	207.2	228.2	206.4	206.4	206.4	14.3
1983	12000	-	191.2	194.7	193.8	193.8	193.8	9.0
1984	18000	-	196.4	217.2	231.8	221.0	221.0	8.0
1985	12000	-	184.3	205.2	224.1	224.1	221.9	3.4
1986	12000	-	144.1	170.6	191.4	190.5	185.9	2.8
1987	9350	-	110.8	121.4	141.0	141.0	104.2	2.7
1988	12000	15.7	130.9	150.8	182.6	167.6	109.5	3.0
1989	12000	-	140.6	148.2	186.5	126.4	25.7	4.2
1990	9455	11.9	87.9	103.8	136.0	0	0	4.0
1991	13284	4.5	190.4	195.0	264.9	0	0	4.2
1992	16802	-	208.5	209.2	294.1	0	0	4.0
1993	16854	-	206.9	207.6	301.2	0	0	3.7
1994	16904	-	181.0	181.0	271.0	0	0	3.4
Subtotal	174532	32.1	2332.1	2484.8	2942.7	1588.7	1386.3	

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year $	Total Then-Year $			Escl Rate %
		Nonrec	Rec		Program	Obligated	Expended	
APPROPRIATION: 2035 Other Procurement, Army								
1981	-	-	30.5	30.5	27.8	27.8	27.8	11.9
1982	-	-	33.0	33.0	32.3	32.3	32.3	7.6
1983	-	-	44.1	44.1	45.3	45.3	45.3	4.9
1984	-	-	33.7	33.7	35.9	35.9	35.9	4.3
Subtotal	0		141.3	141.3	141.3	141.3	141.3	
Total	174645	32.1	2473.4	2984.0	3502.3	1892.6	1666.4	

Paragraph 16 Comments:

The Army will procure the maximum number of supportable systems consistent with the dollars appropriated. (Refers to Missile Procurement FY1990 Quantity.

17. [U] Production Rate Data:

a. [U] Annualized Production Rates -- The annual production rates shown differ from the annual funded quantities because the funded delivery period is 6 mos for FY86 and 6 mos for FY87. Also, the attainment of the maximum production rate may be limited by expected U.S. Marine Corp and Foreign Military Sales buys. Plant shut-down in Aug 84 resulted in stockpiled assets which were accepted with the resumption of production exceeding the normal maximum rate.

Production Rates (Quantity/Year)

Fiscal Year Buy	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1981	0	3875	3875	30000
1982	0	10008	10008	30000
1983	0	12000	12000	30000
1984	0	18000	18000	30000
1985	0	18000	12000	30000
1986	0	18000	24000	30000
1987	0	15500	18700	
1988	0	21029	12000	
1989	0	24812	12000	
1990	0	0	9455	
1991	0	0	13284	
1992	0	0	16802	
1993	0	0	16854	
1994	0	0	16904	

b. [U] Cost Variance: (Dollars in Millions)

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Acq. Cost (BY $)	2302.1	+681.9	2984.0	+762.0	2222.0
(TY $)	2623.8	+878.5	3502.3	+970.5	2531.8
PAUC Cost (BY $)	0.016	+0.001	0.017	+0.004	0.013
(TY $)	0.019	+0.001	0.020	+0.005	0.015

7. [U] Production Rate Data: (Cont'd)

c. [U] Schedule Variance:

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	Dec 81	0	Dec 81	N/A	Dec 81
Duration (in Mo.)	95	+63	+158	+71	87
End Date (Mo/Yr)	Nov 89	+75	Feb 95	N/A	Mar 89

d. [U] Deliveries:

	(Plan/Actual) To Date
RDT&E	113/113
Procurement	101233/89233
MILCON	0/0
O&M	0/0

e. [U] Approved Design-to-Cost Goal: None.

8. [U] Operating and Support Costs:

a. Assumptions and Ground Rules -- O&S Costs were obtained from Level I validated Baseline Cost Estimate (BCE) dated Sep 89. Costs are presented in FY90 Constant dollars. Costs were calculated using OSD inflation guidelines dated 22 December 1988. The MICOM approved PICES Cost Model was used to develop the Operations/Sustainment Cost Estimates. O&S costs reflect full sustainment from 1981-2003 to include sustainment of existing and emerging TOW configurations.

18. [redacted] Operating and Support Costs: (Cont'd)

b. O&S Costs -- (10763.626 FY90 C$ in Millions.)

COST ELEMENT	AVG ANNUAL COST	TOTAL (FY 81-2003)
PERSONNEL LESS PCS	276.708	6,364.302
O & S CONSUMABLES	9.126	209.880
DIRECT DEPOT MAINTENANCE	12.305	283.023
SUSTAINING INVESTMENT	60.602	1,393.852
OTHER DIRECT COSTS	22.859	525.755
INDIRECT COSTS	86.393	1,986.814
TOTAL	467.983	10,763.626

c. [redacted] Contractor Support Costs -- (Current (Then-Year) Dollars in Millions)

FUNDING	FY 1990 & PRIOR	FY 1991	FY 1992	BALANCE TO COMPLETE	TOTAL
O&M	4.3	2.6	0	---	6.9
Industrial Fund	---	---	---	---	---
Total	4.3	2.6	0	---	6.9

N-39 T45TS

SAR-89-046

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A) 823)

PROGRAM: T45TS

AS OF DATE: December 31, 1989

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1. **Designation and Nomenclature (Popular Name):** T45TS Navy Undergraduate Jet Flight Training System (GOSHAWK)

2. **DoD Component:** Department of the Navy

3. **Responsible Office and Telephone Number:**

Naval Air Systems Command
PMA-273, Rm. 852, JP-1
Washington, D.C. 20361-1273

Capt. R. E. Koehler, USN
Assigned: June 15, 1989
AV 222-7392; COMM (202)692-7392

4. **Program Elements/Procurement Line Items:**

RDT&E: PE 0603208N APPN 1319 Project No. W1142

PROCUREMENT: PE 84745N APPN 1506 ICN 0025
ICN 0026

b(1)

5. **Related Programs:** PE 0603216N Navy Aircrew Common Ejection Seat (NACES)
PE 0604203N Standard Attitude and Heading Reference System (SAHRS)

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Mission and Description: The T45TS is an integrated system designed to provide undergraduate jet pilot training for prospective Navy/Marine Corps pilots and selected international students to meet aircrew requirements in the 1990's and beyond. A jet strike pilot training rate requirement of approximately 600 pilots annually is projected through the year 2000. The T-45 Training System (T45TS) is comprised of aircraft, simulators, academics, a training integration system (TIS), and contractor logistic support. The T-45A GOSHAWK aircraft is a derivative of the British Aerospace HAWK aircraft, a tandem seat aircraft powered by a single turbofan engine. The T-45A is being adapted to provide the capability for carrier catapult and arrested landings and has an adapted engine, the F-405 (Rolls-Royce designation Adour Mk 871). The simulator suite includes both Instrument Flight Trainers (IFT) and Operational Flight Trainers (OFT). Academics include textbook materials, classroom aids and a computer-assisted instruction (CAI) system. The TIS utilizes existing hardware and adapted and developed software to provide planning, scheduling, and tracking of training events in order to achieve required training efficiency. Contractor logistic support has been structured to provide for future competition of maintenance support services to ensure that the system will be supported in the most cost effective manner. The T45TS will replace existing T-2C intermediate and TA-4J advanced jet trainer aircraft, simulators, and associated equipment.

7. **Program Highlights:**

a. Significant Historical Developments -- Development of the T45TS was initiated in 1975 when the Navy perceived that both the T-2B/C and TA-4J aircraft would need to be replaced during the early 1990's due to age and attrition. As a result, a series of studies was conducted to confirm the feasibility of developing a single aircraft for both intermediate and advanced undergraduate jet pilot training. A Mission Element Need Statement (MENS) was approved in 1979. In August 1980, contracts were awarded for the development/definition of two training system alternatives - a system concept with a new design aircraft and one with an existing or derivative aircraft. In March 1981, a Request for Proposal (RFP) for Pre-Full Scale Development (Pre-FSD) was released and on 19 November 1981, the Navy announced the selection of Douglas Aircraft Company (DAC) as the winner of the competition to further develop the system based on a derivative variation of the British Aerospace HAWK aircraft. The Pre-FSD contract was awarded to DAC in September 1982 and in the same year the aircraft was formally designated the T-45A. Until November 1983, entry into FSD was based on a two phase acquisition strategy involving the initial production of 54 Field Carrier Landing Practice (Dry) T-45B aircraft and subsequent development and production of 251 carrier capable (Wet) T-45A aircraft. However, Congressional guidance in November, 1983 to procure only carrier capable aircraft resulted in a major redirection of the acquisition strategy and adjustments in planned costs and milestones.

A Secretary of Defense Decision Memorandum (SDDM), resulting from a successful DSARC Milestone I/II Review, was issued in October 1984 authorizing the T45TS program to enter full scale engineering development (FSED). A $9.5 million letter contract was signed on October 2, 1984 with the prime contractor, DAC, to initiate a firm-fixed price, incrementally funded contract for development of the system at a total cost of approximately $511.9 million (TY$) over a six year period.

). Program Highlights (Cont'd):

a. Significant Historical Developments (cont'd) -- After extensive negotiations, contract definitization was reached in May 1986 on a firm-fixed price FSED contract of $511.9 million (TY$) which conformed with the ceiling price established by the Navy. The FSED contract also included three limited production options for the procurement of sixty aircraft with associated ground training systems and logistic support hardware/software in FY 88 through FY 90. The $1,337 million not-to-exceed option price included flyaway cost containment, contractor involvement in the rate tooling and expanded warranty protection provisions. Following a successful Navy Program Decision Meeting (NPDM) and OSD staff review, DEPSECDEF authorized the T45TS Program to proceed with the procurement of the twelve pilot production lot T-45A aircraft, two flight simulators, a TIS, an academic subsystem and the required integrated logistics support for FY 88. The Deputy Secretary of Defense gave his authorization in an Acquisition Decision Memorandum (ADM) signed November 24, 1987 to procure the FY 1988 production program and release the FY 1989 long lead funding. The firm fixed price contract option was definitized in December 1987 at $420.8 million (TY$).

A successful first flight of prototype aircraft Y-1 occurred on 16 April 1988 and initial contractor development tests were flown at Yuma, AZ and Edwards AFB, CA. First flight of Y-2 occurred on 2 November 1988. Flight testing operations were subsequently moved to NAS Patuxent River, MD. In November 1988 government flight testing, DT-IIA, was conducted consisting of 20.2 flight hours followed by OT-IIA testing of 13.3 flight hours. Several aircraft performance deficiencies were documented during DT/OT-II testing. Combined contractor and Navy flight testing for 1988 consisted of 121.5 hours in 106 flights. The prototype Operational Flight Trainer (OFT) was formally accepted on 20 December 1988. Developmental Test & Evaluation (DT&E) included successful completion of drop tests up to 24 feet per second sink rate, avionics integration bench tests, NACES sled tests, and iron bird tests.

The FY 1990/1991 Revised Budget restructured the program by deleting 24 aircraft each in FY 1990 and 1991 and replacing them in FY 1996. For the first six months of 1989 the contractor was working to resolve the aircraft performance deficiencies discovered in 1988 DT/OT testing. Corrections to the longitudinal directional handling qualities were evaluated by the Navy in March 1989 and found satisfactory. Significant corrections which required major design and development efforts were being installed at this time for a Navy evaluation in August 1989. Combined contractor and Navy flight testing for the first six months of 1989 consisted of 146 hours in 151 flights. The OFT OT-IIA (Phase I) report was received in March 1989 and stated the OFT "has potential to be operationally effective and operationally suitable".

Program Highlights (Cont'd):

b. Significant Developments Since Last Report -- The September 1989 Navy/contractor participatory test period, with an improved leading edge, identified the need for additional design to solve deficiencies related with aircraft stall. The evaluation also looked at a simulated MK-871 engine and improvements to lateral directional flying qualities, with both areas demonstrating improvements. In September 1989 the final results of three independent engineering audits confirmed that all OT/OT deficiencies were correctible. An aggressive design effort to solve the stall deficiency resulted in completion of phase I of wind tunnel testing and the initial design of a full span slat in November 1989. The FSED OFT Simulator, through high fidelity simulation, continues to support aircraft T&E efforts. Also, the addition of the mini-Head Up Display (HUD) to the lot 1 2F138 production article was completed in November 1989.

The FY 1991 President's Budget restructured the program by deleting 12 and 24 aircraft from FY 1991 and 1992 respectively and adding them to (b)(1) This production stretch reduces the procurement quantities to the minimum sustaining production rate, accomodating the time necessary to fabricate and test all DT/OT IIA deficiency corrections. A Defense Acquisition Board (DAB) review was successfully completed in December 1989. The review culminated with the issuing of an Acquisition Decision Memorandum which approved program baseline changes, and authorized continuation of pilot rate production. Based on initial technical evaluation of aircraft DT/OT deficiency corrections, T45TS is expected to satisfy all mission requirements.

c. Changes Since "As Of" Date -- A revised baseline document is in the approval cycle and reflects the 1991 President's budget. These new, approved baseline values will be reflected in the next SAR submission. McDonnell Douglas Corporation (MDC) announced their intention to move the T45TS program from their Douglas Aircraft Company component in Long Beach, CA to McDonnell Aircraft in St. Louis, MO. The impact of the move is currently being evaluated.

8. Threshold Breaches: Current DAE Baseline dated 30 June 1989 has been breached in the technical, schedule and cost categories. The approved baseline change document addresses these breaches and is included in the FY 1991 President's Budget submission.

Schedule:

a. Milestones --	Planning Estimate	Approved Program	Current Estimate
Program Initiated (Preliminary Design Study)	Jul 75	Jul 75	Jul 75
Requirements Validation Study	Mar 78	Mar 78	Mar 78
Mission Element Need Statement (MENS) Approved/ MS Zero	Jun 79	Jun 79	Jun 79
Request For Quotation (RFQ) For Concept Definition	Dec 79	Dec 79	Dec 79
Alternative System Exploration (ASE) Contract Award	Nov 80	N/A	Aug 80
Project Charter Approved	Aug 80	Aug 80	Aug 80
ASE Studies Completed	Mar 81	Mar 81	Mar 81
RFQ For Demonstration/ Validation (Pre-FSED)	Mar 81	N/A	Mar 81
Sustaining Engineering Contract Award	Nov 81	Nov 81	Nov 81
Demonstration/Validation Contract Award (Pre-FSED)	Sep 82	Sep 82	Sep 82
Program Redirection (All Carrier Qualified)	--	Nov 83	Nov 83
Advanced Development Contract Award	--	Jul 84	Jul 84
Milestone I/II (DSARC)	--	Sep 84	Sep 84
FSED Letter Contract Award	Sep 84	Oct 84	Oct 84
Approval Pilot Production (APP) (NPDM)	--	Sep 87	Sep 87
T-45A First Flight	Jan 88	Mar 88	Apr 88
Approval Continued Pilot Production (Pilot Lot II)	--	Sep 88	Dec 89 (Ch-1)
Milestone IIIA Approval Low Rate Initial Production (FY 91)	--	Sep 89	Nov 90 (Ch-2)
Milestone IIIA Approval Low Rate Initial Production (FY 92)	--	--	Nov 91 (Ch-2)
Complete Navy Technical Evaluation (NTE)	Jan 90	Oct 89	Mar 92 (Ch-2)
Complete OPEVAL	Jun 90	Mar 90	Jul 92 (Ch-2)
Initial Operational Capability (IOC)	May 91	Sep 90	Jun 91
Milestone III Authorized Full Production (AFP) (DAB)	--	Oct 90	Nov 92 (Ch-2)

9. Schedule (Cont'd):

b. Previous Change Explanations --

DSARC I/II was completed in September, 1984 and IOC redefined as delivery of the 12th production aircraft projected for October, 1990. Similarly, Milestone IIID (AFP) was projected for October, 1990 based on the development schedule. Subsequent definitization of the FSED contract established the delivery date of the 12th production aircraft as September 1990. The 31 December 1986 SAR showed four production milestones; MS IIIA - Pilot Production (9/87), MS IIIB - Limited Production (9/88), MS IIIC - Limited Production (9/89), and MS IIID - Full Production (10/90). For the 31 December 1987 SAR the pilot production milestone was approved by OSD review of a Navy Program Decision (NPDM) rather than a formal DAB major milestone. Milestone IIIA, as part of that decision was redefined as Approval for Limited Production (ALP) (9/88). Milestone IIIB and IIIC deleted. Milestone III redefined as Approval for Full Production. First flight of Y-1 prototype was contractually required on 31 March 1988. It was delayed two weeks due to contractor's late delivery. For the June 1989 SAR MS IIIA was retitled Approval for Continued Pilot Production and Approval for Low Rate Initial Production (FY 91) was retitled MS IIIA. These milestones along with TECHEVAL, OPEVAL, IOC and AFP were slipped due to late delivery of the flight test articles, delayed flight test schedule and to allow for correction of the DT/OT II deficiencies.

c. Current Change Explanations --

(Ch-I) Approval for Continued Pilot Production (Pilot Lot II) review was held December 1989.

(Ch-2) MS IIIA (FY 92) was added and MS IIIA (FY 91), TECHEVAL, OPEVAL and AFP decisions were slipped due to program restructure and to incorporate time required to design, test, and produce the slatted wing configuration.

d. References --

Planning Estimate: Draft SCP of January, 1984.

Approved Program: DAE Baseline dated 30 June 1989.

10. Technical/Operational Characteristics:

a. Technical --	Planning Estimate	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
Wing Span (ft)	30.81	30.81/ 30.81	N/A	30.81
Length (ft)	39.26	39.26/ 39.26	N/A	39.26
Height (ft)	13.42	13.42/ 13.42	N/A	13.92
Wing Area (Sq. ft.)	179.64	179.64/179.64	N/A	179.64
Flight Design Weight (lbs)	12,420	12,758/12,758	N/A	12,958

D. Technical/Operational Characteristics (Continued):

	Planning Estimate	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate **
b. Operational --				
Pilot Training Rate (Annual)	600	600/600	N/A	600
Aircraft				
(1) Utilization Rate (Hr/Yr)	720	720/720	N/A	720
(2) Max Range (NM)	1,000	1,000/1,000	N/A	825
(3) Speed				
(a) Max Level Flt (Mach)	.80	.85/.85	.84 *	.85
(b) Approach (Kts)	115-125	125/125	125 *	125
(4) Sustained G's @ 15,000 ft.	3.0	3.4/3.4	3.4 *	3.4
(5) Mean Flight Hours Between Failure (MFHBF)	3.2	3.2/3.2	2.17 *	3.2
(6) Direct Maintenance Man Hours per Flight Hour (DMMH/FH)	10.0	10.0/10.0	5.21 *	10.0
(7) Mission Capability (%)	85%	85%/85%	100% *	85%
Simulator Availability (% Sched)				
(1) Instrument Flight Trainer (IFT)	96%	95%/95%	N/A	95%
(2) Operational Flight Trainer (OFT)	95%	95%/95%	100% *	95%
Academics				
(1) Computer Aided Instruction (CAI) System Availability (% Sched)	98%	95%/95%	N/A	95%
Training Integration System (TIS)				
(1) Availability (% Sched)	99%	95%/95%	N/A	95%

* Limited initial DT/OT testing results for operational characteristics as follows:
** Current estimates are for system at maturity.

10. **Technical/Operational Characteristics (Continued):**

Previous Change Explanations --

More sophisticated analyses of inherent HAWK capabilities increased the maximum range estimate from 994 to the SDDM threshold of 1000 and decreased the sustained G's estimate from the SDDM threshold of 3.6 to 3.4. Heretofore, theoretical maximum range estimates have excluded start/taxi/takeoff/climb/descent/land/taxi/reserve requirements. The correct operational max range has always been 825 nautical miles. Maximum range is not a specification requirement.The TIS availability estimate was reduced from 99% to 95% because of cost effectiveness considerations. The CAI availability estimate is an actual contract specification value. Definitized FSED contract changed Flight Design Weight from 12,699 to 12,758 pounds. OSD notified during PRE-DSARC Briefing November 6, 1985. Program managers latest estimate of flight design weight increased by 512 pounds due to design changes to correct deficiencies discovered during DT/OT-IIA.

d. Current Change Explanations: None

e. References --

Planning Estimate: Draft SCP of January, 1984

Approved Program: DAE Baseline dated 30 June 1989.

1. **Program Acquisition Cost:** (Current Estimate in Millions of Dollars)

a. Cost --	Planning Estimate	Approved Program	Current Estimate
Development (RDT&E)	1150.3	537.4	545.5
Procurement	2604.3	3668.7	3645.1
Airframe/CFE	(1259.1)	2232.5	(2209.0)
Engine/Accessories (GFE)	(363.6)	0.0	(0.0)
Electronics (GFE/CFE)	(136.6)	177.4	(149.2)
Change Allowance (ECO)	(42.9)	47.9	(47.2)
Other GFE	(17.7)	59.0	(102.6)
Nonrecurring	(35.4)	121.4	(116.6)
Ancillary Equipment	(0.0)	0.0	(0.0)
Total Flyaway	(1855.3)	2638.2	(2624.6)
Other Wpn Sys Cost	(577.5)	819.9	(738.5)
Initial Spares	(171.5)	210.6	(282.0)
Construction (MILCON)	--	37.7	34.0
Total FY 84 Base-Year $	3754.6	4243.8	4224.6
Escalation	1707.4	1302.3	1682.6
Development (RDT&E)	(192.6)	(62.0)	(64.3)
Procurement	(1514.8)	(1229.8)	(1607.2)
Construction (MILCON)	(--)	(10.5)	(11.1)
Total Then-Year $	5462.0	5546.1	5907.2

11. Program Acquisition Cost (cont'd): (Current Estimate in Millions of Dollars)

	Planning Estimate	Approved Program	Current Estimate
b. Quantities --			
Development (RDT&E)	4	(b)(1)	
Procurement	300		
Total	304		

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Planning Estimate: Draft SCP of January, 1984

Approved Program: DAE Baseline dated 30 June 1989

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est Dec 89 SAR	UCR Baseline (Dec 88 SAR)	UCR Baseline Dec 89 SAR
a. Program Acquisition --			
(1) Cost	5907.2	5157.1	5907.2
(2) Quantity	(b)(1)	302	(b)(1)
(3) Unit Cost		17.1	
b. Current Procurement --	(FY 1990)	(FY 1990)	(FY 1991)
(1) Cost	0.0	0.0	329.9
Less CY Adv Proc	(0.0)	(0.0)	(44.9)
Plus PY Adv Proc	0.0	0.0	40.6
Net Total	0.0	0.0	325.6
(2) Quantity	0	0	12
(3) Unit Cost	0	0	27.1

13. Cost Variance Analysis:

a. Summary --

(Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	1342.9	4119.1	-	5462.0
Previous Changes:				
Economic	-24.4	-725.4	+0.1	-749.7
Quantity	-23.8	-	-	-23.8
Schedule	-619.6	+110.7	-	-508.9
Engineering	-11.8	+640.7	-	+628.9
Estimating	+35.8	+310.4	+48.1	+394.3
Other	-	-	-	-
Support	-99.7	+443.0	-	+343.3
Subtotal	-743.5	+779.4	+48.2	+84.1
Current Changes:				
Economic	+0.5	+307.5	-1.0	+307.0
Quantity	-	-	-	-
Schedule	+6.8	+97.8	-	+104.6
Engineering	-	-	-	-
Estimating	+7.1	-51.9	-2.1	-46.9
Other	-	-	-	-
Support	-4.0	+0.4	-	-3.6
Subtotal	+10.4	+353.8	-3.1	+361.1
Total Changes	-733.1	+1133.2	+45.1	+445.2
Current Estimate	609.8	5252.3	45.1	5907.2

(FY 1984 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	1150.3	2604.3	-	3754.6
Previous Changes:				
Quantity	-24.7	-	-	-24.7
Schedule	-497.4	+35.1	-	-462.3
Engineering	-18.4	+478.3	-	+459.9
Estimating	+32.4	+267.7	+37.7	+337.8
Other	-	-	-	-
Support	-104.8	+283.3	-	+178.5
Subtotal	-612.9	+1064.4	+37.7	+489.2
Current Changes:				
Quantity	-	-	-	-
Schedule	+5.0	+24.1	-	+29.1
Engineering	-	-	-	-
Estimating	+6.3	-37.6	-3.7	-35.0
Other	-	-	-	-
Support	-3.2	-10.1	-	-13.3
Subtotal	+8.1	-23.6	-3.7	-19.2
Total Changes	-604.8	+1040.8	+34.0	+470.0
Current Estimate	545.5	3645.1	34.0	4224.6

3. **Cost Variance Analysis (Cont'd):**

b. Previous Change Explanations --

RDT&E

Economic:	revised escalation indices
Quantity:	decrease from four to two flight test aircraft
Schedule:	milestone schedule adjustments to accommodate reduction in flight test program and earlier first flight of prototype aircraft, deletion of T-45B aircraft funding in accordance with Congressional direction
Engineering:	reduction in requirements for flight testing and tooling and use of existing production engine vice an extensively redeveloped engine and emerging system changes to reduce O&S costs
Estimating:	revision of methodology for estimating engineering hours, accounting and estimating adjustments to accommodate revised escalation rates and reprogramming adjustments to account for historical foreign exchange rate variances
Support:	reduced manpower and material to support a two vice a four flight test article program and use of a TIS based on an adaptation of a previously developed computerized instructional system, restoral of prior Navy In-House support reductions

Procurement

Economic:	revised escalation indices
Schedule:	revised aircraft procurement schedule
Engineering:	revised estimates to reflect restructured system characteristics approved at DSARC I/II and design changes to correct deficiencies discovered during DT/OT IIA
Estimating:	change in dollar/pound exchange rate, addition of SAHRS as GFE
Support:	more refined estimate of ILS requirements

MILCON

Economic:	revised escalation indices
Estimating:	revised estimate of T45TS system specific MILCON

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised escalation indices (Economic)		+0.5
Addition of FY 92 (Schedule)	+5.0	+6.8
Reprogramming adjustment to account for historical Foreign Exchange Rate variance (Estimating)	+6.3	+7.7
Reduction in Navy-In-House (Support)	-3.2	-4.0

3. **Cost Variance Analysis- (Cont'd):**

(2) Procurement		
Revised escalation indices (Economic)		+307.5
Deferment 36 from FY 91/92 to FY 97 (Sched)	+24.1	+97.8
Estimating adjustments based on change in revised $/£ exchange rate (Estimating)	-37.6	-51.9
Revised estimate of ILS requirements for aircraft and ground training systems resulting from program restructure. (Support)	-10.1	+ 0.4
(3) MILCON		
Revised estimate of T45TS system specific MILCON (Estimating)	+3.7	+3.1

14. **Program Acquisition Unit Cost (PAUC) History:** (Millions of Then-Year dollars)

a. Initial SAR Estimate (PE) to Current Estimate

PAUC Planning st)	Changes								PAUC (Current) (Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
(b)(1)									

15. **Contract Information:** (Then-year Dollars in Millions)

a. RDT&E --

T-45 Training System:
Douglas Aircraft Co., Long Beach, CA,
N00019-84-C-0240, FFP
Award: October, 1984
Definitized: May, 1986

Initial Contract Price		
Target	Ceiling	Qty
$511.9	N/A	2

Current Contract Price		
Target	Ceiling	Qty
$530.6	N/A	2

Estimated Price At Completion	
Contractor	Program Manager
$530.6	$530.6

Cost/Schedule Variances: None (FFP Contract)
Addition of Foreign Exchange Rate/Economic Price Adjustments consistent with contract provisions

15. Contract Information (Cont'd): (Then-year Dollars in Millions)

b. Procurement

T-45 Training System:	Target	Ceiling	Qty
Douglas Aircraft Co., Long Beach, CA,	$420.8	N/A	12

N00019-84-C-0240, FFP, FY 1988 Procurement
Award: December, 1987

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$420.8	N/A	12	$420.8	$420.8

Cost/Schedule Variances: None/FFP Contract

Procurement

T-45 Training System:	Target	Ceiling	Qty
Douglas Aircraft Co., Long Beach, CA,	$557.0	N/A	24

N00019-84-C-0240, FFP, Advance Acquisition Contract
Award: December, 1987

Current Contract Price			Estimated Price At Completion (NTE)	
Target	Ceiling	Qty	Contractor	Program Manager
$160.4	N/A	24	$557.0	$557.0

Cost/Schedule Variances: None/FFP Contract

c. MILCON -- N/A

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 61.1% (11 yrs/18 yrs)
(2) Percent Program Cost Appropriated: 27.4% ($1620.9/$5907.3)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-96)	TOTAL
RDT&E	565.7	22.4	14.9	6.8	609.8
Procurement	885.8	125.9	329.9	3910.7	5252.3
MILCON	9.2	11.8	--	24.1	45.1
Total	1460.7	160.1	344.8	3941.6	5907.2

16. **Program Funding Summary (Cont'd):** (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	FY 84 Base-Year Dollars Flyaway Nonrec	Rec	Total	Total Then-Year Dollars Program	Obli-gated	Ex-pended	Escl Rate (%)
				Appropriation: RDT&E				
1980				4.2 1/	4.2	4.2	4.2	10.6
1981				1.6 1/	1.6	1.6	1.6	10.6
1982				5.0 1/	5.0	5.0	5.0	7.6
1983				7.9 1/	7.9	7.9	7.9	4.9
1984				24.8 1/	24.8	24.8	24.8	3.8
1985				64.3	67.5	67.5	67.5	3.4
1986				112.5	121.6 2/	121.6	121.6	2.8
1987				128.1	142.5 2/	142.5	142.5	2.7
1988				86.5	99.4 2/	99.5	99.5	3.0
1989				76.1	91.2	91.2	58.1	4.2
1990				18.0	22.4	21.3		4.0
1991				11.5	14.9			4.2
1992				5.0	6.8			4.0
Subtotal	2			545.5	609.8	587.1	532.7	
				Appropriation: Procurement				
1987				54.1	65.1	65.1	65.1	2.7
1988	12	40.0	173.9	324.9	392.2	390.5	185.1	3.0
1989	24	9.0	273.5	339.8	428.5	140.6	8.9	4.2
1990	0	16.1	0.0	96.7	125.9			4.0
1991	12	15.1	122.1	243.0	329.9			4.2
1992	[redacted]	7.6	218.0	359.8	505.5			4.0
1993		6.1	376.0	522.8	757.5			3.7
1994		5.2	367.3	526.8	787.2			3.4
1995		5.0	354.9	464.8	716.2			3.1
1996		6.3	354.3	425.9	676.2			3.1
1997		6.2	268.0	286.5	468.1			3.1
Subtotal		116.6	2508.0	3645.1	5252.3	596.2	259.1	

(b)(1)

1/ The following amounts must be added to the reflected actuals to bring them to Base Year 1984 dollars: 1980: +0.9, 1981: +0.2, 1982: +0.3, 1983: +0.1, 1984: -0.5.

2/ Reprogramming actions to cover historical foreign exchange rate (FER) adjustments of the FSED contract.

[redacted]

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16. **Program Funding Summary (Cont'd):**

	Appropriation:	MILCON	
1987			
1988	7.7	9.2	2.7
1989	--	--	3.0
1990	9.1	11.8	4.2
1991	--	--	4.0
1992	12.5	17.4	4.2
1993	4.7	6.7	4.0
Subtotal	34.0	45.1	
Total (b)(1) [redacted]	4224.6	5907.2	

17. **Production Rate Data:**

a. Annual Production Rates -- (NOTE: The annual production rates shown differ from the annual funded quantities because the funded delivery period varies for each production buy.)

Production Rates (Quantity/Year)

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1988	4	4	10	24
1989	8	8	19	24
1990	8	8	0	24
1991	16	16	12	24
1992	16	16	(b)(1) [redacted]	48
1993	16	16		48
1994	16	16		48
1995	16	16		48
1996	--	--		--

b. Cost Variance -- Dollars in Millions

Item		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY $)	N/A	N/A	4224.6	- 0 -	4224.6
	(TY $)	N/A	N/A	5907.2	- 0 -	5907.2
PAUC	(BY $)	N/A	N/A	14.0	- 0 -	14.0
	(TY $)	N/A	N/A	(b)(1) [redacted]		19.6

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7. **Production Rate Data (Cont'd):**

c. Schedule Variance --

	Production Estimate	Variance (CE vs PdE)	Current Estimate	Variance (CE vs Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	12/87	N/A	12/87
Duration (in Months)	N/A	N/A	141	+12	129
End Date (Mo/Yr)	N/A	N/A	9/99	N/A	9/98

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	2/2
Procurement	0/0

e. Design to Cost Goal -- N/A

18. **Operating and Support Costs:** N/A

a. N/A

b. N/A

c.

(Then-Year Dollars in Millions)

	Prior Years (FY80-89)	Budget Year (FY90)	Budget Year (FY91)
Contractor Logistics Support (CLS) (O&M,N)	.2		
Sustaining Engineering (O&M,N)	.2	.2	.2
Depot Maintenance (O&M,N)		.2	.2

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A-4 ASAS/ENSCE ~~CONFIDENTIAL~~

89-137

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: ASAS/ENSCE

AS OF DATE: December 31, 1989

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AS AMENDED
CLEARED
FOR OPEN PUBLICATION
MAR 22 1990
21
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

1. Designation/Nomenclature (Popular Name): Army "All Source Analysis System (ASAS)" and Air Force "Enemy Situation Correlation Element (ENSCE)."

2. DOD Component: Department of the Army as Executive Agent for Joint Army/Air Force Program.

3. Responsible Office and Telephone Number:

Joint Tactical Fusion Program Office (JTFPO)
1500 Planning Research Drive
McLean, Virginia 22102-5099

PM: MG William E. Harmon
Assigned: 26 November 1984
Commercial: (703) 556-2930

4. Program Elements/Procurement Line Items:

RDTE: PE 64321 PROJ D926/B19/B20 (Shared Funding)
PE 64321F (Air Force) (Shared Funding)
PROCUREMENT: SSN KA4400 APPN 2035
AF 3080 -Cost Element 1683790 (Communications Electronics Spares)
-Cost Element 1683xxx (Electronic and Telecommunications Equipment)
MILCON: Not Applicable

OASD(PA) DFOISR 90-T-0703

(b)(1)

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5. (U) Related Program: Tactical ESM Systems, Tactical Cryptologic Program (TCP), Digital Topographic Support System (DTSS), Quick Reaction Multi-color Printer (QRMP), and Integrated Meteorological System (IMETS). Extensive coordination is conducted with Army Tactical Command and Control Systems, other services, and with national intelligence agencies to ensure that duplication of effort is avoided.

6. (C) Mission and Description: The Joint Tactical Fusion Program Office (JTFPO) is building the Army All Source Analysis System (ASAS) and the Air Force Enemy Situation Correlation Element (ENSCE). The ASAS/ENSCE are the newest versions of automated tactical intelligence processing systems. The ASAS/ENSCE will (b)(1) (b)(1) (b)(1) ASAS systems are located in Army divisions, corps, and echelons-above-corps (EAC) and ENSCE systems are located in Tactical Air Control Centers of numbered air forces. These systems are comprised of several hardware modules: Communications Control Set AN/TQY-40 (Common Name: The Forward Sensor Interface and Control (FSIC) module) receives and transmits information from multiple sensor systems; the Data Processor Set AN/TYQ-36 (Common Name: ASAS/ENSCE Interface Module (AIM) or Dual AIM (DAIM)), which processes intelligence data; and, the Workstation, Computer Graphics AN/TYQ-37 (Common Name: Portable ASAS/ENSCE Workstations, (PAWS)), which is the primary user interface with the system. The actual configuration of these modules varies between the ASAS and the ENSCE and differing echelons and unit type. A Limited Capability Configuration (LCC) is being developed and fielded before full production ASAS systems. Since the development and acquisition strategy are evolutionary, valid improvements recommended by units employing RDTE/limited production hardware and successive software releases will be incorporated into full production hardware and later software releases. The JTFPO must ensure that existing intelligence fusion related systems and ASAS/ENSCE will be interoperable in the short term, and that all intelligence fusion related work converges to ASAS/ENSCE in the long term. To accomplish this task, the Program Office coordinates and, as directed, implements related programs.

7. (U) Program Highlights:

a. (U) Significant Historical Developments — This joint service program was developed at Congressional request to acquire ASAS/ENSCE to meet the critically needed requirements for an automated intelligence command and control system. As a result of Congressional review and Department of Army guidance, all ASAS/ENSCE modules were downsized into smaller shelters which were more appropriate to the battlefield environment. During FY 85 the ASAS/ENSCE program developed the AIM Brassboard (ABB), which provided a near-real-time processing capability. The System Readiness and Verification Test (SRVT) for the ASAS/ENSCE Interface Module (AIM) and the Forward Sensor Interface and Control (FSIC) Module was successfully completed in October 1986. Subsequent to the test the equipment was delivered to III Corps/2nd Armored Division.

7. (U) Program Highlights (Cont'd):

In 1986 the Assistant Secretary of the Army (Research, Development and Acquisition) approved a directed limited production (urgent procurement) for the Limited Capability Configurations (LCC).

PACAF/USAFE ASAS/ENSCE Software was renamed Intelligence Correlation Element (ICE) to more adequately reflect its function.

The procurement contract was let in March 1987 for production of LCC's. In April 1987 Congress was notified of the results of the Nov/Dec 1986 Field Trials. In November 1987, the Joint Oversight Group (JOG) approved an acquisition strategy of LCC's to be delivered at Ft Hood, TX in FY89.

b. (U) Significant Developments Since Last Report—During 1989 ASAS/ENSCE participated in a variety of tests and experimentations that culminated with the Force Development Test and Experimentation. The purpose of FDT&E was to provide data on the organizational and operational concept, force structure issues, refinement of materiel, training, and maintenance concept of the LCC ASAS and to support the Operational Test and Evaluation Agency's (OTEA) continuous comprehensive evaluation of ASAS. Key activities leading up to the FDT&E were the System Level Practical Exercise (SLPE) conducted from 2-4 November 1989 at Ft Hood TX and the System Readiness Verification Test (SRVT) II conducted on 5-11 Nov 89 by personnel from the U.S. Army Electronics Proving Ground. The ASAS Corps Enclave also participated in GOLDEN SABER XVI field exercise 17-21 Nov 89. During GOLDEN SABER there were minimal software and hardware problems and good user acceptance. The actual FDT&E was conducted at Ft Hood TX 3-8 Dec 89. Finally, the R2/3 Summary PDR was conducted at JPL on 25-29 Sep 1989.

During 1989 the ICE software underwent development and integration, successful acceptance testing and training was completed by April 1989. Delivery of the ICE software to HQ USAFE at Ramstein AB, West Germany, was completed in May 1989.

(U) ASAS/ENSCE is expected to satisfy the mission requirement.

c. (U) Changes Since "As of" Date — On 10 Jan 90, the Chief of Staff of the Army (CSA) directed that the ASAS program engage in accelerated acquisition; to field the system with the minimum level of functionality acceptable to the user and accomplish this as soon as possible. This SAR reflects CSA final decisions as of 5 Feb 1990.

8. (U) Threshold Breaches: No DAE approved Baseline established for this program.

9. (U) Schedule:

a. (U) Milestones —

	Development Estimate	Approved Program	Current Estimate
ASAS Acquisition Strategy	Nov 82	N/A	Nov 82
OSD/Congressional Approval of Acquisition Strategy	Feb 83	N/A	Feb 83
Implementing Contractor Award	Mar 83	N/A	Mar 83
Functional Capabilities Document Complete	Dec 83	N/A	Dec 83
Preliminary Design Review (Architecture)	Feb 84	N/A	Feb 84
Joint Oversight Group (ASARC Authority)	Mar 84	N/A	Mar 84
Request for Proposals	May 84	N/A	May 84
JTFP Letter of Instruction	Jul 84	N/A	Jul 84
Award Baseline System Contracts (Development)	Dec 84	N/A	Dec 84
Preliminary Design Review (Development)	Nov 85	N/A	Nov 85
ABB Testing	Aug 85	N/A	Aug 85
AIM/FSIC Testing	Jul 86	N/A	Jul 86
IDP	Nov 87	N/A	Nov 87 (Ch-1)
Software Release 1	Nov 87	N/A	Apr 89 (Ch-2)
Software Release 2	Sep 88	N/A	Oct 91 (Ch-3)
Software Release 3	Nov 88	N/A	Oct 91 (Ch-4)

b. (U) Previous Change Explanations — NONE

c. (U) Current Change Explanation —

(Ch-1) Due to direction from Congress to only build the smaller modules which created higher development costs and coupled with total program decrements, the IDP development was deferred to the block upgrade phase.

(Ch-2) Budgetary cuts, contractor delays, decision to field R1 software caused requirements growth to satisfy security and operational mission requirements.

(Ch-3/4) Congressional direction creating the rescope of R2/3, HQDA budget cuts, and dependency on R1.

9. (U) Schedule (Cont'd):

d. (U) References —

(U) Development Estimate: Chief of Staff, Army letter, 10 Nov 1982, Subj: All Source Analysis System (ASAS) Acquisition Strategy; Functional Capabilities Document (FCD), 7 Dec 1983; Letter of Instruction for Joint Tactical Fusion Program (JTFP) Special Task Force (STF), 5 Jul 1984.

(U) Approved Program: No DAE approved Baseline established for this program.

10. (U) Technical/Operational Characteristics:

a. (U) Technical

	Dev Est	Approved Program Goal/Thresh	Demon-strated Perf	Current Estimate
(U) Intelligence Est. Summary	(b)(1)			
(U) Situation Assessment				
(U) Intelligence Rpt (Tactical)				
(U) Report (INTREP/ TACREP Response) to request for Info Target Recommendations				

Note: *NRT — Near-Real-Time

b. (U) Operational — N/A

c. (U) Previous Change Explanations - None

d. (U) Current Change Explanations - None

e. (U) References —

(U) Development Estimate: Chief of Staff, Army letter, 10 Nov 1982, Subj: All Source Analysis System (ASAS) Acquisition Strategy; Functional Capabilities Document (FCD), 7 Dec 1983; Letter of Instruction for Joint Tactical Fusion Program (JTFP) Special Task Force (STF), 5 Jul 1984.

(U) Approved Program: No DAE approved Baseline established for this program.

11. (U) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. (U) Cost —	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	998.8	N/A	(b)(1)
Procurement	771.1	N/A	
Construction (MILCON)	0	N/A	
Total FY 86 Base-Year $	1,769.9	N/A	
Escalation	240.0	N/A	
Development (RDT&E)	(79.9)	N/A	
Procurement	(160.1)	N/A	
Construction (MILCON)	0	N/A	
Total Then - Year $	2,009.9	N/A	

b. (U) Quantities — Quantities for ASAS/ENSCE systems vary in size based on specific echelon or mission requirements (e.g., Heavy Division, Light Division, Corps, and Echelon-Above-Corps). The size variation is relative to the number/type of PAWS, FSIC's and AIM's within the system and results in a considerable difference in cost. The quantities procured in each fiscal year consists of two or more systems of different configurations; therefore, a unit of measure cannot be defined for the ASAS/ENSCE.

c. (U) Foreign Military Sales — None

d. (U) Nuclear Costs — None

e. (U) References —

(U) Development Estimate: Chief of Staff, Army letter, 10 Nov 1982, Subj: All Source Analysis System (ASAS) Acquisition Strategy; Functional Capabilities Document (FCD), 7 Dec 1983; Letter of Instruction for Joint Tactical Fusion Program (JTFP) Special Task Force (STF), 5 Jul 1984.

(U) Approved Program: No DAE approved Baseline established for this program.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. (U) Program Acquisition	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	(b)(1)	2,082.9	(b)(1)
(2) Quantity		TBD	TBD
(3) Unit Cost	N/A	N/A	N/A
b. (U) Current Procurement —	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	82.2	82.2	59.3
Less CY Adv Proc	0	0	0
Plus PY Adv Proc	0	0	0
Net Total	82.2	82.2	59.3
(2) Quantity	TBD	TBD	TBD
(3) Unit Cost	N/A	N/A	N/A

13. (U) Cost Variance Analysis:

a. (U) Summary —

(Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	(b)(1)			
Previous Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Current Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Total Changes				
Current Estimate				

13. (U) Cost Variance Analysis Cont'd:

a. (U) Summary — (Cont'd)

(FY 1986 CONSTANT (BASE-YEAR) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	(b)(1)			
Previous Changes:				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Total Changes				
Current Estimate				

b. (U) Previous Change Explanation —

RDTE
Economic: Revised Jan 89 escalation rates.
Estimating: Addition of 2 years in FYDP (FY 93-94)

Procurement
Economic: Revised Jan 89 escalation rates.
Estimating: Reflects funding reductions as a result of 7 Dec 87 Chief of Staff, Army meeting.

c. (U) Current Change Explanations —

(1) RDTE	(Dollars in Millions) Base Year	Then-Yr
Revised 28 Dec 89 Economic escalation rates. (Economic)	None	+22.6
Current and prior year inflation offset. (Estimating)	-1.7	-2.0
Revised Program Estimate dollar amounts now reflect accelerated Program. Increase Program Cost to include total program content beyond FYDP. (Estimating)	+252.4	+428.2

13. (U) Cost Variance Analysis Cont'd:

c. (U) Current Change Explanations (Cont'd) —

		(Dollars in Millions) Base Year	Then-Yr
(2)	Procurement Revised 28 Dec 89 escalation rates (Economic)	None	+31.9
	Current and prior year inflation offset. (Estimating)	-1.8	-2.2
	Revised Program Estimate dollar amounts now reflect accelerated Program. Increase Program Cost to include total program content beyond FYDP. (Estimating)	+1,384.1	+2,421.4
(3)	MILCON	N/A	N/A

14. (U) Program Acquisition Unit Cost (PAUC) History:

a. Initial SAR Estimate to Current Baseline Estimate — N/A

b. Current Baseline Estimate to Current Estimate — N/A

15. (U) Contract Information: (Then-Year Dollars Millions)

a. RDTE —

ASAS/ENSCE:	Initial Contract Price Target	Ceiling	QTY
Jet Propulsion Laboratory, Pasadena, CA NAS 7-918, CREI *(See Note Below) Award: 1 OCT 1984 Definitized: N/A		* See Note Below	

Current Contract Price Target	Ceiling	QTY	Estimated Price At Completion Contractor	Program Manager
$1,018.8	$1,018.8	N/A	$1,018.8	$1,018.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (24 Dec 89)	$2.6	$-6.1
Net Change	N/A	N/A

Explanation of Change: The unfavorable schedule variance of $-6.1 (-0.7%) and a favorable cost variance of $2.6 (0.3%) are within the threshold and are not specifically addressed.

*NOTE: The National Science Foundation has listed JPL as a Federally Funded Research & Development Center (FFRDC) under the cognizance of the National Aeronautics and Space Administration. JPL's role for the ASAS/ENSCE baseline phase is that of a Systems Engineering and Technical Direction (SE/TD)

15. (U) Contract Information (Cont'd): (Then-Year Dollars Millions)

*NOTE: (Cont'd)

contractor, which includes a significant number of project management functions normally attributed to a government program office such as, technical integration and management functions associated with systems development, to include architectural design, RFP completion, competitive contracting for prototypes (JPL would let major contracts during this phase), acceptance testing, conduct government reviews and associated contract management of industrial contractors. Although JPL is the prime contractor, JTFPO does not have a contract with JPL for the ASAS effort. JPL is performing under a Task Order against a NASA contract. JPL's role during the objective system phase (production) will be that of a System Engineering/Technical Assistance (SE/TA) contractor, providing sustaining engineering and technical assistance to the JTFPO.

b. (U) Procurement — Directed Acquisition of LCC's is being done through JPL as described above.

c. (U) MILCON — NONE

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status —

(1) Percent Program Completed: 33% (Year 8 of 24)

(2) Percent Program Cost Appropriated: 23% ($1,139.1 (b)(1) [redacted])

b. (C) Appropriation Summary —

(Then Year Dollars in Millions)

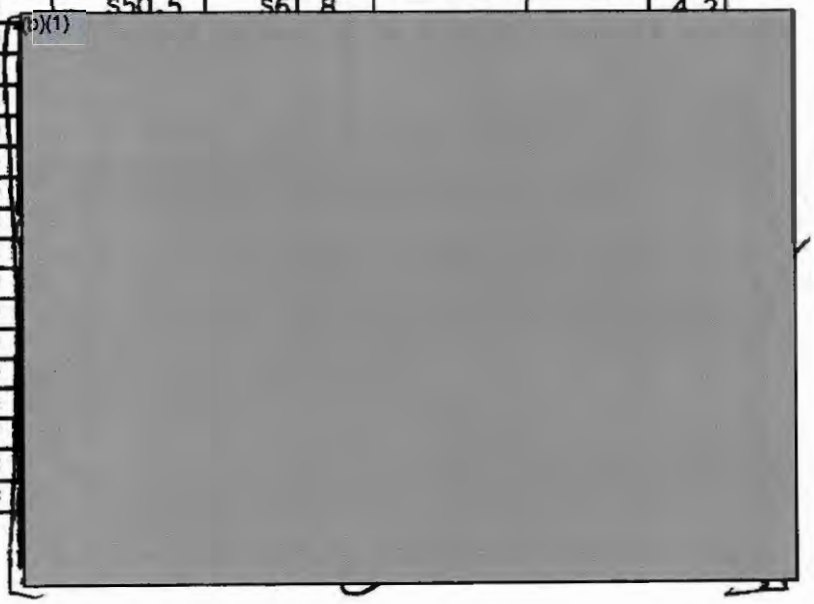
APPROPRIATION	PRIOR YEARS (FY83-89)	BUDGET YEAR (FY90)	BUDGET YEAR (FY91)	BALANCE TO COMPLETE (FY92-06)	TOTAL (FY83-06)
RDTE	793.8	95.1	71.1	(b)(1) [redacted]	
Procurement	168.0	82.2	59.3		
MILCON	0	0	0		
TOTAL	961.8	177.3	130.4		

16. ~~(S)~~ Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. ~~(S)~~ Annual Summary —

FISCAL YEAR	QTY	FLYAWAY FY 86 Dollars Nonrec	FLYAWAY FY 86 Dollars Rec	TOTAL BASE YEAR$	Total Then-Year $ PROGRAM	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
APPROPRIATION: RDTE (ARMY)								
1983		0	0	$27.8	$25.8	$25.8	$25.8	
1984		0	0	$48.3	$46.4	$46.4	$46.4	3.8
1985		0	0	$66.9	$66.3	$66.3	$66.3	3.4
1986		0	0	$142.2	$145.3	$145.3	$145.3	2.8
1987		0	0	$141.1	$148.7	$148.6	$148.4	2.7
1988		0	0	$135.8	$147.9	$147.9	$142.7	3.0
1989		0	0	$108.5	$122.7	$122.0	$109.7	4.2
1990		0	0	$72.9	$85.8	$46.6	$.9	4.0
1991		0	0	$50.5	$61.8			4.2
1992		0	0					
1993		0	0					
1994		0	0					
1995		0	0					
1996		0	0					
1997		0	0					
1998		0	0					
1999		0	0					
2000		0	0					
2001		0	0					
2002		0	0					
2003		0	0					
2004		0	0					
2005		0	0					
2006		0	0					
SUBTOTAL	0	0	0					

(b)(1)



16. ~~(U)~~ Program Funding Summary (Cont'd): (Current Summary in Millions of Dollars)

c. ~~(U)~~ Annual Summary (Cont'd) --

FISCAL YEAR	QTY	FLYAWAY FY 86 Dollars		TOTAL BASE YEAR$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		PROGRAM	Obli-gated	Ex-pended	
APPROPRIATION: RDTE (AIR FORCE)								
1983		0	0	$5.6	$5.2	$5.2	$5.2	
1984		0	0	$5.8	$5.6	$5.6	$5.6	3.8
1985		0	0	$14.9	$14.8	$14.8	$14.8	3.4
1986		0	0	$25.2	$25.7	$25.7	$25.7	2.8
1987		0	0	$23.4	$24.7	$24.7	$24.7	2.7
1988		0	0	$7.1	$7.7	$7.6	$7.6	3.0
1989		0	0	$6.2	$7.0	$5.5	$5.5	4.2
1990		0	0	$7.9	$9.3	$4.9	$.0	4.0
1991		0	0	$7.8	$9.3			4.2
1992		0	0	(b)(1)				
1993		0	0					
1994		0	0					
1995		0	0					
1996		0	0					
1997		0	0					
1998		0	0					
1999		0	0					
2000		0	0					
2001		0	0					
2002		0	0					
2003		0	0					
2004		0	0					
2005		0	0					
2006		0	0					
SUBTOTAL	0	0	0					

16. ~~(e)~~ Program Funding Summary (Cont'd): (Current Summary in Millions of Dollars)

c. ~~(U)~~ Annual Summary (Cont'd) --

FISCAL YEAR	QTY	FLYAWAY FY 86 Dollars		TOTAL BASE YEAR$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		PROGRAM	Obli-gated	Ex-pended	
APPROPRIATION: RDTE (ARMY/AIR FORCE)								
1983		0	0	$33.4	$31.0	$31.0	$31.0	
1984		0	0	$54.1	$52.0	$52.0	$52.0	3.8
1985		0	0	$81.8	$81.1	$81.1	$81.1	3.4
1986		0	0	$167.4	$171.0	$171.0	$171.0	2.8
1987		0	0	$164.5	$173.4	$173.3	$173.1	2.7
1988		0	0	$142.9	$155.6	$155.5	$150.3	3.0
1989		0	0	$114.7	$129.7	$127.5	$115.2	4.2
1990		0	0	$80.8	$95.1	$51.5	$.9	4.0
1991		0	0	$58.3	$71.1			4.2
1992		0	0					
1993		0	0					
1994		0	0					
1995		0	0					
1996		0	0					
1997		0	0					
1998		0	0					
1999		0	0					
2000		0	0					
2001		0	0					
2002		0	0					
2003		0	0					
2004		0	0					
2005		0	0					
2006		0	0					
SUBTOTAL	0	0	0					

(b)(1)

[redacted]

16. ~~(C)~~ Program Funding Summary (Cont'd): (Current Summary in Millions of Dollars)

c. ~~(C)~~ Annual Summary (Cont'd) --

FISCAL YEAR	QTY	FLYAWAY FY 86 Dollars Nonrec	FLYAWAY FY 86 Dollars Rec	TOTAL BASE YEAR$	Total Then-Year $ PROGRAM	Obli-gated	Ex-pended	Escl Rate (%)
APPROPRIATION: PROCUREMENT (ARMY)								
1987		TBD	TBD	$95.2	$104.6	$93.7	$93.5	
1988		TBD	TBD	$33.2	$38.2	$40.0	$39.7	3.0
1989		TBD	TBD	$21.2	$25.2	$22.7	$16.7	4.2
1990		TBD	TBD	$66.4	$82.2	$33.1	$.0	4.0
1991		TBD	TBD	$46.2	$59.3			4.2
1992		TBD	TBD	(b)(1)				
1993		TBD	TBD					
1994		TBD	TBD					
1995		TBD	TBD					
1996		TBD	TBD					
1997		TBD	TBD					
1998		TBD	TBD					
1999		TBD	TBD					
2000		TBD	TBD					
2001		TBD	TBD					
2002		TBD	TBD					
2003		TBD	TBD					
2004		TBD	TBD					
2005		TBD	TBD					
2006		TBD	TBD					
SUBTOTAL	0	0	0					
APPROPRIATION: MILCON								
SUBTOTAL	0	0	0	(b)(1)	0	0	0	
TOTAL	0	0	0		0	0		

17. (U) Production Rate Data: None

18. (U) Operating and Support Costs:

a. Assumptions and Ground Rules — No Baseline Cost Estimate (BCE) exists however, current plans project an approved BCE by 3Q FY90.

b. Costs — This program has no approved BCE, however, current plans project an approved BCE by 3Q FY90.

c. Contractor Support Costs —

(Current (Then-Year) Dollars in Millions)

FUNDING	FY 1989* & Prior	FY 1990	FY 1991	Balance to Complete	Total
O&M	8.0	15.3	17.0	—	40.3
TOTAL	8.0	15.3	17.0	—	40.3

*1 Includes FY89 costs only.

A-19 MLRS-TGW ~~CONFIDENTIAL~~

SAR-89-116

~~CONFIDENTIAL~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: MLRS/TGW RDT&E ONLY

AS OF DATE: December 31, 1989

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AS AMENDED

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FOR OPEN PUBLICATION

MAR 22 1990 21

DIRECTORATE FOR FREEDOM OF INFORMATION
AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

1. ~~(U)~~ Designation and Nomenclature (Popular Name): Multiple Launch Rocket System Terminal Guidance Warhead (MLRS TGW)

2. ~~(U)~~ DoD Component: ARMY

3. ~~(U)~~ Responsible Office and Telephone Number:
MLRS Project Office — COL William F. Hecker
Program Management Division — Assigned: September 21, 1987
Redstone Arsenal, AL 35898-5700 — AV 746-1195 COMM 205-876-1195

4. ~~(U)~~ Program Elements/Procurement Line Items:
RDT&E:
PE 63303 Project D216

5. ~~(U)~~ Related Programs: Basic MLRS; XM447 fuze, Scatterable Mine Warhead, Fire Direction Data Manager, TACFIRE, Field Artillery Meteorological Data System, Bradley Fighting Vehicles, test set AN/MSM-105, Sense and Destroy Armor, Army Tactical Missile System.

6. ~~(U)~~ Mission and Description: a. ~~(U)~~ The concept of a TGW for the MLRS envisions the attack of armored target arrays from above using highly accurate and lethal submunitions dispensed from an MLRS rocket. (b)(1) (b)(1)

(b)(1)

~~CLASSIFIED BY: MLRS TGW SCG~~
~~9 Dec 88, Addendum 1, 29 Mar 89~~
~~Addendum 2, 8 Dec 89~~
~~DECLASSIFY ON: OADR~~

(THIS PAGE IS ~~CONFIDENTIAL~~)

OASD(PA) DFOISR 90-T-0763/1

~~CONFIDENTIAL~~

6. (U) Mission and Description (Cont'd):

(b)(1)

(b)(1) The TGW for the MLRS will contain multiple submunitions packaged within the rocket warhead section. The TGW consists of a dispenser and three terminally guided submunitions (TGSM's). The primary mission of the MLRS TGW is to provide rapid fire, nonnuclear capability to destroy a wide spectrum of stationary or moving, medium hard to very hard, armored targets. The Army intends to develop this warhead in cooperation with the Republic of France (FR), the Federal Republic of Germany (GE), and the United Kingdom (UK) under a Memorandum of Understanding (MOU) dated 3 December 1983.

b. (U) This system is intended to supplement cannon and rocket artillery rather than replace equipment and/or munitions in the current inventory. The TGW will be fully integrated into the existing MLRS and be compatible with the components of the system as required in the specification for the rocket, rocket pod/container, and fire control. The MLRS launcher has been modified to Deep Attack Configuration and is currently in production with fielding in process. This allows MLRS launchers to fire all Deep Attack weapons including MLRS TGW.

c. (U) Change since "As of" Date - None

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- (1) (U) The MLRS TGW development program was a direct result of compliance by DA and OSD with congressional guidance to explore terminal homing options in the MLRS program. Congress appropriated FY80 research, development, test, and evaluation (RDT&E) funding under a separate program element to support concept definition studies for MLRS TGW. MLRS TGW is a cooperative development program between the U.S., UK, FR, and GE in accordance with the July 1979 MLRS MOU and Supplement Number 3 to the MLRS MOU signed December 1983. Under the terms of the MOU supplement, the total international development program costs will be shared in the ratio of U.S. - 40 percent, and FR, GE, and UK - 20 percent each. Each country will be responsible for total funding of any internal national task they decide to do in addition to the agreed international development program.

(2) (U) The ASARC/DSARC I conducted in August/September 1984 approved entry into the component demonstration substage (CDS) of the development program. Development and integration contracts were awarded on 29 November 1984 to MDTT Joint Venture and LTV Aerospace Division, respectively. MDTT Joint Venture consists of Martin Marietta Corporation (U.S.), Thomson CFS (FR), Thorn EMI Electronics (UK), Diehl GmbH and Company (GE), and MDTT, Inc. LTV Aerospace, the MLRS prime contractor, erospace and MDTT will be associate prime contractors for development of he total MLRS TGW weapon system.

7. (U) Program Highlights (Cont'd):

(3) (U) On 23 October 1986, the Joint Steering Committee (JSC) approved the contractor's recommended configuration of three TGSMs. As a result of 17 1/2 month schedule delay in completion of CDS due to technical difficulties and revised threat, the JSC on 4 December 1986 approved a modification to the TGW development contract reflecting a 46-month CDS phase. All testing planned for the CDS phase was successfully completed. The CDS contract was completed by MDTT on 31 March 1989.

(4) (U) Decision Memorandum from the Conventional Systems Committee (CSC) Review authorized entry into System Demonstration Substage (SDS) once the Army provided a plan to address certain issues at Milestone II.

(5) (U) In accordance with the FY87 DoD Authorization Act, SARs for pre-milestone II programs may reflect cost limited to the development program. Accordingly, the cost included in this report reflect the MLRS TGW development program only through SDS.

b. (U) Significant Developments Since Last Report -- (1) (U) SDS contract was signed 31 July 1989.

(2) (U) The total requirement through FY94 of $456.9M reflects a shortfall of $169.3M. A congressional decrement of $18.3M in FY90 and below threshold reprogramming to date result in a net shortfall of $16.1M for the completion of SDS. The remaining shortfall of $153.2M (FY92-14.2M; FY93-69.3M; FY94-69.7M) plus an additional $25.4M in FY95 will be required to execute the FSD phase.

(3) (U) MLRS TGW is expected to satisfy mission requirements.

c. (U) Changes Since As of Date -- None.

8. (U) Threshold Breaches: No DAE Baseline has been approved for this program.

9. (U) Schedule:

a. (U) Milestones --	Planning Estimate	Approved Program	Current Estimate
Milestone I (ASARC)	AUG 84	N/A	AUG 84
Award Validation Phase Contract	NOV 84	N/A	NOV 84
Captive Flight Tests Initiated	DEC 85	N/A	MAY 87
CSC Program Review		N/A	MAY 88
ASARC Review (CDS/SDS Transition)		N/A	NOV 88

9. (U) Schedule (Cont'd):

a. (U) Milestones -- Continued

	Planning Estimate	Approved Program	Current Estimate
CDS/SDS Transition Decision		N/A	FEB 89
SDS Contract Award		N/A	JUL 89
PEO Assessment		N/A	MAR 91 (Ch-1)
PEO Assessment		N/A	NOV 91 (Ch-1)
MS/FSD Contract Award		N/A	NOV 92 (Ch-2)
LRIP Contract Award		N/A	APR 95 (Ch-3)
FSP Award		N/A	NOV 97 (Ch-4)
Milestone I (DSARC)	SEP 84	N/A	SEP 84
Milestone II		N/A	OCT 92 (Ch-5)
Milestone III		N/A	OCT 97 (Ch-6)
Milestone IIIA		N/A	MAR 95 (Ch-7)

(b)(1) [redacted]

b. (U) Previous Change Explanations --

Initial Milestone dates established per ASARC/DSARC I. 22½ month delay in completion of CDS due to design, technical, and manufacturing problems associated with prototype hardware. Start of the System Demonstration Substage was delayed three months from April 1989 to July 1989 due to International staffing approval process delays.

c. (U) Current Change Explanations --

(Ch-1) Additional milestones added to reflect measureable goals/thresholds between SDS and FSD phase.

(Ch-2) MS/FSD changed from Sep 92 to Nov 92 (See Ch-5 Milestone II explanation).

(Ch-3) LRIP Contract Award changed from Feb 95 to Apr 95 (See Ch-5 explanation).

(Ch-4) FSP Award changed from Oct 97 to Nov 97.

(Ch-5) Milestone II changed from Aug 92 to Oct 92 to include drop and flight test data results for ASARC/DAB review.

(Ch-6) Milestone III changed from Sep 97 to Oct 97.

(Ch-7) Milestone IIIA changed from Jan 95 to Mar 95.

d. (U) References --

Planning Estimate: Decision Coordinating Paper (DCP), Jan 89.

Approved Program: No DAE Baseline has been approved for this program.

10. [redacted] Technical/Operational Characteristics:

		Plan Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
a. [redacted] Technical --					
[redacted] Effectiveness 1/			(b)(1)		
[redacted] Range (km)					
[redacted] Maximum					
[redacted] Minimum					
b. [redacted] Operational --					
Reliability					
Rocket	2/	0.93	N/A		0.93
TGWM	3/	0.90	N/A		0.90
Availability	4/	0.85	N/A		0.85

c. [redacted] Previous Change Explanations --

(b)(1)

2/ [redacted] TGW carrier reliability is defined as the probability that after loading on a MLRS launcher, a TGW rocket will properly pass all preflight checkouts and complete the rocket firing and flight sequence including proper carrier warhead fuzing and dispensing of any given submunition. The assigned reliability of the basic rocket less fuze and warhead is .965.

3/ [redacted] TGSM reliability is defined as the probability that a TSGM will complete preflight checks and when dispensed, will orient, stabilize and fly to the vicinity of the target (given target acquisition) and detonate given a target impact.

4/ [redacted] Seeker availability is defined as the mean percentage of time that the environmental conditions of clutter and weather allow the system to defeat the target arrays within the number of rockets required. It shall be calculated as the availability at 20 km range against the tank BN target.

d. [redacted] Current Change Explanations -- None.

e. [redacted] References --

Planning Estimate: Decision Coordinating Paper (DCP), Jan 89

10. Technical/Operational Characteristics (Cont'd):

Approved Program: No DAE Baseline has been approved for this program.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Planning Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	190.7	N/A	243.3
Procurement	(0.0)	N/A	(0.0)
Total Flyaway	(0.0)	N/A	(0.0)
Other Wpn Sys Cost	(0.0)	N/A	(0.0)
Peculiar Support	(0.0)	N/A	(0.0)
Initial Spares	(0.0)	N/A	(0.0)
Construction	0.0	N/A	0.0
Ops. and Maint. (O&M)	0.0	N/A	0.0
Total FY 84 Base-Year $	190.7	N/A	243.3
Escalation	20.5	N/A	44.3
Development (RDT&E)	(20.5)	N/A	(44.3)
Procurement	(0.0)	N/A	(0.0)
Construction (MILCON)	(0.0)	N/A	(0.0)
Ops. and Maint. (O&M)	(0.0)	N/A	(0.0)
Total Then-Year $	211.2	N/A	287.6
b. Quantities --			
Development (RDT&E)	0	N/A	0
Procurement	0	N/A	0
Construction (MILCON)	0	N/A	0
Total	0	N/A	0

Paragraph 11 Comments:

NOTES:
1/ No DAE Baseline has been approved for this program.

2/ The program acquisition costs shown reflect only the U.S. share of MLRS TGW, through SDS Development. (Refers to all of 11.)

3/ Development (RDT&E) costs have a total international development program cost of $920.3M (FY84 dollars) based on Oct 89 Baseline Cost Estimate (BCE).

c. ( ) Foreign Military Sales -- None.

d. ( ) Nuclear Costs -- None.

11. (U) Program Acquisition Cost (Cont'd):

e. (U) References --

Planning Estimate: FY 1985 President's Budget.

Approved Program: No DAE Baseline has been approved for this program.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. (U) Program Acquistion	(SAR)	(SAR)	(SAR)
(1) Cost	0.0	0.0	0.0
(2) Quantity	0.0	0.0	0.0
(3) Unit Cost	-	-	-
b. (U) Current Procurement --	(FY)	(FY APPN)	(FY 1990)
(1) Cost	0.0	0.0	0.0
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	0.0	0.0	0.0
(2) Quantity	0.0	0.0	0.0
(3) Unit Cost	-	-	-

Paragraph 12 Comments:
NOTE: In accordance with section 2433, title 10, USC, unit cost reporting shall not apply to reports that are limited to the development (RDT&E) program.

(U) **Cost Variance Analysis:**

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	211.2	0.0	0.0	211.2
Previous Changes:				
Economic	-12.3	-	-	-12.3
Quantity	-	-	-	-
Schedule	-4.2	-	-	-4.2
Engineering	+1.5	-	-	+1.5
Estimating	+107.3	-	-	+107.3
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+92.3	-	-	+92.3
Current Changes:				
Economic	+3.2	-	-	+3.2
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-19.1	-	-	-19.1
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-15.9	-	-	-15.9
Total Changes	+76.4	-	-	+76.4
Current Estimate	287.6	-	-	287.6

13. Cost Variance Analysis (Cont'd):

(FY 1984 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	190.7	0.0	0.0	190.7
Previous Changes:				
Quantity	-	-	-	-
Schedule	-5.6	-	-	-5.6
Engineering	+1.3	-	-	+1.3
Estimating	+72.2	-	-	+72.2
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+67.9	-	-	-
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-15.3	-	-	-15.3
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-15.3	-	-	-15.3
Total Changes	+52.6	-	-	+52.6
Current Estimate	243.3	-	-	243.3

13. (U) Cost Variance Analysis (Cont'd):

b. (U) Previous Change Explanations --

RDT&E

Economic:	Revised escalation indices. Previous total represented the funded portion of the FYDP only and did not include total TGW development program (recategorized to estimating) 3-month schedule slip. 14 1/2-month schedule extension of CDS. Six month CDS schedule extension plus 14 month SDS schedule extension. Maturation/Full scale Development phase (28 months) deleted from current program to reflect amended Budget Submission, 27 April 1989.
Engineering:	TGSM configuration change and revised threat.
Estimating:	Refinement of costs resulting from ASARC/DSARC I decision and directed U.S. adjustments in development program to offset 3-month schedule slip. Cost growth associated with Improved Electronic Unit (IEU) bubble storage memory and CDS development contract. Three months in start of SDS phase.

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
RDT&E		
Revised escalation indices. (Economic)	N/A	+3.2
Funding decrement of $18.3M in FY90. (Estimating)	-15.3	-19.1
PROCUREMENT		

14. (U) Program Acquisition Unit Cost (PAUC) History: (Then-Year Dollars in Millions)

a. (U) Initial SAR Estimate to Current Baseline Estimate -- N/A

b. (U) Current Baseline Estimate to Current Estimate -- N/A

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E

MLRS TGW:	Initial Contract Price Target	Ceiling	Qty
MDTT, Inc. Orlando, FL DAAH01-85-C-A004, CPIF Award: November 1, 1984 Definitized: July 31, 1989	$295.2	$330.6	0.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$295.2	$330.6	0.0	$295.2	$295.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date (11/30/89)	$+0.5	$-2.6
Net Change	$+0.5	$-2.6

Explanation of Change: Component Demonstration Substage phase was completed 31 March 1989. The System Demonstration Substage phase option was awarded 31 July 1989. The cumulative cost variance is due to inability to status milestone completion. The cumulative schedule variance is due to unavailability of software; lack of definitized milestones for support activities; and delay of the drawing details of the non-long lead time items for brassboard tracking.

16. (U) Program Funding Summary:

a. (U) Program Status --

(1) Percent Program Completed: 68.8% (11 yrs/16 yrs)

(2) Percent Program Cost Appropriated: 70.0% ($201.31/$287.6)

Program Funding Summary (Cont'd): (Current Estimate in Millions Dollars

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-95)	Total
RDT&E	172.9	28.4	47.2	39.1	287.6
Procurement	-	-	-	-	-
MILCON	-	-	-	-	-
O&M	-	-	-	-	-
Total	172.9	28.4	47.2	39.1	287.6

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2040 Research, Development, Test & Eval, Army								
1980				0.6	0.5	0.5	0.5	10.6
1981				0.3	0.3	0.3	0.3	10.6
1982				1.0	1.0	1.0	1.0	7.6
1983				2.4	2.3	2.3	2.3	4.9
1984				15.1	15.5	15.5	15.4	3.8
1985				23.1	24.4	24.4	24.4	3.4
1986				25.0	27.1	27.0	27.0	2.8
1987				35.3	39.3	39.3	39.1	2.7
1988				20.6	23.6	23.5	22.8	3.1

c. (U) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2040 Research, Development, Test & Eval, Army (Cont'd)								
1989				32.4	38.9	32.0	9.1	4.2
1990				22.7	28.4			4.0
1991				36.2	47.2			4.2
1992				28.9	39.1			4.0
1993								3.7
1994								3.4
1995								
Subtot	0			243.6	287.6	165.8	141.9	
Total	0			243.6	287.6	165.8	141.9	

17. (U) **Production Rate Data:** None.

a. (U) Annualized Production Rates -- None.

b. (U) Cost Variance -- None.

c. (U) Schedule Variance -- None.

d. (U) Deliveries (Plan/Actual) -- None.

e. (U) Approved Design-to-Cost Goal -- None.

18. (U) **Operating and Support Costs:** N/A

A-15 LHX

SAR-89-121

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
RDT&E - ONLY SAR

PROGRAM: LIGHT HELICOPTER PROGRAM (LH)

AS OF DATE: DECEMBER 31, 1989

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1. Designation and Nomenclature (Popular Name): Light Helicopter Program (LH)

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MAR 22 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

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2. DoD Component: U.S. Army

3. Responsible Office and Telephone Number:

Office of the Program Manager
Light Helicopter Program
4300 Goodfellow Blvd.
St. Louis, MO 63120-1798

Major General Ronald R. Andreson
Assigned: August 1984
AUTOVON 693-1800
Commercial (314) 263-1800

4. Program Elements/Procurement Line Items:

RDT&E: PE 0603220
PE 0604216
PE 0604810 Project D327/DC72(FY88 Only
PE 0604223
RDT&E - Only SAR

PROCUREMENT: TBD

(b)(1)
OASD(PA) DFOISR 90-T-0703

MILCON: TBD

5. Related Programs: Air-to-Air Stinger Missile System; Anti-tank Missile system; Army Aviation Modernization Program including AH-64 and UH-60; Longbow.

6. Mission and Description: The LH will be a lightweight, low cost, twin engine advanced helicopter that will retire the current light fleet of tactically obsolescent AH-1, OH-6, and OH-58 helicopters for the primary missions of light attack and armed reconnaissance. LH will provide leap ahead combat lethality and battlefield survivability to defeat the threat of the mid-1990s and to modernize 100 percent of the Army's light attack/scout fleet. LH will correct the major light fleet deficiencies such as marginal night and adverse weather capability; position location/navigation accuracy; inability to self-deploy to overseas theaters of operations; and inadequate reliability, performance, and survivability. LH improvements include lightweight composite airframe structures for enhanced power to weight ratios that provide increased agility/maneuverability, increased speed and excellent high altitude/hot day performance; advanced technology target acquisition and night vision sensors which allow greater standoff range and shorter exposure time to the threat as well as effective night/adverse weather operations; the tri-service common avionics architecture which is compatible with the Navy Advanced Tactical Aircraft and Air Force Advanced Tactical Fighter; and built-in diagnostics/prognostics. LH will be integrated into the force structure to complement the AH-64 attack helicopter.

7. Program Highlights:

a. Significant Historical Developments -- Following the Army's first Army Aviation Mission Area Analysis (AAMAA) in January 1982, Senior Army leadership endorsed the AAMAA recommendation to replace the current light fleet with the LH at the Army Aviation Systems Program Review in March 1982. Advanced development effort began in October 1983, under the Advanced Rotorcraft Technology Integration (ARTI) Program and completed in May 1986. In September 1986, ARTI effort was expanded with the award of contracts to address those areas of the program determined as higher than medium risk. On 19 July 1985, competitive FFP Full Scale Development contracts were awarded for development of a 1200 shaft horsepower class, advanced technology engine, designated as the T800. On 13 April 1987, the LH Army System Acquisition Review Council (ASARC I) was conducted. On 23 April, the LH Defense Acquisition Board (DAB I) was conducted with guidance to reconvene for a continuing DAB planned for summer 1988. On 19 May 1987, a Secretary of Defense Decision Memorandum was issued for the LH program that supported the need for the Army to upgrade the aviation capabilities for the light attack role and authorized continuance of LH Mission Equipment Package (MEP) design and definition effort to the extent that it was compatible with all competing airframe technologies and directed a parallel independent assessment of competing airframe technologies be conducted. The independent assessments were conducted by the RAND Corporation and the Institute for Defense Analyses (IDA) from June-November 1987. Both study teams recommended a new development conventional helicopter as the most cost and operationally effective airframe alternative for the

b. Previous Change Explanations --

DAE approved program baseline date 15 June 1988. Milestone I ADM, dated 17 June 88.

c. Current Changes Explanations --

(Ch-1) FUE/IOC changed from November to December due to funding reduction in FY 91.

d. References --

Planning Estimate: AMC Approved Acquisition Strategy (16 December 1985).

Approved Program: DAE approved program (15 June 1988).

Footnotes:

1/ The planning estimate phase I is replaced in the approved program with a competitive demonstration effort.

2/ The planning estimate phase II is replaced in the approved program with a full scale development effort.

10. Technical/Operational Characteristics:

a. Technical --	Planning Estimate	Approved Program Goal/ Threshold	Demon-strated Perf	Current Estimate
SCAT Primary Mission Gross Empty Weight:	N/A	7,500/ 8,200	N/A	7,500
Gross Weight:	N/A	11,200/11,900	N/A	11,200
Flight Performance (Prim Msn):				
SCAT Vertical Rate of Climb (VROC) feet per minute (FPM) 4000'/95F. at structural design gross weight	500	500/250	N/A	500
Dash Speed, Knots 4,000'/95F	N/A	170/160	N/A	180
Single Engine Operation, Knots @ CRP, 100FPM Rate of Climb	N/A	40/80	N/A	40
Crashworthiness (Vertical Impact Velocity, FPS)	N/A	38/30	N/A	38
EMI/EMP Protection (Volts/M)	N/A	200/100	N/A	200
Engine Size, Intermediate Rated Power at Sea Level Standard	N/A	1200/1140	N/A	1233(Ch-1)

7. Program Highlights (cont'd):

LH. Following the Milestone Decision I Review on 9 June 1988, the LH was given approval to proceed with the Demonstration/Validation (Dem/Val) phase of the program. On 28 October 1988, the contractor team of Light Helicopter Turbine Engine Company was announced the winner of the competitive T800 engine program. On 1 November 1988, contractor teams of Boeing Sikorsky and McDonnell/Bell began competitive LH Dem/Val effort under letter contracts.

b. Significant Developments Since Last Report --

In March 1989, the LH Dem/Val contracts with the McDonnell/Bell team and the Boeing Sikorsky team were definitized. Documentation to support the LH Milestone II decision was initiated.

The LH system is expected to satisfy the mission requirement.

c. Changes Since "As of Date" -- N/A

8. Threshold Breaches: There are currently no Defense Acquisition Executive (DAE) approved program baseline (15 June 1988) breaches.

9. Schedule:

a. Milestones --	Planning Estimate	Approved Program	Current Estimate
T800 Engine FSD Contract Awards	Jul 85	Jul 85	Jul 85
Milestone I (ASARC I)	Feb 87	May 88	May 88
(DAB I)	Mar 87	Jun 88	Jun 88
Milestone II (ASARC II)	Feb 87	Nov 90	Nov 90
(DAB II)	Mar 87	Dec 90	Dec 90
Issue RFP for Air Vehicle	Mar 87	N/A	Jun 88
Contract Awards for Air Vehicle (Phase I) 1/	Oct 87	Oct 88	Oct 88
T800 Engine Source Selection (FSD Down Selection)	Sep 88	Oct 88	Oct 88
Contract Award for Air Vehicle (Phase II) 2/	Jul 89	Dec 90	Dec 90
First Flight (FSD Hardware)	Sep 91	Aug 93	Aug 93
T800 Engine Production Contract Award	Jan 93	Jun 93	Jun 93
DT/EUTE Completed	Nov 93	Nov 94	Nov 94
Milestone IIIa (LRIP)	Jan 94	Nov 94	Nov 94
Air Vehicle Production Contract Award	Jan 94	Nov 94	Nov 94
First Air Vehicle Production Delivery	Jul 95	Mar 96	Mar 96
IOTE Completed	N/A	Sep 96	Sep 96
Milestone III (ASARC/DAB III)	Jan 94	Nov 96	Nov 96
FUE/IOC	May 96	Nov 96	Dec 96(Ch-1)

b. Previous Change Explanations --

DAE approved program baseline date 15 June 1988. Milestone I ADM, dated 17 June 88.

c. Current Changes Explanations --

(Ch-1) FUE/IOC changed from November to December due to funding reduction in FY 91.

d. References --

Planning Estimate: AMC Approved Acquisition Strategy (16 December 1985).

Approved Program: DAE approved program (15 June 1988).

Footnotes:

1/ The planning estimate phase I is replaced in the approved program with a competitive demonstration effort.

2/ The planning estimate phase II is replaced in the approved program with a full scale development effort.

10. Technical/Operational Characteristics:

a. Technical --	Planning Estimate	Approved Program Goal/ Threshold	Demon-strated Perf	Current Estimate
SCAT Primary Mission Gross Empty Weight:	N/A	7,500/ 8,200	N/A	7,500
Gross Weight:	N/A	11,200/11,900	N/A	11,200
Flight Performance (Prim Msn):				
SCAT Vertical Rate of Climb (VROC) feet per minute (FPM) 4000'/95F. at structural design gross weight	500	500/250	N/A	500
Dash Speed, Knots 4,000'/95F	N/A	170/160	N/A	180
Single Engine Operation, Knots @ CRP, 100FPM Rate of Climb	N/A	40/80	N/A	40
Crashworthiness (Vertical Impact Velocity, FPS)	N/A	38/30	N/A	38
EMI/EMP Protection (Volts/M)	N/A	200/100	N/A	200
Engine Size, Intermediate Rated Power at Sea Level Standard	N/A	1200/1140	N/A	1233(Ch-1)

10. Technical/Operational Characteristics (cont'd):

b. Operational --	Planning Estimate	Approved Program Goal/ Threshold	Demon-strated Perf	Current Estimate
Reliability				
Mean Time Between Essential Maintenance Action (MTBEMA) (hours)	4.5	5.1/4.5	N/A	5.1(Ch-2)
Mean Time Between Mission Affecting Failure (MTBMAF) (hours)	8.4	9.5/8.5	N/A	9.5(Ch-3)
Maintainability				
Mean Time to Repair (MTTR) (hours)	1.0	.86/1.0	N/A	.86
Maintenance Manhours per Flight Hour (MMH/FH)	2.8	2.6/2.8	N/A	2.6
Payload				
SCAT (Expendable Ordnance)				
HELLFIRE Missiles:				
Internal MSL Cap.	N/A	6/4	N/A	6
External MSL Cap.	N/A	4/2	N/A	4
Gun Ammo, rds.	TBD	500/300	N/A	500
Refuel/Rearm (No. Pers./ time, min)	N/A	3/15/4/30	N/A	3/15
Air Transportability in C-5 (time to unload, hrs)	N/A	1.0/2.0	N/A	1.0
Self-Deployable (NM):	1260	1260/1120	N/A	1260

c. Previous Change Explanations --

UTAS design excluded from refocused program. MTBMAF and MTTR revised to reflect changes in Reliability, Availability, and Maintainability (RAM) rationale report. MMH/FH revised from 2.8 to 2.6 hours to reflect results of RAM data analysis. PMGW weapon load increased from 4 tc 6 missiles to reflect results of LH Milestone I Cost and Operational Effectiveness Analyses (COEA).

d. Current Changes Explanations --

(Ch-1) From 1200 to 1233, current values reflect program goals.

(Ch-2) From 4.5 to 5.1, current values reflect program goals.

(Ch-3) From 8.5 to 9.5, current values reflect program goals.

10. Technical/Operational Characteristics (cont'd):

e. References --

Planning Estimate: Letter of Agreement approved by DA, 19 August 1985. Draft Required Operational Capability (ROC) document dated 4 March 1985.

Approved Program: DAE approved program baseline (15 June 1988).

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. Cost --	Planning Estimate	Approved Program	Current Estimate
Development (RDT&E)	1756.2	2900.0	2834.7
Procurement	TBD	TBD	TBD
Air Vehicle	TBD	TBD	TBD
Engine	TBD	TBD	TBD
Initial Spares	TBD	TBD	TBD
Construction (MILCON)	TBD	TBD	TBD
Total FY 84 Base-Year $	1756.2	2900.0	2834.7
Escalation	376.8	950.0	978.5
Development (RDT&E)	(+376.8)	(+950.0)	(+978.5)
Procurement	(-0-)	(-0-)	(-0-)
Construction (MILCON)	(-0-)	(-0-)	(-0-)
Total Then-Year $	2133.0	3850.0	3813.1
b. Quantities -- (Development Prototypes)	N/A	6	6

c. Foreign Military Sales -- TBD

d. Nuclear Cost -- None

e. References --

Planning Estimate: AMC Approved Acquisition Strategy (16 December 1985).

Approved Program: DAE approved program baseline (15 June 1988).

12. Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions)

NOTE: In accordance with title 10, USC 2433, unit cost reporting shall not apply to reports that are limited to the development (RDT&E) program.

13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	2133.0	----	------	2133.0
Previous Changes:				
Economic	-28.4	----	------	-28.4
Quantity	------	----	------	------
Schedule	------	----	------	------
Engineering	------	----	------	------
Estimating	+1504.1	----	------	+1504.1
Other	------	----	------	------
Support	------	----	------	------
Subtotal	+1475.7	----	------	+1475.7
Current Changes:				
Economic	+147.6	----	------	+147.6
Quantity	------	----	------	------
Schedule	------	----	------	------
Engineering	------	----	------	------
Estimating	+56.8	----	------	+56.8
Other	------	----	------	------
Support	------	----	------	------
Subtotal	+204.4	----	------	+204.4
Total Changes:	+1680.1	----	------	+1680.1
Current Estimate:	+3813.1	----	------	+3813.1

13. Cost Variance Analysis (cont'd):

(FY 1984 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	1756.2	----	------	1756.2
Previous Changes:				
Quantity	------	----	------	------
Schedule	------	----	------	------
Engineering	------	----	------	------
Estimating	+1050.9	----	------	+1050.9
Other	------	----	------	------
Support	------	----	------	------
Subtotal	+1050.9	----	------	+1050.9
Current Changes:				
Quantity	------	----	------	------
Schedule	------	----	------	------
Engineering	------	----	------	------
Estimating	+27.6	----	------	+27.6
Other	------	----	------	------
Support	------	----	------	------
Subtotal	+27.6	----	------	+27.6
Total Changes:	+1078.5	----	------	+1078.5
Current Estimate:	+2834.7	----	------	+2834.7

b. Previous Change Explanations --

RDT&E

Economic: Revised escalation indices

Estimating: Acquistion strategies revised to reflect varying competitive development time and prototype fly-off alternatives. Assault/utility design was excluded.

Total DAE approved baseline program added FY93 through FY96 estimate.

Program estimate reduced length and scope of Dem/Val effort. This reduction was in response to the DEPSECDEF 20 January 1988, ADM.

13. Cost Variance Analysis (cont'd):

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Economic escalation rates (Economic).	-0-	+147.6
Updated estimate of competitive T800 program to actuals (Estimating).	+27.6	+56.8
	+27.6	+204.4

(2) Procurement - N/A

(3) MILCON - N/A

14. Program Acquisition Unit Cost (PAUC) History: (Millions of then-year dollars)

a. Initial SAR Estimate to Current Baseline Estimate -- TBD

b. Current Baseline Estimate to Current Estimate - TBD

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E --

Engine (FSD)	Initial Contract Price Target	Ceiling	Quantity
LHTEC Allison Gas Turbine Division, Indianapolis, IN 46241 Garrett Turbine Engine Co., Phoenix, AZ 85034 DAAJ09-85-C-B017 Award: July 19, 1985 Definitized: July 19, 1985 Type: FFP with CPIF Production option	207.8	TBD[1/]	0

Current Contract Price Target	Ceiling	Quantity	Estimated Price at Completion Contractor	Program Manager
207.8	TBD	0	207.8	207.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (12/31/89)	N/A	N/A
Net Change	N/A	N/A

15. Contract Information (cont'd):

Air Vehicle (Dem/Val)	Initial Contract Price Target	Ceiling	Quantity
McDonnell Douglas Helicopter Co. Bell Helicopter Textron Inc./ McDonnell Aircraft Company Mesa, AZ 85205-9797 DAAJ09-89-C-A001 Award: October 28, 1988 Definitized: March 29, 1989 Type: CPFF	158.0	158.0	0

Current Contract Price Target	Ceiling	Quantity	Estimated Price at Completion Contractor	Program Manager
167.3	167.3	0	167.3	167.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (12/31/89)	N/A	N/A
Net Change	N/A	N/A[2/]

Air Vehicle (Dem/Val)	Initial Contract Price Target	Ceiling	Quantity
Boeing Sikorsky Joint Program Office Philadelphia, PA 19142 DAAJ09-89-C-A002 Award: October 28, 1988 Definitized: March 30, 1989 Type: CPFF	158.0	158.0	0

Current Contract Price Target	Ceiling	Quantity	Estimate Price at Completion Contractor	Program Manager
167.6	167.6	0	167.6	167.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (12/31/89)	N/A	N/A
Net Change	N/A	N/A[2/]

15. Contract Information (cont'd):

Footnotes:

1/ Contract remains FFP; options have not been exercised to date.

2/ Due to the competition sensitive nature of the contracts, variance information and estimates at completion will be reported after down selection to one contractor team.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 50.0% (7 yrs./14 yrs.)

(2) Percent Program Cost Appropriated: 23.5% ($ 895.6M/$ 3813.1M)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs. (FY 84-89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance to Complete (FY 92-97)	Total
RDT&E	621.2	274.2	465.1	2452.6	3813.1
PROC	-0-	-0-	-0-	TBD	TBD
MILCON	-0-	-0-	TBD	TBD	TBD
TOTAL	621.2	274.2	465.1	2452.6	3813.1

16. Program Funding Summary cont'd:

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY84 Dollars		Total	Total Then-Year $			Escl Rate %
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1984				1.0	1.0	1.0	1.0	3.8
1985				67.8	71.4	71.3	70.3	3.4
1986				98.6	106.9	106.9	106.8	2.8
1987				123.4	137.6	137.6	137.5	2.7
1988				110.0	127.1	127.1	113.7	3.0
1989				147.4	177.2	174.7	116.8	4.2
1990				219.1	274.2	202.4	.7	4.0
1991				357.2	465.1			4.2
1992				401.6	542.7			4.0
1993				418.0	584.9			3.7
1994				318.4	459.9			3.4
1995				336.0	500.4			3.1
1996				195.2	299.8			3.1
1997				41.0	64.9			3.1
TOTAL	6			2834.7	3813.1	821.0	546.8	

17. Production Rate Data: N/A

18. Operating and Support Costs: N/A

A-20 MSE

SAR-89-114

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)

PROGRAM: Mobile Subscriber Equipment (MSE)

AS OF DATE: December 31, 1989

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MAR 22 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

21

1. Designation and Nomenclature (Popular Name):

Mobile Subscriber Equipment (MSE)

DoD Component: U.S. Army

3. Responsible Office and Telephone Number:

PM MSE
Ft. Monmouth, NJ 07703-5210

Colonel John R. Power
Assigned: January 23, 1988
AV 995-2524; COM (201) 544-2524

4. Program Elements/Procurement Line Items:

RDT&E: None
PROCUREMENT: APPN 2035 SSN BB 1610
MILCON: None

5. Related Programs: None

6. Mission and Description: The mission of MSE is to provide the tactical U.S. Army commander with a secure, automatic, mobile and survivable tactical telephone system capable of passing data, facsimile, and voice traffic throughout the corps area of operations and allow commanders and their staffs to communicate while moving as well as stationary. The MSE system is being procured through a nondevelopmental item (NDI) procurement acquisition strategy. MSE will, for the first time, enable the Army to fully implement the Air Land

(b)(1)

OASD(PA) DFOISR 90-T-0703

6. Mission and Description (Cont'd): The MSE system will field the total [illegible]e of an equivalent of 5 corps and 26 divisions if Option 6 is not [illegible]ted, however, the 28 divisions requirement is still valid. The major [illegible]tems of equipment will be integrated into the following function areas: Subscriber Terminals, Mobile Subscriber Access, Wire Subscriber Access, Area Coverage and System Control. The system will automatically reroute traffic around damaged or jammed nodes or links. Node centers will constitute the "background" of the MSE system and will provide connectivity to extension switches and radio access units (RAU) by means of UHF multichannel radio. The MSE system provides the Army with a new capability and will not replace any existing system. The system offers subscribers a means of communication with each other on a discrete address, fixed directory basis, throughout the corps area of operations. The MSE system will provide necessary interfaces for communications with echelons above corps (EAC), the other services and NATO.

7. Program Highlights:

a. Significant Historical Developments -- The MSE system was part of the TRI-TAC architecture and was initially identified as the division backbone communication system in the Army's INTACS Objective System, approved in Oct 76, and revalidated by TRADOC in Feb 81. The OSD Memorandum dated 13 Oct 79 approved the Joint Operational Requirement (JOR) for MSE and continued the assignment of the Army as the acquisition agent. The OSD Memorandum dated 8 Jan 80 approved the Mission Element Need Statement (MENS) for MSE. AMC was directed to proceed immediately [illegible] actions necessary to obtain the MSE system in a HQ DA (DCSRDA) [illegible]age dated 6 Aug 82. In Nov 82, guidance was received from the Under [illegible]etary of the Army to procure MSE using a nondevelopmental approach. The JOR and MENS were updated and expanded to include corps and division in the MSE Operational Capabilities Document (MSEOCD) dated 24 May 84. The JOR and MENS identified MSE as a separate program from TRI-TAC and defined MSE as the corps and division common user area communication system. On 5 Nov 85, GTE was declared the winning contractor by the Secretary of the Army. On 19 Dec 85, the basic contract was signed and on 31 Dec 85, Option 1 of the contract was signed. On 19 Feb 87, Option 2 of the contract was signed. Follow-on Test and Evaluation (FOTE) was started on 9 Aug 88 and completed on 25 Oct 88. On 8 Dec 88, Option 3 of the contract was signed. On 8 Mar 89, Option 4 of the contract was signed. On 7 Apr 89, the existing contract option to include packet switching in MSE was executed. The 90% Grade of Service (GOS) with a 20% off hook factor was not demonstrated during FOTE. GTE has contractually committed to a corrective action plan leading to a field demonstration during 2Q FY90 for the 90% GOS requirement. Of the quantity of 48 units to be fielded, five of the twenty-six division signal bns, four of the twenty corps signal bns, and the two training sets have been fielded to date. The MSE system is expected to satisfy the mission requirement.

b. Significant Developments Since Last Report -- None

c. Changes Since 'As Of Date' -- None

b. Threshold Breaches: There are currently no breaches to the AAE Baseline, dated 26 Feb 90.

9. Schedule:

a. Milestones --	Production Estimate	Approved Program	Current Estimate
Program Initiated	Aug 82	Aug 82	Aug 82
Issue Request for Proposal	Jul 84	Jul 84	Jul 84
Type Classification (Std) Approved	Nov 85	Nov 85	Nov 85
Contract Award Basic Year	Dec 85	Dec 85	Dec 85
Contract Award Option Year 1	Dec 85	Dec 85	Dec 85
Contract Award Option Year 2	Feb 87	Feb 87	Feb 87
First Article Test (Start)	Jul 87	Jul 87	Jul 87
First Article Test (Complete)	Jan 88	Jan 88	Jan 88
First Production Delivery (On-Site)	Apr 88	Feb 88	Feb 88
First Delivered Unit Basic Year	Apr 88	Feb 88	Feb 88
Destination Final Acceptance (Start)	Feb 88	Feb 88	Feb 88
Destination Final Acceptance (Complete)	Apr 88	Apr 88	Apr 88
First Unit Equipped	May 88	May 88	May 88
User Follow-On Test & Eval (Start)	May 88	Aug 88	Aug 88
User Follow-On Test & Eval (Complete)	Sep 88	Oct 88	Oct 88
Contract Award Option Year 3	Sep 88	Dec 88	Dec 88
First Delivered Unit Option Year 1	Sep 88	Dec 88	Dec 88(Ch-1)
Contract Award Option Year 4	Mar 89	Mar 89	Mar 89
First Delivered Unit Option Year 2	Mar 89	Jun 89	Jun 89(Ch-1)
Field Verification of 90% GOS (Start)	N/A	Jan 90	Jan 90
Field Verification of 90% GOS (Complete)	N/A	Feb 90	Feb 90
Operational Evaluation of Call Completion	N/A	Mar 90	Mar 90
Contract Award Option Year 5	Mar 90	Mar 90	Mar 90
First Delivered Unit Option Year 3	Mar 90	Mar 90	Mar 90
Contract Award Option Year 6	Mar 91	N/A	N/A (Ch-2)
Last Delivered Unit Option Year 2	N/A	Jul 90	Jul 90(Ch-3)
Last Delivered Unit Option Year 3	N/A	Jul 91	Jul 91(Ch-3)
First Delivered Unit Option Year 4	Aug 91	Aug 91	Aug 91
First Delivered Unit Option Year 5	Sep 92	Sep 92	Sep 92
Last Delivered Unit Option Year 4	N/A	Oct 92	Oct 92(Ch-3)
Last Delivered Unit Option Year 5	N/A	Oct 93	Oct 93(Ch-3)
First Delivered Unit Option Year 6	TBD	N/A	N/A (Ch-2)
Last Unit Fielding Completed	N/A	Dec 93	Dec 93(Ch-1)

b. Previous Change Explanations --

First Unit Equipped date is May 88, the date that the system handoff took place. The FOTE delay was due to the additional time required for enhanced training and to correct software deficiencies in order to have an effective test. Added milestones to reflect the milestones in the AAE approved Program Baseline, dated 26 Feb 90.

Schedule (Cont'd):

c. Current Change Explanations --

(Ch-1) Current Estimate was changed to reflect current AAE Baseline, dated 26 Feb 90.

(Ch-2) Contract Award Option Year 6 and First Delivered Unit Option Year 6 milestones will be deleted. The Option will not be exercised due to funding reductions.

(Ch-3) Added milestone dates to reflect current AAE Baseline, 26 Feb 90.

d. References --
Production Estimate: MSE Operational Capabilities Document (MSEOCD), 24 May 84 and MSE Program Baseline document dated Jul 87.
Approved Program: AAE Baseline approved 26 Feb 90.

10. Technical/Operational Characteristics:

	Pdn Est	Approved Program Goal/Threshold	Demonstrated 1/ Perf	Cur Est
a. Technical --				
MSE Switching Equipment				
Node Center Switch				
Max # of Local Subscribers	24	N/A/N/A	24	24
# of Digital Transmission Groups	16	N/A/N/A	16	16
Operating Temp (F) 2/	-40 to 120	N/A/N/A N/A/N/A	-40 to 120	-40 to 120
Subscriber Switchboard Capacity				
Large Extension Switch				
Max # of Local Subscribers	176	176/150	176	176
# of Digital Transmission Groups	8	N/A/N/A	8	8
Operating Temp (F) 2/	-40 to 120	N/A/N/A N/A/N/A	-40 to 120 3/	-40 to 120
Small Extension Switch (V1)				
Max # of Local Subscribers	N/A	26/19	26	26
# of Digital Transmission Groups	1	N/A/N/A	1	1
Operating Temp (F) 2/	-40 to 120	N/A/N/A N/A/N/A	-40 to 120	-40 to 120

1/ Update reflects the approved Program Baseline Document.
2/ Ambient Temperature External to the Assemblage.
3/ Demonstrated by analysis as equivalent to Node Center Switch.

Technical/Operational Characteristics (Cont'd):

	Pdn Est	Approved Program Goal/Threshold	Demonstrated Perf	Cur Est
a. Technical (Cont'd) --				
Small Extension Switch (V2)				
Max # of Local Subscribers	41	41/30	41	41
# of Digital Transmission Groups	1	N/A/N/A	1	1
Operating Temp (F) 2/	-40 to 120	N/A/N/A N/A/N/A	-40 to 120	-40 to 120
Mobile Subscriber Affiliation Capacity (Per Radio Access Unit)	N/A	50/40	50	50
MSE Radio Equipment				
UHF Frequency (Mhz)				
Band I	225-400	225-400/ 225-400	225-400	225-400
Band III	1350-1850	1350-1850/ 1350-1850	1350-1850	1350 1850
Output Power (Watts)				
Band I	10	N/A/N/A	10	10
Band III	5	N/A/N/A	5 1/	5
Data Rates (Kbps)	256,512,1024	N/A/N/A	256,512, 1024	256,512 1024
Operating Temp (F) 2/	-40 to 120	N/A/N/A	-40 to 120	-40 to 120
VHF Frequency (Mhz)	30-88	30-88/ 30-88	30-88	30-88
Output Power (Watts)	14-18	N/A/N/A	14-18	14-18
Data Rates (Kbps)	16	N/A/N/A	16	16
Operating Temp (F)	-40 to 120	-40 to 120 -35 to 110	-40 to 120	-40to 120
b. Operational --				
Set-up (Min)	30	30/45	30	30
Tear Down (Min)	30	30/45	<45	<45
Max Vehicle Curb Weight(lbs)	8660	N/A/N/A	8800	8800
Max MSE Radio Operating Ranges (Km):				
VHF	15	N/A/N/A	15	15
UHF	40	N/A/N/A	40	40
Grade of Service (20% Off-Hook Factor)	N/A	90%/90%	3/	90%

1/ Portion of initial quantity below 5 watts. Design fix is being developed.
Ambient Temperature External to the Assemblage.
To be demonstrated in Mar 90.

10. Technical/Operational Characteristics (Cont'd):

c. Previous Changes Explanations --
Separated Set-up and Tear Down in separate lines and added the actual demo performance. Max vehicle curb weight from 8600 to 8660 due to typo errors.

d. Current Change Explanations -- NONE

e. References --

Production Estimate: MSE System Specification, dated 8 Jul 85.
Approved Program: AAE Baseline approved 26 Feb 90.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost--	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	-	-	-
Procurement	$4,428.5	$3,548.4	$3,548.4
Subscriber Terminals	(157.4)	(120.9)	(120.9)
Mobile Subscriber Access	(548.2)	(387.3)	(387.3)
Wire Subscriber Access	(1,198.2)	(917.4)	(917.4)
Area Coverage	(1,587.4)	(1,228.1)	(1,228.1)
System Control Center	(116.4)	(89.6)	(89.6)
Initial Spare Parts	(160.4)	(117.0)	(117.0)
Warranty	(166.3)	(128.3)	(128.3)
Contractor Fielding	(166.3)	(129.5)	(129.5)
Other Weapon Sys. Cost	(327.9)	(430.3)	(430.3)
Construction (MILCON)	-	-	-
Total FY86 Base-Year $	$4,428.5	$3,548.4	$3,548.4
Escalation --	705.5	760.8	760.8
Development (RDT&E)	-	-	-
Procurement	(705.5)	(760.8)	(760.8)
Construction (MILCON)	-	-	-
TOTAL Then-Year $	$5,134.0	$4,309.2	$4,309.2
b. Quantities --			
Development (RDT&E)	-	-	-
Procurement	48	48	48
Total	48	48	48

1/ The quantity of 48 units identified above represents twenty-six division signal battalions, twenty corps signal battalions and two training sets for a total of $4,309.2M. All user equipment located in the division/ corps areas has been included in the total program acquisition cost.

Program Acquisition Cost (Cont'd)

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Production Estimate: MSE Basic Contract dated 19 Dec 85.

Approved Program: AAE Baseline approved 26 Feb 90.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

		Current Est	Current Year UCB Baseline	Budget Year UCR Baseline
a.	Program Acquisition	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
	(1) Cost	$4,309.2	$4,643.5	$4,309.2
	(2) Quantity	48	50	48
	(3) Unit Cost	89.8	92.9	89.8
b.	Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
	(1) Cost	934.7	934.7	29.2
	Less CY Adv Proc	N/A	N/A	N/A
	Plus PY Adv Proc	N/A	N/A	N/A
	Net Total	934.7	934.7	29.2
	(2) Quantity	11	11	0
	(3) Unit Cost	84.97	84.97	0

Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	-	$5,134.0	-	$5,134.0
Previous Changes:				
Economic	-	-37.3	-	-37.3
Quantity	-	+83.0	-	+83.0
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-813.2	-	-813.2
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-767.5	-	-767.5
Current Changes:	-		-	
Economic	-	+258.9	-	+258.9
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-316.2	-	-316.2
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-57.3	-	-57.3
Total Changes	-	-824.8	-	-824.8
Current Estimate	-	$4,309.2	-	$4,309.2

Cost Variance Analysis: (Cont'd)
(FY 1986 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	-	$4,428.5	-	$4,428.5
Previous Changes:				
Economic	-	-	-	-
Quantity	-	+69.3	-	+69.3
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-691.5	-	-691.5
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-622.2	-	-622.2
Current Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-257.9	-	-257.9
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-257.9	-	-257.9
Total Changes	-	-880.1	-	-880.1
Current Estimate	-	$3,548.4	-	$3,548.4

b. Previous Change Explanations --

Economic: Revised indices.

Quantity: Addition and reduction of units.

Estimating: Change due to revision of force structure requirements and reprogramming action.

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
Revised escalation rates.(Economic)	N/A	+258.9
	-257.9	-316.2
FY90 Program decrement.	(-38.7)	(-50.0)
FY91 Program decrement.	(-29.4)	(-39.4)
FY92 and FY93 plus-up.	(+22.8)	(+32.1)
Error in estimating (Estimating).	(-212.6)	(-258.9)

. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Yr llars)

a. Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Current Estimate)
	Eco	Qty	Sched	Eng	Est	Other	Spt	Total	
107.0	4.6	1.7	-	-	-23.5	-	-	-17.2	89.8

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E -- N/A

b. Procurement

Basic Contract:	Initial Contract Price Target	Ceiling	Qty
GTE Corp., Taunton, MA DAAB07-86-C-K022, FFP, Award: 19 Dec 85 Definitized: 19 Dec 85	N/A	$4,145.7	48

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Prog. Manager
N/A	$4,127.6	48	$4,127.6	$4,127.6

Requirements Contract (IKs Only):	Target	Ceiling	Qty
GTE Corp., Taunton, MA DAAB07-86-C-K023, FFP, (D.O. Base) Award: 19 Dec 85 Definitized: 19 Dec 85	N/A	$40.9	9,416

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Prog. Manager
N/A	$42.1	10,007	$42.1	$42.1

NOTE: For FFP Contracts, cost and schedule variance information is not required.

. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 66.7% (6 yrs/9 yrs)

(2) Percent Program Cost Appropriated: 98.6% ($4247.9/$4309.2)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Prior Years (FY85-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-93)	Total
RDT&E	-	-	-	-	-
Procurement	$3,313.2	$934.7	$ 29.2	$ 32.1	$4,309.2
MILCON	-	-	-	-	-
Total	$3,313.2	$934.7	$ 29.2	$ 32.1	$4,309.2

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY86 Dollars Nonrec 1/	Flyaway FY86 Dollars Recur	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: RDT&E - N/A								
Appropriation: Procurement								
1985	1		56.8	57.6	63.3	63.3	63.3	3.4
1986	1		285.2	296.6	335.3	335.3	335.3	2.8
1987	11		748.6	776.0	903.7	903.7	647.9	2.7
1988	12		820.8	850.2	1019.8	1007.7	176.4	3.0
1989	12		767.3	798.5	991.1	950.0	9.5	4.2
1990	11		692.1	724.8	934.7			4.0
1991	0		21.9	21.9	29.2			4.2
1992	0		11.5	11.5	15.9			4.0
1993	0		11.3	11.3	16.2			3.7
Total	48		3415.5	3548.4	4309.2	3260.0	1232.4	
Appropriation: MILCON - N/A								

1/ Nonrecurring costs are not separately identified.

. Production Rate Data: Because this program will purchase a varying number of Subscriber Terminals, Mobile Subscriber Access, Wire Subscriber Access, Area Coverage and System Control Units in a given year, it would not be appropriate to report production rates.

18. Operating and Support Costs:

a. Assumptions and Ground Rules --

The MSE system will be utilized in a peacetime mode for 8.2 hours per day, 7 days per week with an annual operating time of 2,996.4 hours. The costs are the direct/indirect costs to support the primary personnel and to operate the system. The cost of military personnel and indirect support operations were estimated from Tables of Organization and Equipment (TOEs) developed for the MSE system. Costs applied for the military personnel were from the composite standard rates for costing military personnel services. For the nonstandard Communications-Electronics (C-E) equipment, the summary costs for replenishment spares were calculated by the Optimum Supply and Maintenance Model (OSAMM) using MTBF, washout rates and estimated qualitative data from the Contractor together with weighted average unit prices developed from fixed range prices in the contract. For standard C-E equipment, estimates were developed through OSAMM using liability data furnished by the contractor and unit price data from COM. The non C-E equipment costs for vehicles, generators and trailers re developed from historical data furnished by TACOM and TROSCOM. The non C-E maintenance action costs were furnished by the contractor and the C-E maintenance action costs were obtained from the CECOM Directorate of Maintenance Engineering (DME). The petroleum, oil and lubricants (POL) cost is based on the number and type of vehicles and generators, the operating scenario (4,243 miles driven per year for active forces and 419 miles driven per year for the reserve forces), fuel economy and cost factors for gas and oil. All the O & S costs were based on a life cycle of 17.5 years of deployment. The 17.5 year deployment is comprised of 15 years of a fully deployed MSE system plus an additional 2.5 years to account for the 6 years of a partially deployed MSE system.

Reference -- Sep 89 Baseline Cost Estimate (BCE).

[redacted]. Operating and Support Costs (Cont'd):

b. Costs -- (FY86 Constant (Base-Year) Dollars in Millions)

Cost Element	Average Annual Cost Per MSE System 1/
Personnel	11.4
Replenishment Spares	1.1
Depot Maintenance	1.1
POL	0.2
TOTAL	13.8

c. Contractor Support Costs -- (Then-Year Dollars in Millions)

	FY90 2/ & Prior	FY91 Year	FY92 Year	Balance to Complete	Total
O&M	45.4	45.3	0.0	0.0	90.7

[redacted]

1/ The Average Annual O&S cost per MSE system is based on a quantity of 48 units which represents twenty-six division signal bns, twenty corps signal bns and two training sets. All user equipment located in the division/corps areas has been included in the total program acquisition cost.

2/ Includes FY88, FY89, and FY90.

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: SSN 21

1-36 SSN 21

AS OF DATE: December 31, 1989

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1. ~~(U)~~ Designation and Nomenclature (Popular Name): High Speed Nuclear Attack Submarine/SSN 21 Class

2. ~~(U)~~ DoD Component: NAVY

~~(U)~~ Responsible Office and Telephone Number:
SSN 21 Program Office
PMS350
RADM M.S. Firebaugh
Assigned: January 1,1984
COMM 703-602-7200-1

4. ~~(U)~~ Program Elements/Procurement Line Items:
RDT&E:
PE 0603570N Project S1914
PE 0604561N Project S1946
PE 0604567N Project S1803
PROCUREMENT:
APPN 1611 ICN 0204281N (Navy)
MILCON:
PE 0204896N
PE 0804731N
PE 0204796N
PE 0702096N

90-C-0667

(b)(1)

~~Multiple Sources~~
~~Not Subject to Automatic Downgrade~~
~~Originating Agency Determination Required (OADR)~~

AS AMENDED

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~~Classified By~~ M Link Sones ~~(THIS PAGE IS UNCLASSIFIED)~~
~~Declassify On~~ OADR

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OASD(PA) DFOISR 90 -T- 0691/7

5. (U) Related Programs: PE 63560N, Project S0222 Submarine Hull Array Development (Adv)
PE 63569N, Project S1974 Adv Sub Tech
PE 64502N, Project S0742 Submarine Integrated Antenna System
PE 64502N, Project S1411 Submarine Tactical Communication System
PE 64520N, Project S0198 Submarine Hull Array Development (Eng)
PE 64524N, Project S1941 AN/BSY-2

6. (U) Mission and Description: The SSN 21 Class Attack Submarine will be quiet, fast, heavily armed, shock resistant, survivable, outfitted with an advanced combat system and capable of contending with the projected enemy threat well into the 21st century. The program provides the advanced technology prototype components and systems to design and construct the SSN 21 Class attack submarine so that the Navy will be better able to aggressively seek out and destroy enemy submarines and surface ships across a broad spectrum of tactical and climatic scenarios. The SSN21 is expected to satisfy the mission requirement.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- The SSN 21 Class submarine program began July 1982 with the establishment of GROUP TANGO to assess the need for an advanced technology submarine. In December 1982, CNO directed NAVSEA to proceed with feasibility studies. SECNAV approved the conceptual design of the SSN 21 in June 1983, and a new start was authorized by a Program Decision Memorandum in August 1983. In December 1983, SECNAV and SECDEF approved proceeding with preliminary design. Preliminary design contracts subsequently were awarded to Electric Boat and Newport News.

In June 1984, a Secretary of Defense Decision Memorandum, documenting the decisions of the December 1983 SECDEF Program Review, authorized the Navy to proceed with the preliminary design phase for the lead ship of the SSN 21 Class. A Logistics Review Group Audit was conducted in December 1984. The preliminary design phase for the SSN 21 Class attack submarine was completed in May 1985. The SSN 21 program went before the DSARC for Milestone II on 28 June 1985. The NPDM and JRMB were held in July 1986 and authorization to proceed with detail design of the SSN 21 was granted by OSD on 2 October 1986. Contract design contracts with both Tenneco-Newport News Shipbuilding and Drydock Subsidiary (NNS) and General Dynamics - Electric Boat Division (EB) were completed in 1986. A detail design contract with NNS as lead design yard was signed in April 1987. The Defense Acquisition Board (DAB) granted approval for lead ship production on June 30, 1988. The Acquisition Decision Memorandum (ADM) was signed on August 16, 1988.

b. (U) Significant Developments Since Last Report -- DT-II (Development Test II) is presently underway and will continue through FY93. Major programmatic efforts include Silencing, Target Strength Reduction, Propulsors, Advanced Ship Control, Weapons Stowage and Launch, and

(U) Program Highlights (Cont'd):

Submarine Survivability. DT-III is scheduled for FY94-95. OT-III (Operational Test-III) and OT-IV are scheduled for FY96/FY97. The lead ship of the class was awarded January 9, 1989 to Electric Boat Division of General Dynamics. This SAR reflects the current approved program and a base year in FY1988 constant dollars.

c. (U) Changes Since As Of Date -- OT-III (Operational Test-III) and OT-IV are now scheduled for FY96-97 vice FY95-96.

8. (U) Threshold Breaches: There are currently no DAE Baseline threshold breaches.
(30 June 1989)

9. (U) Schedule: SEE ATTACHED FOR OTHER Milestones

a. (U) Milestones --

Milestones	Production Estimate	Approved Program	Current Estimate
	FY94	FY94	FY95 (CH-1)
First HY-130 HULL Program Initiated	JUL 82	JUL 82	JUL 82
FSD Contract Award	JUL 85	JUL 85	JUL 85
First Production Contract Award	JAN 89	JAN 89	JAN 89
DAB Review	MAR 90	MAR 90	MAR 90
Delivery (First Ship)	MAY 95	MAY 95	MAY 95

b. (U) Previous Change Explanations -- None.

c. (U) Current Change Explanations -- (CH-1) - Due to large lot procurement strategy, the first HY-130 hull will be the first ship in FY 95 in lieu of FY 94.

d. (U) References --

Production Estimate: DCP, "SEAWOLF (SSN 21) CLASS SUBMARINE," dated May 11, 1988.

Approved Program: DAE Baseline approved 30 June 1989.

10. (U) Technical/Operational Characteristics:

a. (U) Technical --	Prod Est	Approved Program Goal/Threshold		Demon-strated Perf	Current Estimate
Submarine					
Length (ft)	353	353	N/A	N/A	353
Beam Max (ft)	40	40	N/A	N/A	40
Max Draft(ft)	34	36	N/A	N/A	34

This is a continuation page due to an error in the CARS Program.

9. (U) Schedule:

a. (U) Milestones --

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	Production Estimate	Approved Program	Current Estimate
Milestone I	DEC 83	DEC 83	DEC 83
Milestone II	JUN 85	JUN 85	JUN 85
Milestone IIB	OCT 86	OCT 86	OCT 86
Milestone III	JUN 88	JUN 88	JUN 88
Milestone IOC	MAY 95	MAY 95	MAY 95

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10. (C) Technical/Operational Characteristics (Cont'd):

a.(C)Technical --	Prod Est	Approved Program Goal/Threshold		Demon-strated Perf	Current Estimate
Displacement (tons)	9150	9100	N/A	N/A	9150
Oper. Depth (ft)	(b)(1)				
Propulsion					
Type	S6W		N/A	N/A	S6W
SHP	(b)(1)				
Crew					
Total Billets	134	134	N/A	N/A	134
Underway	108	108	N/A	N/A	108
Combat Systems	25	25	N/A	N/A	25
ESM	4	4	N/A	N/A	4
AN/BSY-2 Combat System					
Mean Time Between Failure (MTBF) (hrs)	(b)(1)				
Mean Time to Repair (MTTR) (min)					
Operational Availiability (Ao)					
Weapons					
Simultaneous					
Wire Guide					
External Communications System (ECS)	(b)(1)				
MTBF (hrs)					
MTTR (hrs)					
Ao					
Electronic Warfare Support Measures(ESM)					
MTBF (hrs)					
MTTR (hrs)					
Ao					
Performance Monitoring (Combat System, ESM, ECS) Probability of Detecting Faults					
Maximum Detection Time at 95%ile (min)					
Mean Time Between False Alarms (hrs)					
Fault Location False					
False Location of Faults					

10. (U) Technical/Operational Characteristics (Cont'd):

b.(U)Operational --	Prod Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
Max Speed (kts)	(b)(1)			
Endurance				
Fuel				
Stores (days)				
Armament				
Torpedo tubes				
Reloads				
Weapons Handling				
Maximum Launch				
Speed (kts)				
Reload Time (min)				
Minimum Launch Interval				
Same Bank (sec)				
Alternate Bank (sec)				
Ship Control				
Bow Plane Extension/ Operation (kts)				
Bow Plane Retraction				
Arctic Operations				
(b)(1)				
Surface Through Ice	(b)(1)			
Routine (ft)				
Emergency (ft)				

c.(U)Previous Change Explanations -- None.

d.(U)Current Change Explanations --

Note: Mean Time Between False Alarms and False Location of Faults does not apply to Combat System.

e.(U)References --

Production Estimate: DCP, "SEAWOLF (SSN 21) CLASS SUBMARINE," dated May 11, 1988.

Approved Program: DAE Baseline approved 30 June 1989.

11. ( ) Program Acquisition Cost (Current Estimate in Millions of Dollars)

a.( )Cost --	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	2357.6	2357.3	2332.1
Procurement	13580.9	14404.4	10693.2
Basic Ship Cost	(7459.3)	(8459.8)	(5899.5)
GFE	(5493.0)	(5340.8)	(4364.1)
Other	(102.4)	(100.4)	(67.5)
OF/PD	(526.2)	(503.4)	(362.1)
Total Sailaway	(13580.9)	(14404.4)	(10693.2)
Other Wpn Sys Cost	(0.0)	(0.0)	(0.0)
Peculiar Support	(0.0)	(0.0)	(0.0)
Initial Spares	(0.0)	(0.0)	(0.0)
Construction	91.0	91.0	62.3
Ops. and Maint. (O&M)	0.0	0.0	0.0
Total FY 88 Base-Year $	16029.5	16852.7	13087.6
Escalation	2853.8	3026.9	2889.6
Development (RDT&E)	(89.5)	(89.5)	(114.8)
Procurement	(2747.6)	(2920.7)	(2759.4)
Construction (MILCON)	(16.7)	(16.7)	(15.4)
Ops. and Maint. (O&M)	(0.0)	(0.0)	(0.0)
Total Then-Year $	18883.3	19879.6 **	15977.2 *
b.( )Quantities --			
Development (RDT&E)	0	0	0
Procurement	12	12	9
Construction (MILCON)	0	0	0
Ops. and Maint. (O&M)	0	0	0
Total	12	12	9

Paragraph 11 Comments:

Note: * Figures exclude $2382.5M Advance Procurement of ships beyond FY94.
** Due to a misapplication of inflation indices, the amounts budgeted for this program are overstated as follows:
FY89 +45.0M

c.( )Foreign Military Sales -- None.

d.( )Nuclear Costs -- Not Available

e.( )References --

Production Estimate: FY1990/91 President's Budget.

Approved Program: DAE BASELINE 30 JUNE 1989

12. [redacted] Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. [redacted] Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1) Cost	15977.2	18883.3	15977.2
(2) Quantity	9.0	12.0	9.0
(3) Unit Cost	1775.24	1573.61	1775.24
b. [redacted] Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	0.0	0.0	3008.4
Less CY Adv Proc	0.0	0.0	665.5
Plus PY Adv Proc	606.3	606.3	1139.1
Net Total	606.3	606.3	3482.0
(2) Quantity	0.0	0.0	2.0
(3) Unit Cost	-	-	1741.00

13. (U) Cost Variance Analysis:

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	2447.1	16328.5	107.7	18883.3
Previous Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-0.3	+1048.0	-	+1047.7
Other	-	-	-	-
Support	-	-29.4	-	-29.4
Subtotal	-0.3	+1018.6	-	+1018.3
Current Changes:				
Economic	+29.5	+1024.2	+5.3	+1059.0
Quantity	-	-4373.9	-	-4373.9
Schedule	-	-211.9	-	-211.9
Engineering	-	-	-	-
Estimating	-29.4	-127.7	-35.3	-192.4
Other	-	-	-	-
Support	-	-205.2	-	-205.2
Subtotal	+0.1	-3894.5	-30.0	-3924.4
Total Changes	-0.2	-2875.9	-30.0	-2906.1
Current Estimate	2446.9	13452.6	77.7	15977.2

13. (U) Cost Variance Analysis (Cont'd):

(FY 1988 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	2357.6	13580.9	91.0	16029.5
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-0.3	+865.8	-	+865.5
Other	-	-	-	-
Support	-	-22.8	-	-22.8
Subtotal	-0.3	+843.0	-	+842.7
Current Changes:				
Quantity	-	-3250.3	-	-3250.3
Schedule	-	-232.3	-	-232.3
Engineering	-	-	-	-
Estimating	-25.2	-106.9	-28.7	-160.8
Other	-	-	-	-
Support	-	-141.2	-	-141.2
Subtotal	-25.2	-3730.7	-28.7	-3784.6
Total Changes	-25.5	-2887.7	-28.7	-2941.9
Current Estimate	2332.1	10693.2	62.3	13087.6

b. (U) Previous Change Explanations --

RDT&E
  Estimating: Revised Program Requirements

PROCUREMENT
  Estimating: Refinement of Estimates to Reflect later Contract/Pricing Data

  Impact of misapplication of Inflation

  Support: Revised Outfitting/Post Delivery Requirements

MILCON

O & M

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Indices (Economic)	N/A	+29.5
Refined Cost Estimates (Estimating)	-25.2	-29.4
(2) PROCUREMENT		
Revised Indices (Economic)	N/A	+1024.2
Deletion of 3 Hulls in FY94 as a result of large lot procurement (Quantity)	-3672.8	-4809.8
3 Hulls in FY92 TO FY93 (Schedule)	-232.9	-211.9
Refined Program Requirements and large lot procurement savings (Estimating)	-106.9	-127.7
Refined Outfitting/Post Delivery Requirements (Support)	-141.2	-205.2
(3) MILCON		
Revised Indices (Economic)	N/A	+5.3
Refined Program Costs/ Requirements (Estimating)	-28.7	-35.3
(4) O & M		

14. (U) Program Acquisition Unit Cost (PAUC) History: (Then-Year Dollars in Millions)

a. (U) Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC (Prod Est)
3875	-24	-2406	--	--	+76	--	+52	-2301	1574

b. (U) Current Baseline Estimate to Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1574	+117.7	+38.56	-23.54	--	+95.03	--	-26.07	+201.6	1775

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E

Imprvd. Performance:
General Dynamics/EB Div.
Groton, CT
N00024-83-C-4181, CPFF
Award: January 10, 1983
Definitized: January 10, 1983

Initial Contract Price		
Target	Ceiling	Qty
$24.1	N/A	N/A

Current Contract Price		
Target	Ceiling	Qty
$234.0	N/A	N/A

Estimated Price At Completion	
Contractor	Program Manager
$234.0	$234.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances*	N/A	N/A
Cumulative Variances To Date	N/A	N/A
Net Change	N/A	N/A

* Cost and schedule variances not applicable because the Department of the Navy has not required CPR or C/SSR data on this contract. The IPMP Phase III competitive requirement invokes the C/SCSC requirement.

[redacted] [redacted]

SSN 21, December 31, 1989

15. (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

b. (U) Procurement

SSN 21 Lead Ship:	Initial Contract Price Target	Ceiling	Qty
Electric Boat Div of GD Groton, CT N00024-89-C-2000, FPIF Award: January 9, 1989 Definitized: January 9, 1989	$726.0	$928.7	1.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$726.0	$928.7	1.0	$726.0	$726.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances*	$0.0	$0.0
Cumulative Variances To Date	$0.0	$0.0
Net Change	$0.0	$0.0

*CS2 data is not yet available. Physical progress on this contract is approximately 2%.

SSN 21 Nuclear Comp.:	Initial Contract Price Target	Ceiling	Qty
General Electric Corp. Schenectady, NY N00024-87-C-4001, CPFF Award: November 7, 1986 Initized: November 7, 1986	$88.0	N/A	N/A

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$203.9	N/A	N/A	$310.0	$310.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances*	N/A	N/A
Cumulative Variances To Date	N/A	N/A
Net Change	N/A	N/A

*Cost and schedule variances not applicable because the Department of the Navy has waived implementation of DOD Instruction 7000.2 for Naval Nuclear Propulsion Program procurements.

[redacted]

[redacted]

15. [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

SSN 21 Nuclear Comp.:
Westinghouse Electric
Wilkins Township, PA
N00024-87-C-4000, CPFF
Award: November 7, 1986
Definitized: November 7, 1986

Initial Contract Price		
Target	Ceiling	Qty
$70.2	N/A	N/A

Current Contract Price		
Target	Ceiling	Qty
$156.7	N/A	N/A

Estimated Price At Completion	
Contractor	Program Manager
$350.0	$350.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances*	N/A	N/A
Cumulative Variances To Date	N/A	N/A
Net Change	N/A	N/A

* Cost and schedule variances not applicable because the Department of the Navy has waived implementation of DOD Instruction 7000.2 for Naval Nuclear Propulsion Program procurements.

SSN Detail Design:
Newport News Shipbuilding
Newport News, VA
N00024-87-C-2046, CPFF
Award: April 30, 1987
Definitized: April 30, 1987

Initial Contract Price		
Target	Ceiling	Qty
$333.0	N/A	N/A

Current Contract Price		
Target	Ceiling	Qty
$375.8	N/A	N/A

Estimated Price At Completion	
Contractor	Program Manager
$549.9	$555.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-51.1	$-32.5
Cumulative Variances To Date*	$-86.2	$-7.5
Net Change	$-35.1	$25.0

*From latest Cost Performance Report covering period through Dec 1989. The original parametric cost estimate of the SSN21 Lead Ship design has proven unrealistic. Independent Cost Estimates by both the contractor and Program Manager indicate that the eventual cost of this design will be approximately $555M. This figure includes all anticipated costs of the lead design effort, including estimtes of future changes and negotiated fees.

15. (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

Engine Room Design:	Initial Contract Price Target	Ceiling	Qty
Elec.Boat Div.,Gen.Dynam. Groton, CT N00024-87-C-4086, CPFF Award: March 12, 1987 Definitized: March 12, 1987	$44.7	N/A	N/A

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$232.2	N/A	N/A	$232.2	$232.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances*	N/A	N/A
Cumulative Variances To Date	N/A	N/A
Net Change	N/A	N/A

*Cost and schedule variances not applicable because the Department of the Navy has waived implementation of DOD Instruction 7000.2 for Naval Nuclear Propulsion Program procurements.

16. (U) Program Funding Summary:

a. (U) Program Status --

(1) Percent Program Completed: 43.8% (7 yrs/16 yrs)

(2) Percent Program Cost Appropriated: 29.2% ($4666.9 / $15977.2)

b. (U) APPROPRIATION SUMMARY

(Then-Year Dollars in Millions)

APPROPRIATION	PRIOR YEARS (84-89)	BUDGET YEAR (FY90)	BUDGET YEAR (FY91)	TO COMPLETE	TOTAL
RDT&E	1529.7	210.6	216.0	490.6	2446.9
PROCUREMENT	2320.3	606.3	3482.0	7044.0	13452.6
MILCON	----	----	27.3	50.4	77.7
TOTAL	3850.0	816.9	3725.3	7585.0	15977.2

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY88 Dollars Nonrec	Flyaway FY88 Dollars Rec	Total Base Year$	Total Then-Year $ Program	Obligated	Expended	Escl Rate (%)
Appropriation: 1319 Research, Development, Test & Eval, Navy								
1984			120.5	120.5	109.2	109.2	109.2	3.8
1985			279.9	279.9	261.5	261.5	260.1	3.4
1986			382.4	382.4	367.5	367.5	366.2	2.8
1987			307.2	307.2	304.0	304.0	295.4	2.7
1988			251.0	251.0	256.8	256.8	245.8	3.0
1989			216.6	216.6	230.7	227.9	131.2	4.2
1990			190.0	190.0	210.6	94.1	27.3	4.0
1991			187.2	187.2	216.0			4.2
1992			161.4	161.4	193.4			4.0
1993			124.2	124.2	154.1			3.7
1994			111.7	111.7	143.1			3.4
Subtot	0		2332.1	2332.1	2446.9	1621.0	1435.2	
Appropriation: 1611 Shipbuilding and Conversion, Navy								
1987			353.4	353.4	375.0	375.0	233.7	1.5
1988			232.0	232.0	257.6	257.6	174.3	2.5
1989	1		1464.3	1464.3	1687.7	1443.0	128.5	2.8
1990			507.3	507.3	606.3	252.6	11.2	4.0
1991	2		2814.4	2814.4	3482.0			4.2

c.([redacted])Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY88 Dollars Nonrec	Flyaway FY88 Dollars Rec	Total Base Year$	Total Then-Year $ Program	Obli-gated	Ex-pended	Escl Rate (%)
Appropriation: 1611 Shipbuilding and Conversion, Navy (Cont'd)								
1992			458.6	458.6	586.4			4.0
1993	6		4512.7	4512.7	5952.7			3.7
1994			35.4	35.4	48.0			3.4
1995			105.5	105.5	147.9			3.1
1996			103.3	103.3	149.4			3.1
1997			83.7	83.7	124.8			3.1
1998			19.4	19.4	29.8			3.1
1999			3.2	3.2	5.0			3.1
ubtot	9		10693.2	10693.2	13452.6	2328.2	547.7	
Appropriation: 1205 Military Construction, Navy								
1991				22.9	27.3			4.2
1992				19.6	24.3			4.0
1993								3.7
1994				19.8	26.1			3.4
Subtot	0			62.3	77.7			
Total	9		13025.3	13087.6	15977.2	3949.2	1982.9	

17. ([redacted]) Production Rate Data: None.

a.([redacted])Annualized Production Rates -- None.

17. (U) Production Rate Data (Cont'd)

b.(U)Cost Variance -- None.

c.(U)Schedule Variance -- None.

d.(U)Deliveries (Plan/Actual) -- None.

e.(U)Approved Design-to-Cost Goal -- None.

18. (U) Operating and Support Costs:

a.(U)Assumptions and Ground Rules --

The O&S cost driving characteristics for the SEAWOLF Class are that each ship has a 30 year service life, displaces 9150 tons, has a crew of 134 officers/enlisted and a maintenance cycle which has 1 refueling overhaul (18 months) at midlife and 8 SRAS (2 months each). There are 32-33 months between depot level availabilities. (The source for this information is the CAIG - Cost Analysis Improvement Group dated 6 May 1988.)

b.(U)Costs -- (FY 1985 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per SHIP	Avg Annual Cost Per (Antecedent)
Personnel	3.1	0.0
O&S Consumables	2.0	0.0
Direct Depot Maintenance	13.1	0.0
Other Direct Costs	8.0	0.0
Indirect Costs	5.0	0.0
Total	31.2	0.0

c.(U)Contractor Support Costs -- None.

Paragraph 18 Comments:
The SEAWOLF program has no O&MN or Industrial Fund contractor support costs.

N-40 T-AO FLEET OILER

SAR-89-048

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(QSA)823)
PROGRAM: T-AO 187 CLASS FLEET OILER

AS OF DATE: December 31, 1989

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CLEARED
For Open Publication
MAR 22 1990
Office of Security Review
Department of Defense

1. **Designation/Nomenclature (Popular Name):** T-AO 187 CLASS FLEET OILER

2. **DOD Component:** U.S. Navy (NAVSEA)

3. **Responsible Office and Telephone Number:**

Auxiliary/Special Mission Ship
Acquisition Project Office (PMS383)
Department of the Navy (NAVSEA)
Washington D.C. 20362-5101

PM: CAPT J. M. Todd
Assigned: 10/01/89
Autovon: 332-3507
Commercial: (703) 602-3507

4. **Program Elements:**

RDT&E: PE: 0603564N Proj: 0408 (Shared)
PE: 0604567N Proj: 1803 (Shared)

Procurement (SCN): PE: 24441N, APPN 1611, ICN 5025

5. **Related Programs:** AOE 6 Class

90-C-067
No Security Objection
to Open Publication
(AMENDED)
MAR 22 1990
Office of Security Review
Department of Defense

N-40 T-AO FLEET OILER

~~UNCLASSIFIED~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: T-AO 187 CLASS FLEET OILER

AS OF DATE: December 31, 1989

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PE: 0604567N Proj: 1803 (Shared)

Procurement (SCN): PE: 24441N, APPN 1611, ICN 5025 90-C-0671

5. **Related Programs:** AOE 6 Class

No Security Objection
Open Publication
MAR 2 1990
Office of
Department of Navy

6. Mission and Description:

DESCRIPTION: A 180,000 barrel capacity twin screw, 20 knot sustained speed, diesel driven Fleet Oiler with a 677.5 foot overall length, a 97.5 foot beam, and a 36 foot maximum navigational draft.

Accommodations are for a 106 Military Sealift Command crew, a Navy Command, Control and Communications Team of 21 Men and 10 transient personnel: a total of 137.

MISSION: The Fleet Oiler operates as a unit of an underway replenishment group or independently, to furnish petroleum (POL) products to operating forces at sea. The ship transports bulk POL from shore depots to Combat Support Ships (AOE), Replenishment Oilers (AOR) and other Fleet Oilers (AO & T-AO) effecting delivery and consolidation underway. The ship delivers bulk POL and delivers and receives fleet freight, mail and personnel, replenishing combatants and support forces underway and in port. The ship will be capable of replenishing from 5 stations simultaneously.

7. Program Highlights:

a. Significant Historical Developments - The T-AO 187 Class program was approved by OCP# S0859 on 12/07/81; a production contract for the first four ships (T-AOs 187-190) was awarded to Avondale Shipyard on 11/12/82. The last of these ships was delivered on 10/22/87. A contract for the T-AOs 191 and 192 was awarded to Penn Shipyard on 5/06/85; options for T-AOs 194 and 196 were executed on 2/26/86 and 2/12/87 respectively. With Navy's concurrence, Penn Shipyard and Avondale negotiated a transfer agreement on 6/16/88 for T-AOs 194 and 196. A contract for the T-AO 193 was awarded to Avondale on 6/28/85; options for T-AOs 195 and 197 were executed on 2/27/86 and 2/12/87 respectively. T-AOs 193 and 195 have been delivered with T-AOs 197, 194, and 196 expected to deliver 5/18/90, 12/14/90, and 4/26/91 respectively. A contract for T-AO 198 was awarded to Avondale on 6/20/88; an option for follow ships (T-AOs 200, 202, 204) was exercised on 10/06/88.

b. Significant Developments since Last Report - The option for the remaining ships (T-AOs 199, 201, and 203) was exercised on 3/24/89. T-AO 195 delivered on 08/02/89. The Penn Shipyard contract for the T-AOs 191-192 contract was terminated for default on 8/28/89. A contract for completion of T-AOs 191 and 192 was awarded to Tampa Shipyard on 11/16/89.

c. Changes Since "As of" Date - N/A

8. Threshold Breaches: DAE Baseline dated 12/31/88. The current estimate for last delivery breaches the DAE baseline.

9. Schedule:

a. Milestones - -	Production Estimate	Approved Program	Current Estimate
CNO Executive Board	Jun 80	Jun 80	Jun 80
Milestone I (DSARC)	Mar 80	Mar 80	Mar 80
Characteristics Approved	Feb 81	Feb 81	Feb 81
DCP #S0859 Approved	Dec 81	Dec 81	Dec 81
Production Contract Awarded	Nov 82	Nov 82	Nov 82
Exercised Option: T-AO 188	N/A	Jan 83	Jan 83
Exercised Option: T-AO 189/190	N/A	Nov 83	Nov 83
Production Started: 1st Ship	Apr 84	Apr 84	Apr 84
T-AO 191/2 Awarded (2nd Source)	N/A	May 85	May 85 1/
T-AO 193 Awarded (Lead Source)	N/A	Jun 85	Jun 85
Launch: 1st Ship	Aug 85	Oct 85	Oct 85
Exercised Option: T-AO 194/195	N/A	Feb 86	Feb 86
Acceptance Trials: 1st Ship	Jul 86	N/A	Sep 86
Delivery: 1st Ship	Sep 86	N/A	Dec 86
Exercised Option: T-AO 196/197	N/A	Feb 87	Feb 87
Initial Operating Capability	Nov 86	N/A	Feb 87
T-AO 198 Contract Award	N/A	N/A	Jun 88
Exercised Option: T-AO 200/02/04	N/A	N/A	Oct 88
Exercised Option: T-AO 199/201/3	N/A	N/A	Mar 89
T-AO 191/2 Awarded	N/A	N/A	Nov 89
Last Delivery	Aug 93	Aug 93	Jun 94(Ch-1)

Note: 1/ Contract with Penn Shipyard for T-AO 191/2 was terminated for default on 8/28/89; completion contract awarded to Tampa Shipyard on 11/16/89.

b. Previous Change Explanations - -

Launch of first ship slipped 2 months due to reduction gear/on-board repair parts shortage.

c. Current Change Explanations - -

(Ch-1) Due to the buyout of the T-AO program in FY 1989 vice FY 1991, delivery of the last T-AO has been changed to Jun 1994.

d. References - -

Production Estimate: NOCP S0859 approved 7 December 1981.

Approved Program: OAE Baseline approved 31 December 1988.

10. Technical/Operational Characteristics:

	Product. Estimate	Approved Program Goals/ Thresholds	Demon-strated Perfor-mance	Current Estimate
a. Technical - -				
Length Overall (ft)	677' 5"	677' 5"	677' 5"	677' 5"
Beam (maximum) (ft)	97' 5"	97' 5"	97' 5"	97' 5"
Draft (navig.) (ft)	36' 0"	36' 0"	36' 0"	36' 0"
Displacement(Ltons)	40,000	40,000	40,000	40,000
Propulsion				
(1) Diesel Engines	2	2	2	2
(2) Shafts	2	2	2	2
(3) SHP (each)	16,000	16,000	16,000	16,000
(4) Type - Controllable, reversible pitch propellers				
Accommodations	137	137	137	137
b. Operational - -				
Speed Max. Kts	20	20	20	20
Endurance NM	6,000	6,000	6,000	6,000
Armament	None	None	None	None
Cargo bbls	180,000	180,000	180,000	180,000

c. Previous Change Explanation - - N/A

d. Current Change Explanation - - N/A

e. References - -

Production Estimate: NOCP S0859 approved 7 December 1981.

Approved Program: OAE Baseline dated 31 December 1988.

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. Cost - -	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	15.8	15.3	15.3
Procurement	2591.9	2367.0	2439.4
Total Sailaway	(2518.4)	(2299.5)	(2355.3)
Other Costs	-	-	-
Initial Spares	-	-	-
Total FY84 Base-Year $	2607.7	2382.3	2454.7
Escalation	583.0	287.6	311.5
Development (RDT&E)	(+ 0.4)	(- 0.6)	(- 0.6)
Procurement	(+582.6)	(+288.2)	(+312.1)
Total Then-Year $	3190.7	2669.9	2766.2
b. Quantities - -			
Development (RDT&E)	-	-	-
Procurement	17	18	18
Total	17	18	18

c. Foreign Military Sales - - N/A

d. Nuclear Costs - - N/A

e. References - -

Production Estimate: NDCP S0859 approved 7 December 1981.

Approved Program: DAE Baseline dated 31 December 1988.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (THEN-YEAR) Dollars in Millions)

a. Program Acquisition	Current Estimate (Dec 89 SAR)	Current Year UCR Baseline (Dec 88 SAR)	Budget Year UCR Baseline (Dec 89 SAR)
(1) Cost	2766.2	2669.9	2766.2
(2) Quantity	18	18	18
(3) Unit Cost	153.7	148.3	153.7

b. Current Procurement	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	6.5	6.5	18.8
Less CY Adv Proc	-	-	-
Less PY Adv Proc	-	-	-
Net Total	6.5	6.5	18.8
(2) Quantity	-	-	-
(3) Unit Cost	N/A	N/A	N/A

13. Cost Variance Analysis:

a. Summary - - (Current (THEN-YEAR) Dollars in Millions)

	RDT&E	PROC	TOTAL
Production Estimate	16.2	3174.5	3190.7
Previous Changes:			
Economic	-	- 153.8	- 153.8
Quantity	-	+ 177.6	+ 177.6
Schedule	-	- 65.9	- 65.9
Engineering	-	-	-
Estimating	- 1.5	- 442.7	- 444.2
Other	-	-	-
Support	-	- 34.5	- 34.5
SUBTOTAL	- 1.5	- 519.3	- 520.8
Current Changes:			
Economic	-	+ 14.9	+ 14.9
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	-	+ 55.4	+ 55.4
Other	-	-	-
Support	-	+ 26.0	+ 26.0
SUBTOTAL	0.0	+ 96.3	+ 96.3
TOTAL CHANGES	- 1.5	- 423.0	- 424.5
CURRENT ESTIMATE	14.7	2751.5	2766.2

13. Cost Variance Analysis: (Cont.)
(FY 1984 Constant Dollars (BASE YEAR) in Millions)

	RDT&E	PROC	TOTAL
Production Estimate	15.8	2591.1	2607.7
Previous Changes:			
Quantity	-	+ 166.4	+ 166.4
Schedule	-	- 13.9	- 13.9
Engineering	+ 0.7	-	+ 0.7
Estimating	- 1.2	- 370.1	- 371.3
Other	-	-	-
Support	-	- 7.3	- 7.3
SUBTOTAL	- 0.5	- 224.9	- 225.4
Current Changes:			
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	-	+ 49.3	+ 49.3
Other	-	-	-
Support	-	+ 23.1	+ 23.1
SUBTOTAL	-	+ 72.4	+ 72.4
TOTAL CHANGES	- 0.5	- 152.5	- 153.0
CURRENT ESTIMATE	+ 15.3	+ 2439.4	+ 2454.7

b. Previous Change Explanation - -

(1) RDT&E

Engineering: Higher RDT&E effort costs.

Estimating: Twin Skeg alternative canceled, contract design requirements reduced accordingly.

13. Cost Variance Analysis: (Cont.)

(2) PROCUREMENT

Economic: Revised inflation indices.

Quantity: One additional ship added to the program in FY91.

Schedule: Addition of 3 ships in FY-89 and deletion of FY90/9 ships to reflect consolidation of program.

Estimating: Repricing based on prior year shipbuilding experience.
Overrun to FY 85 ships.

Support: Decrease in Outfitting (OF) material and Post-delivery (PD) allowance. Also prior year asset recoupment.

(3) MILCON N/A

c. Current Change Explanation - -

(Dollars in Millions)

(1) RDT&E	BASE-YEAR	THEN-YEAR
None		
(2) PROCUREMENT		
Revised inflation indices. (Economic)	N/A	+ 14.9
Repricing based on prior year shipbuilding experience. Overrun to FY 85-87 ships. (Estimating)	+ 49.3	+ 55.4
Increase in Outfitting (OF) material costs and Post Delivery (PD) allowances. (Support)	+ 23.1	+ 26.0

(3) MILCON N/A

14. Program Acquisition Unit Cost (PAUC) History:
(Millions of THEN-YEAR dollars)

a. Initial SAR Estimate to Current Baseline Estimate - -
Same as Current Baseline Estimate.

b. Production Estimate to Current Estimate - -

PAUC Prod. Est.	Changes (Then Year Dollars in Millions)								PAUC Cur. Est.
	Econ	Qty	Sched	Engin	Estim	Spt	Other	Total	
187.7	-7.7	-0.5	-3.7	-	-21.6	-0.5	-	-34.0	153.7

15. Contract Information: (Then-Year Dollars in Millions)

Procurement

Note: N00024-85-C-2115 (T-AO 191, 192, 194, and 196) will no longer be reported as the contract was terminated for default on 8/28/89.

Avondale Shipyard, Inc.
New Orleans, LA N00024-85-C-2131 (FPI w/esc)
Award: 6/28/85
Definitized: 6/28/85
T-AO 193, 195, 197

Initial Contract Price		
Target	Ceiling	Qty
221.5	247.1	2

Current Contract Price		
Target	Ceiling	Qty
331.5	371.6	3

Estimated Price At Completion	
Contractor	Program Manager
330.2	329.0

	Cost Variance	Schedule Variance
Previous Cumulative Variance	- 2.1	- 17.7
Cumulative Variance to Date (1/31/90)	- 4.7	- 15.5
Net Change	- 2.6	- 2.2

Explanation of Change: Avondale's unfavorable cost and schedule variances are due to higher than anticipated overhead costs and lower than expected production efficiency.

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: December 31, 1989

Avondale Shipyard, Inc.
New Orleans, LA N00024-85-C-2131 (FFP)
Award: 6/16/88
Definitized: 6/16/88
T-AO 194, 196

Initial Contract Price		
Target	Ceiling	Qty
176.5	176.5	2

Current Contract Price		
Target	Ceiling	Qty
185.1	185.1	2

Estimated Price At Completion	
Contractor	Program Manager
185.1	185.1

	Cost Variance	Schedule Variance
Previous Cumulative Variance	- 0.55	- 1.18
Cumulative Variance to Date (1/31/90)	-14.50	- 8.40
Change	-14.00	- 7.20

Explanation of Change: Contractor is experiencing higher cumulative composite labor rates than originally anticipated.

Avondale Shipyard, Inc.
New Orleans, LA N00024-88-C-2050 (FP with esc)
Award: 6/20/88
Definitized: 6/20/88
T-AO 198, 199, 200, 201, 202, 203 and 204

Initial Contract Price		
Target	Ceiling	Qty
97.6	97.6	1

Current Contract Price		
Target	Ceiling	Qty
700.6	700.6	7

Estimated Price At Completion	
Contractor	Program Manager
700.6	700.6

	Cost Variance	Schedule Variance
Previous Cumulative Variance	N/A	N/A
Cumulative Variance to Date(12/31/89)	-4.3	+35.4
Net Change	-4.3	+35.4

Explanation of Change: Avondale's favorable schedule variance stems from the receipt of material earlier than anticipated; the unfavorable cost variance is due to higher than anticiapted labor costs.

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: December 31, 1989

Tampa Shipyard, Inc.
Tampa Bay, FL N00024-90-C-2300 (FFP)
Award: 11/16/89
Definitized: TBD
T-AO 191, 192

Initial Contract Price

Target	Ceiling	Qty
49.0	49.0	2

Current Contract Price

Target	Ceiling	Qty
49.0	49.0	2

Estimated Price At Completion

Contractor	Program Manager
49.0	49.0

Note: No monthly CPR reports currently available.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status - -

(1) Percent Program Completed: 69.2% (9 Yrs/13 Yrs)

(2) Percent Program Cost Appropriated: 97.6% ($2699.7/$2766.2)

b. Appropriation Summary - - (Then-Year Dollars in Millions)

Appropriation	Current $ Prior Yrs. (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-94)	Total
RDT&E	14.7	-0-	-0-	-0-	14.7
Procurement	2678.4	6.5	18.8	47.8	2751.5
Total	2693.1	6.5	18.8	47.8	2766.2

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

c. Annual Summary: (cont.)

Fiscal Year	Qty	Sailaway FY84 Dollars		Total Base Year	Total Then-Year $$			Escal Rate (%)
		Nonrec	Rec		Program	Obli-gation	Ex-pended	
Appropriation: RDT&E								
1982	-	-	-	12.7	12.0	12.0	12.0	7.6
1983	-	-	-	1.0	1.0	1.0	1.0	4.9
1984	-	-	-	0.3	0.3	0.3	0.3	3.8
1985	-	-	-	0.3	0.3	0.3	0.3	3.4
1986	-	-	-	0.1	0.1	0.1	0.1	2.8
1987	-	-	-	0.9	1.0	1.0	1.0	2.7
1988	-	-	-	-	-	-	-	3.0
1989	-	-	-	-	-	-	-	4.2
1990	-	-	-	-	-	-	-	4.0
1991	-	-	-	-	-	-	-	4.2
1992	-	-	-	-	-	-	-	4.0
Subtotal	-	-	-	15.3	14.7	14.7	14.7	

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

c. Annual Summary: (cont.)

Fiscal Year	Qty	Sailaway FY84 Dollars		Total Base Year	Total Then-Year $$			Escal Rate (%)
		Nonrec	Rec		Program	Obli-gation	Ex-pended	
Appropriation: Procurement								
1982	1	-	-	171.3	173.4	173.4	159.9	7.5
1983	1	-	-	134.5	138.3	138.3	136.0	3.8
1984	2	-	-	260.3	273.0	272.7	267.0	3.6
1985	3	-	-	545.5	584.9	469.0	426.0	2.1
1986	2	-	-	249.0	274.3	245.4	217.8	1.0
1987	2	-	-	237.6	270.6	242.9	183.3	1.5
1988	2	-	-	223.8	266.6	228.6	69.3	2.5
1989	5	-	-	563.9	697.3	597.7	38.8	2.8
1990	-	-	-	5.1	6.5	-	-	4.0
1991	-	-	-	14.2	18.8	-	-	4.2
1992	-	-	-	18.3	25.2	-	-	4.0
1993	-	-	-	11.2	15.8	-	-	3.7
1994	-	-	-	4.6	6.7	-	-	3.4
1995	-	-	-	0.1	0.1	-	-	3.1
Subtotal	18	-	-	2439.4	2751.5	2369.0	1508.1	-
Total	18	-	-	2454.7	2766.2	2383.7	1522.8	-

17. Production Rate Data: N/A

18. Operating and Support Cost: N/A

~~SECRET~~

AF-27 SRAM II

SAF/PAS

-099 -T

#04

(8)

89-132

AGM-131A, December 31, 1989

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: SHORT RANGE ATTACK MISSILE (SRAM) II

As of Date: December 31, 1989

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CLEARED FOR OPEN PUBLICATION AS AMENDED FEB 28 1990 DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

1. ~~(U)~~ **Designation and Nomenclature (Popular Name):** AGM-131A/Short Range Attack Missile (SRAM) II.

2. (U) **DOD Component:** U.S. Air Force

3. (U) **Responsible Office:**

SRAM II Program Office
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433

Col Stanley E. Boyd
Assigned: November 1, 1988
AV 785-5080; COMM (513) 255-5080

4. (U) **Program Elements/Procurement Line Items:**

RDT&E: PE 0603364F, 0604244F
PROCUREMENT: PE 0101218F APPN 3020 ICN ADVASM
O&M: NA
MILCON: NA

5. (U) **Related Programs:** B-1B and B-2

~~FORMERLY RESTRICTED DATA~~
~~UNAUTHORIZED DISCLOSURE SUBJECT TO ADMINISTRATIVE AND CRIMINAL SANCTIONS. HANDLE AS RESTRICTED DATA IN FOREIGN DISSEMINATION. SECTION 144B ATOMIC ENERGY ACT OF 1954~~

~~Classified by: SRAM II SCG, 01 Jun 89~~

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~~SECRET~~

6. (U) Mission and Description: The SRAM II program develops an improved nuclear air-to-surface missile to replace the aging AGM-69A Short Range Attack Missile (SRAM). SRAM II will be capable of penetrating advanced defensive threats from stand-off ranges to strike hardened/defended and relocatable targets. Primary carrier aircraft will be the B-1B and B-2. Major program activities include: developing a new rocket motor providing high missile velocities and increased range; developing a guidance system that will provide high accuracy even with extended ranges; incorporating changes in the missile shape/design to reduce radar observability; and integrating a new warhead with modern safety features. These improvements, relative to the existing SRAM, are required because the Soviet target base is becoming harder and more heavily defended and because we must hold relocatable targets at risk.

7. ~~(U/FRD)~~ Program Highlights:

a. (U) Significant Historical Developments -- The SRAM II program was a new start in FY85. The decision to initiate the program was made in Sep 82, following an unsuccessful attempt to establish a new production source for the existing SRAM A rocket motor. An accelerated acquisition approach was chosen for SRAM II because of the need to field an operational system in the early 1990s. Thus, the normal Concept Exploration and Demonstration/Validation Phases were combined to form a System Definition Phase. A competition was conducted and contracts were awarded (Feb 85) to three major aerospace contractors (Boeing Aerospace, Martin Marietta Orlando Aerospace, and McDonnell Douglas Astronautics) for system definition studies and component risk reduction testing. In addition, integration study contracts were awarded to Rockwell and Boeing Military Airplane Company for B-1B integration.

(U) In Aug 85, after four months of detailed trade studies by the three contractors and a two-month Air Force evaluation of the trade studies, decisions were made on two key missile characteristics. A missile size of approximately two-thirds of the existing SRAM A was selected to allow carriage of twelve missiles on a modified B-1B multipurpose launcher. For missile propulsion, a solid rocket motor was chosen since this technology met all performance requirements at the least estimated cost. Risk reduction work, including firings of full-scale rocket motor candidate designs and tests of candidate missile inertial navigation units using test bed aircraft to simulate bomber and missile flights, was successfully completed. Contractor and government agencies reviewed a draft request for proposal (RFP) and provided comments for inclusion into the final full scale development (FSD) and initial production RFP.

~~(U/FRD)~~ An RFP for FSD, Low Rate Initial Production (LRIP) (100 Units) and the first lot (300 Units) of full rate production was released on 23 Apr 86 and two of the system definition study contractors (Boeing Aerospace and McDonnell Douglas Astronautics) submitted proposals.

Engineering change proposals from Rockwell International and Boeing Military Airplane Company were also received in Jun 86 for the B-1B integration effort. A Warhead Decision Cost Study was conducted with the Department of Energy (DOE) from Jun to Sep 86 and supported the final warhead and laboratory selection. On 5 Nov 86, the DOE announced that the Lawrence Livermore National Laboratory warhead candidate number one, with a yield of [redacted] had been selected for SRAM II. Source selection for FSD and initial production was completed with Boeing Aerospace announced as the winner on 5 Dec 86.

(b)(1),(b)(3) 42 USC §2168(a)(1)(C)--(FRD)

(U) An advanced design phase, with options for FSD and Low Rate Initial Production, contract (fixed price incentive firm) was awarded to Boeing Aerospace on 30 Apr 87. This contract award was delayed from Jan 87 to 30 Apr 87 to allow completion of a Congressionally-directed report comparing the cost effectiveness of a re-motored SRAM A versus a SRAM II and an in-production warhead versus a new warhead. Congressional language within the FY87 Department of Defense Authorization Act required submission of this report prior to obligating any FY87 funds. Following a Defense Acquisition Board (DAB) Milestone II meeting on 22 Jul 87, the Acquisition Decision Memorandum, authorizing FSD, was signed 19 Aug 87, and the FSD contract option was exercised on 25 Aug 87. Related B-1B carrier aircraft integration FSD contracts were awarded to Boeing Military Airplane Company and Rockwell International on 28 and 31 Aug 87 respectively. Major subsystem Preliminary Design Reviews (PDRs) are complete. The ADA compiler was selected, and the decision was made to continue the ADA operational flight software development. The missile warhead interface control drawings were signed by both the Department of Energy and Boeing Aerospace. An engineering change proposal to increase the diameter of the missile to accommodate a heavier warhead was put on the basic contract Dec 88. The larger diameter reduced the potential number of missiles carried on the B-1B multi-purpose launcher from twelve to ten.

(U) A delayed closeout of Air Vehicle Critical Design Review (CDR) to Dec 89, caused a DAB and SAR baseline breach in program schedule. The delay was driven by rocket motor propellant cracking during thermal cycling tests. As a result, rocket motor CDR was split into case and propellant portions; case CDR was held in May 89. All other component CDRs were also completed by May 89, allowing work in those areas to progress. Flight test schedule has slipped due to Air Vehicle CDR delay.

(U) The SRAM Tactical (SRAM T) study effort was briefed to the Strategic Systems Committee (SSC) in Sep 89. An information exchange program was initiated with the UK in accordance with the US/UK Memorandum of Understanding (MOU) for the Tactical Air-to-Surface Missile (TASM).

b. (U) Significant Developments Since Last Report -- Modification to B-1B Aircraft #9 was completed, and flight test program was started. The first jettison test of a SRAM II missile was successfully conducted on 20 Dec 89. The persistent rocket motor cracking problem has delayed CDR completion to Sep 90 and first live launch to approximately Apr 91. The

contractor is working a systematic fault/decision analysis tree to verify correction of the most recent grain cracking. Numerous subscale tests in support of the fault tree are being conducted with some already completed. In addition, subscale and full-scale analog motors have been cast to identify failure mode and verify the fix.

(U) SRAM Tactical (SRAM T) Milestone II, Full-Scale Development (FSD), was briefed to the Defense Acquisition Board (DAB) on 27 Nov 89, with an Acquisition Decision Memorandum issued 30 Nov 89 for FSD go-ahead. The SRAM T program will be included in a future SAR.

(U) The SRAM II system is expected to satisfy the mission requirement.

c. (U) Changes Since "As Of" Date -- None

8. (U) Threshold Breaches: A DAE baseline breach (Jun 30, 89) caused by CDR schedule slip was reported to the SAE in May 89.

9. (U) Schedule:

a. (U) Milestones --

	Development Estimate	Approved Program	Current Estimate
Systems Concept Paper	Feb 85	N/A	Feb 85
Milestone II (DAB)	Aug 87	Aug 87	Aug 87
Preliminary Design Review	Nov 87	N/A	Nov 87
Critical Design Review	May 89	May 89	Sep 90 (Ch 1)
First Live Launch	Sep 90	Sep 90	Apr 91 (Ch 1)
Milestone IIIA (DAB) Low Rate Production	Jul 91	Jul 91	Feb 92 (Ch 1)
Milestone IIIB (DAB)	Oct 92	Oct 92	3rd Qtr FY93 (Ch 1)
First Assets Delivery (FAD)/IOC (50 missiles)	Apr 93	Apr 93	3rd Qtr FY94 (Ch 2)

b. (U) Previous Change Explanations --

Critical Design Review changed from N/A to May 89 and First Live Launch changed from N/A to Sep 90 to reflect USD(A) memo, 14 Dec 88.

The Air Vehicle Critical Design Review (CDR) was originally scheduled to occur in May 89. Due to rocket motor propellant design problems, the completion of Air Vehicle CDR was delayed six months. CDR for all other subsystems of the program occurred on schedule in May 89.

c. (U) Current Change Explanations --

(Ch 1) Slips are caused by time required to correct second pulse rocket motor propellant grain cracking.

(Ch 2) Propellant grain cracking and lack of B-1B production funding for SRAM II integration will delay nuclear certification and delivery of B-1B and launcher FAD assets. Given that we can identify and verify the second pulse rocket motor problem(s) by Apr 90, and that the B-1B slips are concurrent, our estimate is that FAD will occur in approximately the third quarter of fiscal year 94 vice Apr 93.

d. (U) References --

Development Estimate: Acquisition Decision Memorandum, dated August 19, 1987.

Approved Program: DAE Baseline approved Jun 30, 89.

(U) Technical/Operational Characteristics (Cont'd):

		Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
a.	(U) Technical —				
	(U) Reliability/Availability				
	Reliability excluding warhead	0.95	0.98/0.95	N/A	0.98
	Availability excluding warhead	0.95	0.98/0.95	N/A	0.98
	(U) Size (Length/ Diameter) (in)	168 16	168/168 NA/NA	N/A	168 16
	(U) Weight (pounds)	2100	N/A N/A	N/A	1920
b.	(U) Operational —				
	(U) Lethality (Notes 1,2,3)		(b)(1)		
	(U) Missile Range (0 degrees Azimuth) (nmi)				
	High Launch; High Trajectory (Notes 1,4)		(b)(1)		
	Low launch; High Trajectory (Notes 1,5)				
	Low Launch; Low Trajectory (Notes 1,6)				
	Missile Contribution to CEP				

FORMERLY RESTRICTED DATA

(b)(1),(b)(3) 42 USC §2168(a)(1)(C)--(FRD)

Notes:

1. ~~(S/RD)~~ Warhead [redacted]

2. (U) Low launch; High Trajectory; Aircraft Errors at launch; Position = (b)(1) CEP; Azimuth = (b)(1) ARCMIN (b)(1) Velocity (b)(1) Cev.

3. (U) PD = (b)(1) against (b)(1) target at (b)(1) nmi: straight ahead (0 degrees Azimuth).

4. (U) Launch Mach = (b)(1); Launch Altitude = (b)(1) ft; No Wind; Standard Day; Semi-Ballistic Trajectory

5. (U) Launch Mach = (b)(1); Launch Altitude = (b)(1) ft; No Wind; Standard Day; Semi-Ballistic Trajectory

6. (U) Launch Mach = (b)(1) Launch Altitude = (b)(1) ft; Mean Sea Level (MSL); No Wind; Standard Day; Trajectory = (b)(1) ft MSL

c. (U) Previous Change Explanations --

~~(U)~~ System Specifications updated. Maturity of design and a change in the reliability/availability of the raceway concept have reduced weight goal projections.

~~(S)~~ Reflects CDR Design (S102-P), May 89, which includes all weight and motor changes as of 26 May 89. Trajectory altitude increased from (b)(1) to (b)(1) to reflect changes to the computer flight model.

d. (U) Current Change Explanations --

None.

e. (U) References --

Development Estimate: Acquisition Decision Memorandum, dated August 19. 1987.

Approved Program: DAE Baseline approved June 30, 1989

11. ~~(S/RD)~~ Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. ~~(U)~~ Cost -			
Development (RDT&E)	860.6	842.9	790.7
Procurement	859.9	882.5	792.0
Airframe	(168.6)	(96.3)	(190.5)
Engine	(224.8)	(292.3)	(294.7)
Nav/Guidance	(345.0)	(394.9)	(252.0)
Total Flyaway	(738.4)	(783.5)	(737.2)
Other Weapon System Cost	(87.6)	(53.3)	(46.7)
Initial Spares	(33.9)	(45.7)	(8.1)
Construction (MILCON)	N/A	N/A	N/A
Total FY83 Base-Year $	1720.5	1725.4	1582.7
Escalation	672.9	671.4	720.5
Development (RDT&E)	(222.3)	(226.9)	(222.8)
Procurement	(450.6)	(444.5)	(497.7)
Construction (MILCON)	N/A	N/A	N/A
Total Then-Year $	2393.4	2396.8	2303.2
b. ~~(U)~~ Quantities --			
Development (RDT&E)	N/A	N/A	N/A
Procurement	1633	1633	1633
Total	1633	1633	1633

c. ~~(U)~~ Foreign Military Sales -- None

d. ~~(S/RD)~~ Nuclear Costs -- (b)(1) [redacted]

e. References--

Development Estimate: Acquisition Decision Memorandum, dated August 19, 1987.

Approved Program: Selected Acquisition Report, June 30, 1989.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Est	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition --	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	2303.2	2396.8**	2303.2
(2) Quantity	1633	1633	1633
(3) Unit Cost	1.410	1.468	1.410
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)*	(FY 1991)
(1) Cost	10.7	10.7	21.2
Less CY Adv Proc	6.4	6.4	6.4
Plus PY Adv Proc	0	0	0
Net Total	4.3	4.3	14.8
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

* Adjusted to reflect FY90 Appropriation Act in accordance with Congressional change to SAR law.

** December 88 baseline was incorrectly input into the December 88 SAR as $2396.0 instead of $2396.8 as submitted in the FY90 President's Budget.

13. (U) Cost Variance Analysis:

a. Summary--(Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1082.9	1310.5	0	2393.4
Previous Changes				
Economic	+0.5	-16.2		-15.7
Quantity				
Schedule				
Engineering	+97.2	+66.7		+163.9
Estimating	-110.8			-110.8
Other				
Support		-34.0		-34.0
Subtotal	-13.1	+16.5	0	+3.4
Current Changes				
Economic	+13.2	+117.2		+130.4
Quantity				
Schedule		+2.0		+2.0
Engineering				
Estimating	-69.5	-82.3		-151.8
Other				
Support		-74.2		-74.2
Subtotal	-56.3	-37.3	0	-93.6
Total Changes	-69.4	-20.8	0	-90.2
Current Estimate	1013.5	1289.7	0	2303.2

13. (U) Cost Variance Analysis -(Cont'd):

(FY 1983 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	860.6	859.9	0	1720.5
Previous Changes				
Quantity				
Schedule				
Engineering	+74.0	+45.1		+119.1
Estimating	-91.7			-91.7
Other				
Support		-22.5		-22.5
Subtotal	-17.7	+22.6	0	+4.9
Current Changes				
Quantity				
Schedule				
Engineering				
Estimating	-52.2	-46.3		-98.5
Other				
Support		-44.2		-44.2
Subtotal	-52.2	-90.5	0	-142.7
Total Changes	-69.9	-67.9	0	-137.8
Current Estimate	790.7	792.0	0	1582.7

13. (U) Cost Variance Analysis -(Cont'd):

b. Previous Change Explanations --

(1) RDT&E

Economic: Revised economic escalation indices.

Engineering: Engineering change to increase missile size.

Estimating: Revised B-1B integration estimate. Adjustment for current and prior inflation.

Revised estimate for Engineering Change Orders.

(2) Procurement

Economic: Revised economic escalation indices.

Engineering: Revised estimate for increased missile size.

Support: Revised estimates for initial spares, Electronic Test Set maintenance, and Tech Mod savings.

c. Current Change Explanations--

	(Dollars in Millions) Base Year	Then Year
(1) RDT&E:		
Revised economic escalation indices. (Economic)	N/A	+13.2
Funding reduced in FY91 because of Critical Design Review delay. (Estimating)	-50.5	-67.3
Current and prior year inflation offset. (Estimating)	-1.7	-2.2
(2) PROCUREMENT		
Revised economic escalation indices. (Economic)	N/A	+117.2
Contract option for first low-rate production option will not be exercised until FY92 instead of FY91 because of FSD schedule slip. (Schedule)	N/A	+2.0

Reduced estimate to absorb increases resulting from Jan 90 economic indices. (Estimating)	-46.2	-82.1
Adjustment for current year escalation. (Estimating)	-0.1	-0.2
Deleted installation modification kits from program office estimate. (Support)	-3.6	-6.5
Reduced estimate to absorb increases resulting from Jan 90 economic indices. (Support)	-2.8	-4.6
Reflects change in initial spares funding policy. Beginning in FY 95, initial spares will be funded by O&M appropriation. (Support)	-37.7	-63.0
Adjustment for current year escalation. (Support)	-0.1	-0.1

(3) MILCON: N/A

14. (U) Program Acquisition Unit Cost (PAUC) History: (Millions of Then Year $)

a. Initial SAR Estimate to Current Baseline Estimate

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	SPT	Total	
1.877	-.020		+.054		-.404		-.041	-.411	1.466

b. Current Baseline Estimate to Current Estimate

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	SPT	Total	
1.466	+.070		+.001	+.100	-.161		-.066	-.056	1.410

15. (U) Contract Information: (Then Year Dollars in Millions)

a. RDT&E-- Full Scale Development	Initial Contract Price Target	Ceiling	Qty
Boeing Aerospace Co., Seattle, WA F33657-86-C-0012, FPIF Award: April 30, 1987 * Definitized: April 30, 1987	$214.4	$234.3	N/A

* Advanced Design Phase initiated 30 April 1987; Full Scale Development authorization received 19 August 1987.

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$291.6	$321.0	N/A	$321.0	$321.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-37.627	-10.031
Cumulative Variance To Date (11/30/89)	-69.875	-15.190
Net Change	-32.248	- 5.159
Cumulative Variance Change Percent	-85.7 %	-51.4%

Explanation of Variance: The unfavorable cost variance results primarily from the propulsion subcontractor, Hercules Inc., and the missile guidance computer manufacturer, Boeing Aerospace and Electronics, Inc. Hercules' solid-fuel rocket motor propellant cracked during thermal cycle tests. Hercules and Boeing are conducting a systematic fault tree analysis to identify the failure causes.

Additional cost increases resulted when the missile guidance computer required redesign and the selected VHSIC chip failed to meet performance requirements.

Impact: The contract is expected to go to ceiling, and the program is funded to ceiling.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 53.8% (7 yrs/13 yrs)

(2) Percent Program Cost Appropriated: 29.1% ($669.3M/$2303.2M)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY84-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-97)	Total
RDT&E	443.0	215.6	156.9	198.0	1013.5
Procurement	0.0	10.7	21.2	1257.8	1289.7
MILCON	0.0	0.0	0.0	0.0	0.0
Total	443.0	226.3	178.1	1455.8	2303.2

16. (U) Program Funding Summary -(Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary —

Fiscal Year	Qty	Flyaway FY83 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expanded *	
Appropriation: RDT&E								
1984				5.9	6.3	6.3	6.3	3.8
1985				11.0	12.0	12.0	12.0	3.4
1986				26.5	29.7	29.7	29.7	2.8
1987				56.4	65.2	65.2	65.2	2.7
1988				115.9	138.9	138.9	133.7	3.1
1989				152.7	190.9	185.7	47.1	4.2
1990				165.8	215.6	60.7	.1	4.0
1991				116.0	156.9			4.2
1992				127.0	178.4			4.0
1993				13.5	19.6			3.7
Sub-total				790.7	1013.5	498.5	294.1	

* Reflects program office records as of 31 Dec 89.

16. (U) Program Funding Summary - (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY83 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: Procurement								
1990				7.5	10.7			4.0
1991				14.3	21.2			4.2
1992	100		102.5	127.6	196.3			4.0
1993	300		176.4	195.0	309.4			3.7
1994	400	3.3	167.1	174.5	285.7			3.4
1995	400	0.8	163.6	167.8	283.1			3.1
1996	433		123.5	105.3	183.3			3.1
1997								
Sub-total	1633	4.1	733.1	792.0	1289.7			
Total	1633	4.1	733.1	1582.7	2303.2			

17. (U) Production Rate Data:

a. Annual Production Rates -- (NOTE: The annual production rates shown differ from the annual funded quantities because the funded delivery period is 16 months for FY92, 15 months for FY93, and 12 months thereafter. The two low-rate initial production options have been combined into one fiscal year (FY92).

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1991	42.9	N/A		N/A
1992	112.5	N/A	75*	N/A
1993	300	N/A	240	N/A
1994	400	N/A	400	N/A
1995	400	N/A	400	N/A
1996	433	N/A	433	N/A

* Both low-rate production options will be exercised in FY92.

(NOTE: The Production Estimate and Maximum Economic are not applicable until the program moves to a Production Phase.)

17. (U) Production Rate Data - (Cont'd):

b. Cost Variance -- Dollars in Millions (NOTE: Subject to limitations on production rates above.)

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less PdE)	Maximum Economic
Prog Acq Cost (BY83$)	N/A	N/A	1582.7	N/A	N/A
(TY$)	N/A	N/A	2303.2	N/A	N/A
PAUC (BY83$)	N/A	N/A	0.969	N/A	N/A
(TY$)	N/A	N/A	1.410	N/A	N/A

c. Schedule Variance -- (NOTE: Subject to the limitations on production rates above.)

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	2/92	N/A	N/A
Duration (in Months)	N/A	N/A	91	N/A	N/A
End Date (Mo/YR)	N/A	N/A	9/98	N/A	N/A

d. Deliveries (Plan/Actual)--

	To Date
RDT&E	0/0
Procurement	0/0

e. Approved Design to Cost Goal --

None.

18. (U) Operating and Support Costs:

a. Assumptions and Ground Rules --

There will be fifteen years of operating and support: seven years of ramp up and eight years of steady state.

The quantity of 1633 missiles includes alert and training requirements as well as missiles in maintenance and protected storage and missiles used for operational test launches and the surveillance program.

The Logistics Support Cost model (used for the first time this year) and discrete estimates based on operational requirements were the basic methodologies used to estimate operating and support costs. Calculated mean times between failures (MTBFs) and AFLC Cost and Planning factors were used as inputs for the cost model. The Strategic Air Command's Unit Manning Document, updated as of Oct 88, was used for the manpower loadings.

Software modification costs based on SRAM A history.

Depot maintenance costs include manpower and materials for component repair, repair of Nuclear Test Instrumentation Kits (NTIKs), surveillance testing and repair, and depot supply.

Interim contractor support costs were obtained from a negotiated contract option.

Site activation costs were estimated based on manpower loading and the activation scenario.

18. (U) Operating and Support Costs - (Cont'd):

b. Costs -- (FY 1983 Constant (Base-Year) Dollars in Millions)*

Cost Element	15 Year Total	1 Year Steady State
Interim Contractor Supp	1.1	-
Site Activation - Govt	8.1	-
Base Oper & Maintenance	285.9	24.3
Depot Maintenance	14.8	1.7
Depot Non Maintenance	27.9	2.1
Support Equip Maintenance	8.5	0.6
Replenishment Spares	102.4	10.9
Software Modification	10.2	0.7
Personnel Supp & Training	18.8	-
Installation Support	63.9	-
TOTAL	541.6	40.3

* The Logistics Support Cost (LSC) model was used this year to estimate Operating and Support (O&S) costs instead of the Munitions Model that has been used in the past.

18. (U) Operating and Support Costs (Cont'd):

c. Contractor Support Costs -- N/A

AF-4. ATF
SAF/PAS

SAR-89-069

(T)

90-099 -T

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
RDT&E-Only SAR
PROGRAM: ADVANCED TACTICAL FIGHTER

AS OF DATE: December 31, 1989

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CLEARED
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MAR 1 1990 18
DIRECTORATE FOR FREEDOM OF INFORMATION
AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

1. (U) Designation and Nomenclature(Popular Name):Advanced Tactical Fighter/ATF

2. (U) DoD Component: U.S. Air Force

3. (U) Responsible Office and Telephone Number:

ATF Program Office
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433-6503

Brig Gen J. Pain
Assigned: December 1, 1986
AV 785-4167; COMM (513) 255-4167

4. (U) Program Elements/Procurement Line Items:

RDT&E: PE 0603230F
PE 0604239F
PE 0604227F BPAC 663143 (shared funding)
PE 0603109F BPAC 623393 (shared funding)
PE 0604250F BPAC 643389, 643393, 643786 (shared funding)

5. (U) Related Programs: Not Applicable

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6. (U) Mission and Description: The Advanced Tactical Fighter (ATF) program addresses demonstration/validation and full scale development of the next generation air superiority fighter aircraft. The ATF will be a follow-on to the F-15 with an IOC in the late-1990's to counter the emergence of large numbers of advanced Soviet fighters. The ATF program from the outset has placed balanced emphasis on performance, survivability, reliability/ maintainability and affordability. The ATF concept is characterized by an advanced materials airframe, a new engine, balanced controlled observables and advanced avionics in a highly integrated design.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- Seven weapon system contractors participated in the concept development phase prior to May 84. The Joint Advanced Fighter Engine program awarded two contracts in Sept 83 to build demonstrator engines with new technologies required to support the ATF mission. This effort is now complete. The program received Milestone I approval in Oct 86 and began the Demonstration/Validation phase by awarding two contracts. The contractors are Lockheed, teamed with General Dynamics and Boeing; and Northrop, teamed with McDonnell Douglas. Additionally, General Electric and Pratt and Whitney were awarded contracts to develop prototype engines (ATFE). Each aircraft contractor team will conduct risk reduction demonstrations and trade studies to refine their concept, fabricate and demonstrate a ground-based integrated avionics laboratory, and construct and flight test two prototype air vehicles with the prototype ATFE's. The first major contractual milestone, the System Requirements Review, was held in April/May 87 with the contractors presenting results of performance and cost Trade Studies. The Joint Integrated Avionics Working Group (JIAWG) had its kickoff meeting in Jan 87. The Systems Design Review (SDR) for the Integrated Electronic Warfare System contractor teams has been successfully completed. A detailed plan has been laid out by the JIAWG to define a Common Avionics Baseline by the dates needed for the FSD phases of the Air Force - ATF and Army - LHX programs and Pre-Planned Product Improvement for the Navy - A-12 program. The engine and airframe contracts have been modified to include Navy trade studies for a Naval variant to the ATF.

b. (U) Significant Developments Since Last Report -- SDRs were held with each weapon system prime contractor during November. The reviews focused on the weapon system specifications and sub-tier specifications covering the important items describing the air vehicle, training system and support items. Major avionics ground prototype demonstrations were accomplished by both prime contractors. Avionics effectiveness studies were completed. The Air Force presented ATF program status and rationale for the 6-month Dem/Val extension to a Defense Acquisition Board (DAB) on 6 Oct 89 with a follow-up DAB on 6 Dec 89 at the request of the new Under Secretary of Defense/Acquisition, Mr. John Betti. This review resulted in the concurrence of the Dem/Val extension by USD(A), changing Milestone II to Jun 91 and FSD contract award to Jul 91. The FY90 Appropriation Act reduced current year funding by $203M ($200M-63230F:$3M-64250F). The Air Force is proceeding with a reprogramming action to fund contractual requirements ($134.4M-63230F). Demonstration/Validation Phase II was added to the engine contracts, increasing Target Price for General Electric and Pratt & Whitney by approximately $300M each, for engineering and material efforts to protect the FSD schedule. The first Draft Request For Proposal (DRFP) for ATF FSD was released to industry on 18 Aug 89. This unprecedented early release is one of the ATF SPO acquisition initiatives to ensure that all parties well understand FSD program requirements prior to source selection and contract award.

ATF as currently planned will satisfy its mission requirements.

c. [redacted] Changes Since "As of" Date -- None

8. [redacted] Threshold Breaches -- There are currently no DAE Baseline (dated October 11, 1989) breaches.

9. ([redacted]) Schedule:

a. ([redacted]) Milestones --

	Planning Estimate	Approved Program	Current Estimate
1. Mission Element Need Statement	Nov 81	N/A	Nov 81
2. Concept Development Contract Award	Sep 83	N/A	Sep 83
3. Milestone I (JRMB I)	Sep 85	Oct 86	
4. Dem/Val Contract Award	Oct 85	N/A	
5. Milestone II (DAB II)	Dec 88	Jun 91	
6. Milestone III (DAB III)	Dec 91	N/A	
7. IOC**	Sep 95	N/A	
8. System Requirements Review Complete	N/A	May 87	
9. System Design Review (SDR)	N/A	Nov 89	
10. Prototype First Flight	N/A	Dec 89	
11. First Annual Req Review	N/A	Oct 87	
12. Second Annual Req Review	N/A	Oct 88	
13. Third Annual Req Review	N/A	Oct 89	Oct 89

AF inadvertently changed Prototype First Flight Current Estimate to Dec 89 - Should have been March 90

** IOC was originally defined as delivery of one combat-coded squadron.

b. [redacted] Previous Change Explanations --

Milestones 9.a.3 and 4 changed due to the delay in obtaining program approval from senior Air Force personnel. Subsequently milestones 9.a.3 - 7 changed due to redirection of the Demonstration/Validation phase of the program to include prototyping, to align the program with Packard Commission recommendations, reduce concurrency in the program, and be consistent with DAB Milestone II and III projections. Milestones 9.a.5-7 were changed to reflect budget realities in the FY90/91 President's Budget, and align with a new schedule that further reduces concurrency between FSD and Production. Milestone 9.a.6 was changed to reflect the extension of FSD because of the amended FY90/91 President's Budget. Milestones 9.a.8-10 were added to reflect the 14 Dec 88 approved DAE baseline. Milestone 9.a.7 criteria is currently being redefined.

c. [redacted] Current Change Explanations --

(Ch-1) DAB Milestone II was changed from Dec 90 to Jun 91 to reflect the 6-month extension of the Dem/Val Phase.

(Ch-2) Prototype First Flight has been adjusted from Dec 89 to Mar 90 to reflect the current projected qualification status for equipment required for first flight.

d. [redacted] References --

Planning Estimate: Advanced Tactical Fighter, Mission Element Need Statement, approved by Defense Resources Board Nov 23, 1981 and Statement of Operational Need Nov 9, 1984.

Approved Program: DAE baseline approved October 11, 1989.

10. (U) Technical/Operational Characteristics:

	Plan Est	Approved Program Goal/ Threshold	Demon-strated Perf	Current Estimate
a. (U) Technical* --				
(U) MAINTENANCE HOURS PER FLT HR (on equip) (manhours)	(b)(1)	N/A	N/A	TBD
(U) MEANTIME BETWEEN MAINTENANCE (inherent failures) (manhours)		N/A	N/A	TBD
(U) MEANTIME BETWEEN MAINTENANCE (total failures) (manhours)		N/A	N/A	TBD
(U) MISSILE LOAD IN BASELINE DOCUMENT	N/A	(b)(1)	N/A	TBD
b. (U) Operational --		(b) (b)(1)		
(U) TAKE-OFF GROSS WEIGHT (Primary Air Superiority Mission) (Internal Fuel Only) (Lbs)	50,000	50,000	N/A	TBD
(U) TAKE-OFF/LANDING ROLL (ft)	(b)(1)	N/A	N/A	TBD
(U) SUSTAINED COMBAT SPEED (Non-afterburner, 40K ft) (Mach)		N/A	N/A	TBD
(U) COMBAT RADIUS, FIGHTER SWEEP (40-50K ft, Sub/Supersonic) (N Miles)	(b)(1)		N/A	TBD
ESCORT RADIUS (Subsonic) (N Miles)	(b)(1)	N/A	N/A	TBD
FERRY RANGE (Subsonic) (N Miles)		N/A	N/A	TBD
(U) ACCELERATION (50% Fuel, .8M to 1.8M, 30,000 ft) (Sec)	(b)(1)	N/A	N/A	TBD
(U) SUSTAINED G (50% Fuel, 0.9M, 30,000 ft) (G)		N/A	N/A	TBD
(U) AVIONICS WEIGHT	N/A	2,000 LB	N/A	TBD
(U) LANDING DISTANCE (WET RUNWAY)	N/A	(b)(1)	N/A	TBD
(U) C-141 FOR DEPLOYMENT	N/A	6-8	N/A	TBD
(U) DIRECT ON-AND-OFF MAINTENANCE PERSONNEL	N/A	8.7 Spaces per Aircraft		
(U) SORTIE GEN RATE(WARTIME)(PER DAY)	N/A		N/A	TBD(Ch-1)
		(b)(1)		
(U) RADAR CROSS SECTION	N/A	BASE*	N/A	TBD
(U) MANEUVERABILITY	N/A	BASE	N/A	TBD
(U) BREAK RATE	N/A	8-10%	N/A	TBD

c. (U) Previous Change Explanations --
Take-off Gross Weight is being refined as a result of trade studies which are in process.

d. (U) Current Change Explanations --
(Ch-1) BREAK RATE was changed to SORTIE GEN RATE as a more appropriate performance indicator.

e. (U) References --
Planning Estimate: Advanced Tactical Fighter, Mission Element Need Statement, approved by Defense Resources Board Nov 23, 1981 and Statement of Operational Need Nov 9, 1984.
Approved Program: DAE baseline dated October 11, 1989.

* (U) RCS is classified beyond the highest classification in this document.

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. (U) Cost --	Planning Estimate	Approved Program	Current Estimate
Development (RDT&E)	$ 11785.5	$ 10739.9	$ 10846.2
Procurement	--	--	--
Construction (MILCON)	--	--	--
Total FY 85 Base-Year $	11785.5	10739.9	10846.2
Escalation	3508.5	2767.2	3505.4
Development (RDT&E)	(3508.5)	(2767.2)	(3505.4)
Procurement	--	--	--
Construction (MILCON)	--	--	--
Total Then Year $	$ 15294.0	$ 13507.1	$ 14351.6*

*The current estimate assumes approval of an FY90 reprogramming action totaling $134.4M.

b. (U) Quantities --			
Development (RDT&E)	12	N/A	N/A
Procurement	N/A	N/A	N/A
Total	12	9	9

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References --

Planning Estimate: FY86 President's Budget, 1 Feb 1985.

Approved Program: DAE Baseline Oct 11, 1989.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:

In accordance with section 2433, title 10, USC, Unit Cost Reporting shall not apply to reports that are limited to the development (RDT&E) program.

13. (U) Cost Variance Analysis:

a. (U) Summary--(Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimates	15294.0	--	--	15294.0
Previous Changes				
Economic	-672.5	--	--	-672.5
Quantity	-467.7	--	--	-467.7
Schedule	+395.2	--	--	+395.2
Engineering	-109.8	--	--	-109.8
Estimating	-1215.1	--	--	-1215.1
Other	0.0	--	--	0.0
Support	+283.0	--	--	+283.0
Subtotal	-1786.9	--	--	-1786.9
Current Changes				
Economic	+575.4	--	--	+575.4
Quantity	0.0	--	--	0.0
Schedule	+132.1	--	--	+132.1
Engineering	0.0	--	--	0.0
Estimating	+137.0	--	--	+137.0
Other	0.0	--	--	0.0
Support	0.0	--	--	0.0
Subtotal	+844.5	--	--	+844.5
Total Changes	-942.4	--	--	-942.4
Current Estimate	14351.6*	--	--	14351.6*

* The current estimate assumes approval of an FY 1990 reprogramming action totaling $134.4M.

(FY 1985 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimates	11785.5	--	--	11785.5
Previous Changes				
Quantity	-369.0	--	--	-369.0
Schedule	0.0	--	--	0.0
Engineering	-82.5	--	--	-82.5
Estimating	- 812.7	--	--	- 812.7
Other	0.0	--	--	0.0
Support	+218.6	--	--	+218.6
Subtotal	-1045.6	--	--	-1045.6
Current Changes	0.0			0.0
Quantity	0.0	--	--	0.0
Schedule	0.0	--	--	0.0
Engineering	0.0	--	--	0.0
Estimating	+106.3	--	--	+106.3
Other	0.0	--	--	0.0
Support	0.0	--	--	0.0
Subtotal	+106.3	--	--	+106.3
Total Changes	-939.3	--	--	-939.3
Current Estimate	10846.2*	--	--	10846.2*

*The current estimate assumes approval of the FY90 $134.4M (TY$) reprogramming action.

b. Previous Change Explanations --

RDT&E

Economic: Revised economic escalation indices.

Quantity: Reduction in FSD aircraft to 9 because of prototyping in Dem/Val.

Schedule: Milestone I (JRMB I) decision delayed, revision of program estimate to reflect funding constraints. Fiscal year funding adjusted to reflect rephasing of development effort. An additional year added to FSD delayed start of Production therefore reducing concurrency.

Engineering: USAF realignment of electronic efforts: FY89 Congressional addition for integrated avionics, and deletion of Seek Spartan funding.

Estimating: Adjustment for prior year escalation, updated estimating methodology, increased engine funding, congressional reductions, addition of INEWS/ICNIA avionics effort including prototype modules and increase in FSD estimate for a higher level of testing. Reinstatement of previous engine reductions, and a FY89 Congressional reduction reducing test and the scope of the Dem/Val Phase II engine efforts for FY89. An increase for the additional engine, airframe, ground and flight test due to additional year of FSD.

Support: Simulator funding added to program estimate.

Procurement -- Not Applicable
MILCON -- Not Applicable

c. (U) Current Change Explanations:

	(Dollars in Millions) Base-Year	Then-Year
(1) (U) RDT&E		
Revised economic escalation indices. (ECONOMIC)	--	+575.4
Rephasing of FSD funding profile due to Dem/Val extension (SCHEDULE)	--	+132.1
Adjustment for current and prior years escalation change. (ESTIMATING)	- 9.6	-11.9
Reduction in engine and test efforts due to FY90 Congressional actions. (ESTIMATING)	-56.6	-68.6
FY91 Dem/Val Extension for additional risk reduction efforts. (ESTIMATING)	+172.5	+217.5

(2) (U) Procurement -- Not Applicable

(3) (U) MILCON -- Not Applicable

14. (U) Program Acquisition Unit Cost (PAUC) History: (Then-Year Dollars in Millions)

Not Applicable

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E --

Prototype Engine:

Pratt & Whitney Aircraft Group,
West Palm Beach, Florida
F33657-83-C-0092, FFP*
Award: December 31, 1987
Definitized: December 31, 1987

Initial Contract Price		
Target	Ceiling	Qty
$ 341.9	N/A	6

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 671.6**	N/A	6	$ 671.6**	$ 671.6

* No CPR (FFP Contract)
** Reflects the Dem/Val phase II option

Prototype Engine:

General Electric Co., Cincinnati, OH
F33657-83-C-0281, FFP*
Award: December 31, 1987
Definitized: December 31, 1987

Initial Contract Price		
Target	Ceiling	Qty
$ 341.9	N/A	6

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 671.6**	N/A	6	$ 671.6**	$ 671.6

* No CPR (FFP Contract)
** Reflects the Dem/Val phase II option

Airframe:

Lockheed Corporation, Burbank, CA
P33657-86-C-2085, FFP*
Award: October 31, 1986
Definitized: October 31, 1986

Initial Contract Price		
Target	Ceiling	Qty
$ 691.0	N/A	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 694.0	N/A	N/A	$ 694.0	$ 694.0

* No CPR (FFP Contract)

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Airframe:

Northrop Corporation, Hawthorne, CA
F33657-86-C-2087, FFP*
Award: October 31, 1986
Definitized: October 31, 1986

Initial Contract Price		
Target	Ceiling	Qty
$ 691.0	N/A	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 694.0	N/A	N/A	$ 694.0	$ 694.0

* No CPR (FFP contract)

Integrated Electronic Warfare System(INEWS):

GE / Sanders, Nashua, NH
F33657-86-C-2144, FFP*
Award: September 1986
Definitized: September 1986

Initial Contract Price		
Target	Ceiling	Qty
$ 70.0	N/A	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 70.0	N/A	N/A	$ 70.0	$ 70.0

* No CPR (FFP Contract)

Integrated Electronic Warfare System(INEWS):

TRW / Westinghouse, Redondo Beach, CA
F33657-86-C-2145, FFP*
Award: September 1986
Definitized: September 1986

Initial Contract Price		
Target	Ceiling	Qty
$ 70.0	N/A	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 70.0	N/A	N/A	$ 70.0	$ 70.0

* No CPR (FFP contract)

b. (U) Procurement -- Not Applicable

c. (U) MILCON -- Not Applicable

~~UNCLASSIFIED~~

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status --

(1) Percent Program Completed: 50.0 % (8 yrs / 16 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 21.2 % ($3042.8M*/ $14351.6M)
(Funds Appropriated To Date in Millions/Total Program Funding in Millions)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY83-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-98)	Total
RDT&E	$ 1898.7	$ 1144.1*	$ 1058.2	$10250.6	$ 14351.6
Procurement	$ --	$ --	$ --	$ --	$ --
MILCON	$ --	$ --	$ --	$ --	$ --
Total	$ 1898.7	$ 1144.1*	$ 1058.2	$10250.6	$ 14351.6

*The appropriation summary includes the FY90 $134.4M reprogramming action being pursued by the Air Force.

c. (U) Annual Summary --

Fiscal Year	FY 85 Base-Year Dollars Qty	Flyaway* Nonrec	Flyaway* Rec	Total	Total Then-Year Dollars Program	Obligated**	Expended**	Escl Rate (%)
Appropriation: RDT&E								
1983	--	--	--	21.1	20.0	20.0	20.0	4.9
1984	--	--	--	34.5	34.1	34.1	34.1	3.8
1985	--	--	--	89.2	90.8	90.8	90.8	3.4
1986	--	--	--	145.6	152.1	152.1	152.1	2.8
1987	--	--	--	276.0	297.2	297.2	297.2	2.7
1988	--	--	--	452.0	504.4	504.4	504.4	3.1
1989	--	--	--	687.4	800.1	800.1	764.3	4.2
1990	--	--	--	944.0	1144.1	774.7	634.8	4.0
1991	--	--	--	839.2	1058.2	--	--	4.2
1992	--	--	--	1380.0	1806.4	--	--	4.0
1993	--	--	--	1878.3	2545.1	--	--	3.7
1994	--	--	--	1826.6	2555.4	--	--	3.4
1995	--	--	--	1267.7	1828.0	--	--	3.1
1996	--	--	--	606.6	902.0	--	--	3.1
1997	--	--	--	322.2	493.9	--	--	3.1
1998	--	--	--	75.8	119.8	--	--	3.1
Total	9	--	--	10846.2	14351.6	2673.4	2497.7	3.1

* Not Applicable.
** Reflects Program Office records as of December 31, 1989.

17. (U) Production Rate Data:

a. Annualized Production Rates - N/A
b. Cost Variance - N/A
c. Schedule Variance - N/A
d. Deliveries (Plan/Actual) - N/A
e. Approved Design-To-Cost Goal - N/A

18. (U) Operating and Support Costs:

a. Assumptions and Ground Rules - N/A
b. Costs - N/A
c. Contractor Support Costs - N/A

AF-120 MARK XV IFF

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(This page is ~~Unclassified~~)

SAR-89-079

Mark XV, December 31, 1989

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)

PROGRAM: ~~(U)~~ Mark XV Identification, Friend from Foe (IFF) System

AS OF DATE: December 31, 1989

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90-099 -T

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CLEARED FOR OPEN PUBLICATION AS AMENDED MAR 1 1990 18

DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

1. (U) Designation and Nomenclature: Mark XV Identification, Friend from Foe (IFF) System.

2. (U) DoD Component: U.S. Air Force is the lead service in this tri-service program.

3. (U) Responsible Office and Telephone Number:

Mark XV IFF Program Office
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433-6503

Col Eugene T. Gibson
Assigned: July 01, 1989
AV: 785-6611
Comm: (513) 255-6611

4. (U) Program Elements/Procurement Line Items:

RDT&E:	Air Force	PE 0603742F Project 2599	(Shared funding)
		PE 0604725F Project 2598	(Shared funding)
		PE 0604725F Project 3592	(Tri-service core program)
	Army	PE 0603706A Project D297	(Shared funding)
		PE 0604709A Project D530	(Shared funding)
	Navy	PE 0604211N Project W1253	(Shared funding)

~~Classified by: Mark XV SCG, February 15, 1989~~
~~Review on: OADR~~

~~SECRET~~

(This page is ~~Unclassified~~)

4. (U) Program Elements/Procurement Line Items (Cont'd):

PROCUREMENT:

	Air Force	APPN 3010,WSC OTHACP, PE 0207420F
	Army	APPN 2035A, SSN AD 5053
	Navy	APPN 1810, BLI 2851, PE 0204228N
O&M:	Air Force	PE TBD
	Army	PE TBD
	Navy	PE TBD

5. (U) Related Programs: Mark XII Technical Improvement Program (Mark XII TIP), Integrated Communication Navigation Identification Avionics (ICNIA) and Non Cooperative Target Recognition (NCTR) programs.

6. (U) Mission and Description: The Mark XV is a replacement for the outdated Mark X/XII direct, cooperative aircraft Identification Friend from Foe (IFF) system. It increases force employment options which include beyond visual range (BVR) weapons, flexibility, and overall operational effectiveness. The Mark XV is an Air Force lead, tri-service, NATO interoperable, retrofit acquisition program with a goal of maximum form, fit, function and plug compatibility (F3PC). It will provide necessary performance improvements including resistance to deception (spoofing), jamming, and exploitation, while maintaining compatibility with existing Mark X/XII systems and current and future civil air traffic control functions.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- A concept design phase was initiated in Jun 1980 with the approval of the Joint Mission Element Need Statement (JMENS) and concept design contracts were awarded to three contractor teams in Oct 1980. Final contractor reports were submitted in Aug 1981. An RFP for Demonstration/Validation was issued in Jul 1982. The RFP was restructured in Jan 1983 into a two phase program. Phase I (brassboard waveform demonstration) contracts were awarded to Bendix and Texas Instruments in May 1983. Multi-Command Required Operational Capability (MROC) document, which details the tri-service requirement for an improved Question and Answer (Q&A) system was approved by all services in Jul 1984. DSARC I was held in Jul 1984 and resulted in a Secretary of Defense Decision Memorandum (SDDM) directing exercise of the Phase II Demonstration/ Validation contract options, restructure of the Mark XV program to include more Form, Fit and Function risk reduction studies, acceleration of the program to start FSD in FY87, and a requirement to stay within approved funding levels. Subsequent to the SDDM, Congressional funding cuts in FY85 and a reassessment of the requirement for a Mark XV capability by TAC slipped the start of FSD to FY89.

7. (U) Program Highlights (Cont'd):

At the NATO Identification System (NIS) project director's meeting on Dec 8-10, 1986, agreement was reached among the five participating nations on a refined NATO standardization agreement (STANAG). The document provides an agreed technical basis for the development programs of the nations. Effective with the FY88 President's Budget the Army's and Navy's FY88-92 FSD core program (the portion common to all services) total obligation authority (TOA) was transferred to the Air Force budget line. This allows for increased core program funding stability. Service unique efforts continue to be managed by individual services. Previously reported core program FSD funding shortfalls were restored in the FY88 PB, thereby allowing approved program milestones to be reinstated. The 4950th Test Wing successfully completed the five month core flight test.

The laboratory test and flight test programs were successfully completed. Lab test results indicate all performance parameters can be met. Analysis of flight test results supports lab results.

Laboratory interoperability tests were conducted using both Texas Instruments and Bendix models of the Mark XV systems along with development models of IFF models produced by UK, Germany and France. This test series successfully demonstrated for the first time that IFF systems built by different countries using the same waveform specification could be interoperable with each other.

A Request for Proposal (RFP) was released soliciting offerors to form the Full Scale Development (FSD) phase of the Mark XV effort with a priced option for Low Rate Initial Production (LRIP). A source selection was successfully conducted and Allied Signal Aerospace Corporation, formerly Bendix, was selected for contract award by the Source Selection Authority, Mr. J.J. Welch, Jr. A Defense Acquisition Board for milestone II (DAB II) was held in Dec 1988. The Acquisition Decision Memorandum (ADM) was signed on February 2, 1989, and the FSD contract was awarded February 3, 1989.

b. (U) Significant Developments Since Last Report--

(1) (U) The Systems Design Review (SDR) was conducted on 05-07 Dec 89

(2) (U) The Deputy Secretary of Defense removed FY91 funds for the Mark XV indicating an interest in alternatives for NATO interoperability. The Assistant Secretary of Defense (Command Control and Communication) was subsequently tasked to conduct a comprehensive review of the Mark XV and to provide recommendations to the Dep Sec by the end of March 1990. The services have been directed to continue the Mark XV development through March 1990, utilizing FY90 Funds.

7. (U) Program Highlights (Cont'd)

(3) (U) An agreement was obtained among the five NATO Identification System developing nations (United States, United Kingdom, Germany, Italy, France) on the specific frequency for J-band operation in Oct 89. This agreement successfully culminated over two years of intense analysis and negotiation to resolve the last significant NATO standardization agreement impediment.

(4) (U) This will be the final SAR unless funding is restored.

(5) (U) The Mark XV system is expected to satisfy the mission requirements provided that the ongoing review results in continuation of the current program.

c. (U) Changes Since "As Of" Date -- None.

8. (U) Threshold Breaches: There are currently no DAE Baseline (June 30,1989)

9. (U) Schedule:

(U) Milestones --	Development Estimate	Approved Program	Current Estimate
Program Initiated	Jun 80	Jun 80	Jun 80
Initial PMD	Nov 81	Nov 81	Nov 81
DAB I	Jul 84	Jul 84	Jul 84
DAB II	Dec 88	Dec 88	Dec 88
FSD Contract Award	Feb 89	Feb 89	Feb 89
Critical Design Review	Feb 91	Feb 91	Feb 91
DAB IIIA	Jul 93	Jul 93	Jul 93
First Production Contract Award	Oct 93	Oct 93	Oct 93
DAB III	Jul 95	Jul 95	Jul 95
IOC *	Sep 97	Sep 97	Sep 97

Notes:
* IOC definitions are currently being developed and refined by the services.

b. (U) Previous Change Explanations -- None

c. (U) Current Change Explanations -- None

d. (U) References --

(U) Development Estimate: Acquisition Decision Memorandum, February 2 1989.

(U) Approved Program: DAE baseline dated 30 June 1989.

( ) Technical/Operational Characteristics:

a. ( ) Technical	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf*	Current Estimate
( ) Pid at (b)(1) of Surveillance Range (SR) in Benign Peacetime (Note 7)	N/A	(b)(1)		(Ch-2)
( ) Pid at (b)(1) of SR in Benign Wartime (Note 7)	N/A	(b)(1)		(Ch-2)
( ) Pid at (b)(1) of Jammed Radar Detection Range in Jammed Wartime (Note 7)	N/A			(Ch-2)
( ) Response Time (Note 1)	N/A	(b)(1)		Ch-2)
( ) Prob (Enemy Acceptance) (Pea) (Note 2)	N/A			Ch-2)
( ) Prob (Friend Rejection) (1-Pf/f) (Note 3))	N/A			(Ch-2)
( ) System Mean Time Between Failure (MTBF) (Note 4) (CH-1) (CH-3)	1000	1500/1000		1500/1000 (CH-2)

* System performance to be demonstrated and tested before DAB III.

10. (U) Technical/Operational Characteristics (Cont'd):

b. (U) Operational	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf*	Current Estimate
(U) Mean Time to Repair-On Equipment (Hrs) (Note 6)	0.5	N/A		.25/0.5 (CH-2)
(U) Operational Availability (Ao) (Note 5)	N/A	.99/.95		.99/.95 (CH-2)
(U) Maintenance Manhour Per Flight Hour (MMH/FH) - (Air Force)	N/A	N/A		.00025 (CH-2)

* System performance to be demonstrated and tested before DAB III.

otes: (1) (U) Response time is the time interval from the instant an errogation request is provided to the interrogator to the instant the lark XV evaluated output is available to a platform interface. This assumes the interrogation is received, processed and responded to by the target platform's transponder with sufficient replies to meet the evaluation criteria.

(2) (U) Probability of Enemy Acceptance (Pea) per ID attempt for a random guess is defined as: the probability that the system declares an enemy a friend when the enemy is randomly guessing the correct reply to each interrogation. This is a function of the GFE (NSA) COMSEC algorithm and is a fixed parameter for the implementation. The value given is the threshold.

(3) (U) Probability of Friend Rejection (1-Pf/f) is computed as one minus the probability of accepting a friend as a friend. This probability is defined as the probability, for any identification of a friendly target, that the system will fail to declare that target a friend given adequate signal to noise ratio.

10. (U) Technical/Operational Characteristics (Cont'd):

(4) (U) The Mark XV system consists of an interrogator subsystem and a transponder subsystem. Each subsystem consists of several line replaceable units (LRUs). The system level MTBF is allocated down to the subsystems. The 1000 hour system MTBF is an inherent reliability to be demonstrated by test as part of the FSD qualification process. To assure this level of reliability is achieved in fielded units, the worst case actual platform, transportation, logistics and manufacturing environments (temperature, vibration, shock, acoustic, etc.) will be used to establish the qualification test profiles. In addition, the system will be operated during test in a manner that emulates the actual mission, maintenance, and test conditions (power switches, mode changes, etc.) it will experience over its anticipated life time.

(5) (U) Operational Availability (Ao). Factors driving Ao are: 1.) Platform type (values given apply to fighter platform); 2.) Ao = MTBM/(MTBM + MDT) (where MDT = MTTR + MLDT); 3.) MTBM = 177 hours (for platforms using a interrogator and transponder); 4.) MTTR (on equipment) = .25 hours; and 5.) MLDT = .4 hours (consistent with the baseline comparison study (BCS)).

(6) (U) Applies to organization maintenance on airborne installation.

(7) (U) Probability of friend ID (PID) is the probability of at least one identification before target closes to specified range in specified jamming conditions. The Mark XV system is being developed to operate under conditions of intense incidental jamming, per appropriate threat descriptions, as well as in the normal electromagnetic environment, typically referred to as benign. (b)(1)

(b)(1)

(b)(1)

10. (U) Technical/Operational Characteristics (Cont'd):

c. (U) Previous Change Explanation --

Additional type transponders and interrogators have been incorporated into the program since establishment of the planning estimate. TBD volumes are equal to or less than existing MARK XII volumes.

The following elements were reflected in previous SAR submissions. There were no goals in the Dem/Val program. These are no longer applicable to the technical portion of the program and will not be reflected in future SAR submissions.

Jam Signal Ratio
Transponder, Types I, II & III
Interrogator, Airborne, Ground and Ship
System Compatibility
Form, Fit Function & Plug Compatibility
Frequency Bands
Mean Time Between Critical Failures
Mean Time Between Maintenance
Maintenance False Removal Rate
Mean Time to Repair-off Equipment
Maintenance Manhour Per Operating Hour
Friend Rejection Prob. per ID Attempt
Exploitation Pro. per Interrogator

The June 30 SAR reflected new Technical/Operational characteristics for Probability of Identification (Pid) in Benign Peacetime, Benign Wartime, and Jammed Wartime; Response Time; Prob (Enemy Acceptance); Prob (Friend Rejection); Operational Availability; and Maintenance Manhour Per Flight Hour. These new elements equal or exceed equivalent characteristics' performance estimates shown in previous SAR's planning estimate and approved values. The new elements also provide more essential, usable data and represent the parameters agreed to by the Air Force, Army and Navy in the official DAB II supporting documentation. Characteristics are revised to correspond with identical parameters in the program baseline as of DAB II. The adjustment allows all elements to correspond to the Acquisition Program Baseline (APB).

A goal has been established for Mean Time to Repair-On Equipment in the June 89 SAR. This element is also included in the DCP documentation and the APB.

10. (U) Technical/Operational Characteristics (Cont'd):

d. (U) Current Change Explanation --

(Ch-1) The system MTBF is being listed under technical instead of operational for consistency with the APB.

(Ch-2) Added goal to be consistent with Acquisition Program Baseline (APB), 7 May 1989.

(Ch-3) The previous Note 3 has been incorporated into the current Note 4.

e. (U) References --

Development Estimate: Acquisition Decision Memorandum, February 2, 1989.

Approved Program: NAF baseline dated 30 Jun 1989.

Mark XV, December 31, 1989

11. ~~(U)~~ Program Acquisition Cost: (Current Estimate in Millions of Dollars) (Summary)

	Development Estimate	Approved Program	Current Estimate **
a. ~~(U)~~ Cost --			
Development (RDT&E)	$ 718.5	718.5	249.9
Procurement	1925.8	1925.8	0.0
Flyaway	(1582.2)	(1582.2)	(0.0)
Other Wpn Cost	(178.2)	(178.2)	(0.0)
Initial Spares	(165.4)	(165.4)	(0.0)
Installation (O&M)	139.6	139.6	0.0
Total FY82 Base Year	$ 2783.9	2783.9	249.9
Escalation	1607.7	1607.7	50.5
Development (RDT&E)	(248.1)	(248.1)	(50.5)
Procurement	(1269.2)	(1269.2)	(0.0)
Installation (O&M)	(90.4)	(90.4)	(0.0)
Total Then Year $	$ 4391.6	4391.6	300.4
b. ~~(U)~~ Quantities --			
Development (RDT&E)	140	140	0.0
Procurement	15747 *	15747 *	0.0
Total	15887	15887	0.0

* Includes 87 Army units for integration/test.

** This current estimate reflects PBD 812 dated 15 Dec 89 which zeroed the program and directed FY90 SAR funding profile of $37.7M.

c. (U) Foreign Military Sales -- N/A

d. (U) Nuclear Costs -- N/A

e. (U) References --

Development Estimate: Acquisition Decision Memorandum, February 2, 1989.

Approved Program: DAE Baseline dated June 30, 1989.

Mark XV, December 31, 1989

12. ~~(U)~~ Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then Year) Dollars in Millions) N/A

	Current Estimate (DEC 89 SAR)	Current Year UCR Baseline (June 89 SAR)	Budget Year UCR Baseline (Dec 89 SAR)
a. Program Acquisition			
(1) Cost	300.4	4391.6	300.4
(2) Quantity	0	15747*	0
(3) Unit Cost	N/A	.279	N/A

b. Current Procurement -- N/A

*This value has been revised to exclude R&D units (140) that are not planned to be part of the inventory objective. Such R&D units are not considered fully configured end items for the purposes of this calculation.

13. (U) Cost Variance Analysis:
a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	O&M	TOTAL
Development Estimate	966.6	3195.0	230.0	4391.6
Previous Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0.0	0.0	0.0	0.0
Current Changes:				
Economic	0.5			0.5
Quantity				
Schedule				
Engineering				
Estimating	-3.0	-2625.0		-2628.0
Other	-663.7			-663.7
Support		-570.0	-230.0	-800.0
Subtotal	-666.2	-3195.0	-230.0	-4091.2
Total Changes	-666.2	-3195.0	-230.0	-4091.2
Current Estimate	300.4	0.0	0.0	300.4

13. (U) Cost Variance Analysis (Cont'd):

(U) Summary--(FY1982 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	O&M	TOTAL
Development Estimate	718.5	1925.8	139.6	2783.9
Previous Changes:				
Quantity				
Schedule				
Engineer				
Estimating				
Other				
Support				
Subtotal	0.0	0.0	0.0	0.0
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	-2.3	-1582.2		-1584.5
Other	-466.3			-466.3
Support		-343.6	-139.6	-483.2
Subtotal	-468.6	-1925.8	-139.6	-2534.0
Total Changes	-468.6	-1925.8	-139.6	-2534.0
Current Estimate	249.9	0.0	0.0	249.9

13. (U) Cost Variance Analysis (Cont'd):

b. (U) Previous Change Explanations -- N/A

c. (U) Current Change Explanations: (Dollars in Millions)

	Base-Year $	Then-Year $
(1) RDT&E		
Revised Jan 90 economic escalation indices. (Economic)	N/A	0.5
Adjustment for current and prior year escalation change. (Estimating)	-0.2	-0.5
Adjustment for actuals on Dem/Val contract. (Estimating)	-2.1	-2.5
PBD termination of funding. (Other)	-466.3	-663.7
(2) Procurement		
PBD termination of funding.	-1925.8	-3195.0
o Deletion of all Prime Mission Equipment. (Estimating)	(-1582.2)	(-2625.0)
o Deletion of all Other Weapon Cost and Initial Spares. (Support)	(-343.6)	(-570.0)
(3) O&M		
PBD termination of funding. (Support)	-139.6	-230.0

14. ~~(U)~~ Program Acquisition Unit Cost (PAUC) History:
(Millions of Then-Year Dollars) --

a. Initial SAR/Planning Estimate to Current Estimate.

PAUC (Pln Est)	Eco	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC (Dev Est)
N/A									.279*

b. Development Estimate to Current Estimate

PAUC (Dev Est)	Eco	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC (Current Est)
.279*									N/A

*Note: This value has been revised to exclude R&D units (140) that are not planned to be part of the inventory objective. Such R&D units are not considered fully configured end items for the purposes of this calculation.

15. (U) Contract Information: (Then-Year Dollars in Millions)

(U) a. RDT&E --

The Allied Corporation
Bendix Communications Division
F33657-88-C-0063 CPIF/AF
Award: February 3, 1989

Initial Contract Price		
Target	Ceiling	Qty
161.8	N/A	50

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
162.4	N/A	50	165.9	225.6

Note: Contract information does not include award fee which could amount to a maximum, 5% of target. Numbers are based on contractor's CPR dated 31 Oct 89.

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date	$ -4.8	-8.2
Net Change	-4.8	-8.2
Cumulative Variance Change Percent	N/A	N/A

Explanation of Change:

1. Variances are caused by the contractor's slow acquisition of staff, inadequate initial schedule planning, and delays in developing design specifications. Bendix is replanning effort to reflect a more realistic schedule. In addition, Bendix is in the process of deriving a grassroots EAC on the newly developed schedule.
Major contributors to the variance are: airborne interrogator, type II transponder, and program management. Variances do not impact program.

2. Presently, Bendix cost/schedule control system has not been validated.

(U) b. Procurement -- N/A

(U) c. O&M -- N/A

16. [redacted] Program Funding Summary: (Current Estimate in Millions of Dollars)

a. ([redacted]) Program Status --

(1) Percent Program Completed: 100% (11 yrs/11 yrs)

(2) Percent Program Cost Appropriated: 100% ($300.4/$300.4)

b. ([redacted]) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (N/A)	Total
RDT&E	262.7	37.7	0.0	0.0	300.4
Procurement	0.0	0.0	0.0	0.0	0.0
O&M/Install	0.0	0.0	0.0	0.0	0.0
TOTAL	262.7	37.7	0.0	0.0	300.4

16. (U) Program Funding Summary (Cont'd):

c. (U) Annual Summary --

Fiscal Year	Qty	Flyaway FY 82 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obl	Exp	
APPROPRIATION: RDT&E Tri-Service								
1980	N/A	N/A	N/A	9.8	8.5	8.5	8.5	-
1981				6.5	6.2	6.2	6.2	11.9
1982				14.1	14.4	14.4	14.4	9.2
1983				15.7	16.8	16.8	16.8	4.9
1984				18.4	20.5	20.5	20.5	3.8
1985				21.8	25.0	25.0	25.0	3.4
1986				26.5	31.2	31.2	31.2	2.8
1987				22.5	27.3	27.3	25.0	2.7
1988				21.7	27.3	27.3	24.7	3.1
1989				65.2	85.5	78.9	38.3	4.2
1990				27.7	37.7	4.7	0.0	4.0
1991				0.0	0.0			4.2
1992				0.0	0.0			4.0
1993				0.0	0.0			3.7
1994				0.0	0.0			3.4
1995				0.0	0.0			3.1
TOTAL				249.9	300.4	260.8	210.6	

16. (U) Program Funding Summary (Cont'd):

Fiscal Year	Qty	Flyaway FY 82 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obl*	Exp*	
APPROPRIATION: RDT&E Air Force								
1980	N/A	N/A	N/A	6.9	6.0	6.0	6.0	-
1981				1.3	1.2	1.2	1.2	11.9
1982				5.9	6.0	6.0	6.0	9.2
1983				6.8	7.3	7.3	7.3	4.9
1984				8.7	9.7	9.7	9.7	3.8
1985				14.3	16.4	16.4	16.4	3.4
1986				7.4	8.7	8.7	8.7	2.8
1987				8.1	9.8	9.8	9.1	2.7
1988				14.6	18.4	18.4	16.9	3.1
1989				50.5	66.2	60.4	30.1	4.2
1990				21.6	29.5	1.7	0.0	4.0
1991				0.0	0.0			4.2
1992				0.0	0.0			4.0
1993				0.0	0.0			3.7
1994				0.0	0.0			3.4
1995				0.0	0.0			3.1
SUBTTL				146.1	179.2	145.6	111.4	-

* Obligation and Expenditure data as of 31 Dec 89.

16. ⇔ Program Funding Summary (Cont'd):

Fiscal Year	Qty	Flyaway FY 82 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obl*	Exp*	
APPROPRIATION: RDT&E Army								
1980	N/A	N/A	N/A	2.9	2.5	2.5	2.5	-
1981				2.6	2.5	2.5	2.5	11.9
1982				5.8	5.9	5.9	5.9	9.2
1983				2.8	3.0	3.0	3.0	4.9
1984				3.6	4.0	4.0	4.0	3.8
1985				3.7	4.2	4.2	4.2	3.4
1986				7.7	9.1	9.1	9.1	2.8
1987				4.5	5.5	5.5	4.4	2.7
1988				1.1	1.4	1.4	1.0	3.1
1989				3.7	4.9	4.9	0.4	4.2
1990				5.1	6.9	1.7	0.0	4.0
1991				0.0	0.0			4.2
1992				0.0	0.0			4.0
1993				0.0	0.0			3.7
1994				0.0	0.0			3.4
1995				0.0	0.0			3.1
SUBTTL				43.5	49.9	44.7	37.0	-

* Obligation and Expenditure data as of 31 Dec 89.

16. Program Funding Summary (Cont'd):

Fiscal Year	Qty	Flyaway FY 82 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obl*	Exp*	
APPROPRIATION: RDT&E Navy								
1980	N/A	N/A	N/A	-	-	-	-	-
1981				2.6	2.5	2.5	2.5	11.9
1982				2.4	2.5	2.5	2.5	9.2
1983				6.1	6.5	6.5	6.5	4.9
1984				6.1	6.8	6.8	6.8	3.8
1985				3.8	4.4	4.4	4.4	3.4
1986				11.4	13.4	13.4	13.4	2.8
1987				9.9	12.0	12.0	11.5	2.7
1988				6.0	7.5	7.5	6.8	3.1
1989				11.0	14.4	13.6	7.8	4.2
1990				1.0	1.3	1.3	0.0	4.0
1991				0.0	0.0			4.2
1992				0.0	0.0			4.0
1993				0.0	0.0			3.7
1994				0.0	0.0			3.4
1995				0.0	0.0			3.1
SUBTTL				60.3	71.3	70.5	62.2	-

* Obligation and Expenditure data as of 5 Jan 90.

17. (U) Production Rate Data:

a. (U) Annualized Production Rates --

Fiscal Year	Production Rates Quantity/Year)			
	Dev Estimate	Production Estimate	Current Estimate	Maximum Economic
1993	8	N/A	0	N/A
1994	344	N/A	0	N/A
1995	898	N/A	0	N/A
1996	1,457	N/A	0	N/A
1997	1,617	N/A	0	N/A
1998	1,954	N/A	0	N/A
1999	1,884	N/A	0	N/A
2000	1,775	N/A	0	N/A
2001	1,532	N/A	0	N/A
2002	1,198	N/A	0	N/A
2003	609	N/A	0	N/A
2004	570	N/A	0	N/A
2005	541	N/A	0	N/A
2006	505	N/A	0	N/A
2007	471	N/A	0	N/A
2008	384	N/A	0	N/A
2009	0	N/A	0	N/A

17. (U) Production Rate Data (Cont'd):

b. (U) Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost (BY$)	N/A	N/A	247.8	N/A	N/A
(TY$)	N/A	N/A	297.9	N/A	N/A
PAUC (BY$)	N/A	N/A	N/A	N/A	N/A
(TY$)	N/A	N/A	N/A	N/A	N/A

c. (U) Schedule Variance --

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A
Duration(In Months)	N/A	N/A	N/A	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A

d. (U) Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
Procurement	0/0

e. (U) Approved Design to Cost Goal -- N/A

18. Operating and Support Costs --

a. Assumptions and ground rules --

O&S costs are extracted from the Dec 1988 Independent Cost Analysis (ICA). These costs were computed for eleven years of phase-in (FY93-FY03) and fifteen years of steady state (FY04-FY19) of O&S for 16,628 transponders and interrogators.

b. Cost -- (FY 88 Constant Dollars in Millions)

Depot Maintenance	247.13
Depot Non-maintenance	16.81
O&I Level Maintenance	170.05
Support Equipment Maintenance	126.75
Replenishment Spares	602.51
System Support Division Stock Fund	21.07
Recurring Training	81.72
Interim Contractor Support	1.33
	1267.37

c. Contractor Support Costs: -- N/A

AF-26 SMALL ICBM

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SAR-89-087

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: SMALL ICBM

AS OF DATE: Dec 31, 1989

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FOR OPEN PUBLICATION
AS AMENDED
MAR 1 1990
DIRECTORATE FOR FREEDOM OF INFORMATION
AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

1. (U) Designation and Nomenclature (Popular Name): None assigned to date (Small ICBM)

2. (U) DOD Component: U.S. Air Force

3. (U) Responsible Office and Telephone Number:

Program Director — Col William F. Moore
Ballistic Systems Division — Assigned: 1 Sep 1989
Norton AFB, Ca 92409-6468 — AV 876-7848; COMM (714) 382-7848

4. (U) Program Elements/Procurement Line Items:

RDT&E: PE 0604312F (Shared funding)

PROCUREMENT: APPN 3020 ICN 0101219F (Air Force)

MILCON: N/A

5. (U) Related Programs: Peacekeeper; Rail Garrison; Rapid Execution and Combat Targeting

~~Classified by: Multiple Sources~~
~~Declassify on: OADR~~

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6. (U) Mission and Description: The mission of the Small ICBM weapon system is to enhance the deterrent posture of US strategic forces. The Small ICBM must be able to exact a prohibitively high price-to-attack from any potential aggressor and, should deterrence fail, survive to effectively attack the full spectrum of designated targets with nuclear weapons. The system must provide a prompt, hard target retaliatory capability. The Small ICBM missile has three solid propellant staqes capable of delivering one or two reentry vehicles to a range of more than 6000 nautical miles. The missile is deployed in a nuclear hardened mobile launcher. The Small ICBM is not programed to replace an existing system.

7. (U) Program Highlights:

a. (U) Significant Historical Events — In April 1983, the President's Commission on Strategic Forces (Scowcroft Report) recommended beginning engineering development of a single warhead ICBM weighing about 30,000 lbs and having flexibility for development in several basing modes. Rationale was to improve deterrence, promote stability, and enhance arms control efforts. The President endorsed the report, as did Congress in the Authorization Act of 1984. In September 1983, the report of Small Missile Independent Advisory Group (Shriever Report) provided an acquisition strategy to the AFSC Commander for the System Definition, Pre-Full Scale Development (Pre-FSD) and FSD phases. This strategy identified technology challenges and emphasized maximum competition. During the next three years, competitive pre-operational prototype tests were accomplished to define concepts and minimize technical risks for FSD. In the fall of 1986, results were provided to the AFSARC and JRMB. The data was subsequently presented to the President, who decided in December 1986 to proceed into FSD with a 37,000 lb class, single warhead ICBM carried on a nuclear hardened mobile launcher (HML). This system was to be deployed initially at Minuteman ICBM launch facilities, but with a future option for Southwest basing (random movement mode) should the threat dictate. Test for pre-operational prototype hardware was successfully completed and the System Design Review was successfully accomplished in FY87. In FY88 Congress constrained Small ICBM appropriations to $700M and took action to defer some FSD tasks. However, in February 1988 agreement was reached between OSD and the Air Force to allocate the $700M in FY 1988 together with $200M in FY 1989 to fund a combined two-year $900M program to 30 September 1989. This major restructure was contractually implemented on 1 April 1988 with a significant descope in basing development, and partial termination of missile development. This resulted in erosion of the subcontractor/vendor base, whose restoration is the critical item pacing continuation of the program. The Small ICBM program continued with testing in preparation for two flight tests. In May 1989 the first flight test was conducted and successfully achieved approximately 85% of the flight test objectives. Approximately seventy seconds into the flight the nozzle on the second stage solid fuel rocket failed and the missile was command destructed after 128 seconds of flight. The cause of the failure has subsequently been identified. In May 1989 the Amended FY90/91 President's Budget funded continuation of the Small ICBM program. The Air Force directed restart efforts in a two-phase approach. Phase I will focus on missile development. Phase II will resume basing full-scale development in FY 92 in support of a 1997 Initial Operational Capability. Decisions on force size and basing and number of reentry vehicles will be made at a later date.

7. (U) Program Highlights — (Cont)

b. (U) Significant Developments Since Last Report — On 14 Jul 89 the Small ICBM program office received direction to restart the program using a phased approach (emphasis on missile development in FY90 and FY91, with basing full-scale development restart in FY92), to support a 1997 IOC. Restart change orders for FY 90 tasks were issued Jul-Aug 89. These change orders serve as a bridge between the partially terminated program and the supplemental agreements for remaining full-scale development starting in FY91. The fault tree investigation into the cause of the Stage II anomaly on FTM-1 has been completed and attributed to material variability in the carbon-carbon exit cone. A dual-path program recovery plan to FTM-2 is underway, leading to an FTM-2 launch in 4th Quarter 1990.

The Small ICBM system is expected to satisfy the mission requirement.

c. (U) Changes Since "As Of" Date: None

8. (U) Threshold Breaches: A DAE baseline for the program has not been approved.

9. (U) Schedule:

a. (U) Milestones —

	Development Estimate	Approved Program	Current Estimate
Initial Program Management Directive (Pres. directive)	Sep 83	N/A	Sep 83 *
Full Scale Develop. (JRMB II)	Dec 86	N/A	Dec 86 *
System Design Review	Mar 87	N/A	May 87 *
First Flight Test	Mar 89	N/A	May 89 *
First Contract Award for Low Rate Initial Production	Dec 89	N/A	Dec 94 (Ch-1)
IOC	Dec 92	N/A	Dec 97

* Reflects actual dates of accomplishment

b. (U) Previous Change Explanations

— The SDR slipped two months due to the slip of the planned FSD decision from Oct to Dec.

— Due to reductions in procurement and Milcon, IOC has slipped to Dec 97.

— When the program was restructured to terminate on 30 Sep 89 and funding limitations were imposed, direction was changed to fly when ready. A March 89 First Flight date was retained as an approximate goal rather than a required milestone date. There was no programmatic reason or pressure to fly as early as Mar 89 since the program was scheduled to terminate. The missile was ready in May 1989.

c. (U) Current Change Explanations -- First contract award for Production was slipped due to scheduled termination of the program. It is currently scheduled for December 1994 under the restart program. In addition, FY 94 advanced buy production contracts are planned for award in Dec 93

d. (U) References:

Development Estimate: Secretary of Defense Memorandum, Nov 1,1983 and National Security Decision Directive, dated 10 Jul 85.

Approved Program: No currently approved DAE Baseline for this program.

10. (S) Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/ Threshold	Demonstrated Performance	Current Estimate
a. (U) Technical --				
Missile Weight (lbs)	30,000	N/A	N/A	37,000
Range (NM)	6,000	N/A	N/A	6,000
Payload	--	N/A	N/A	1 or 2 MK21 RV
b. (S) Operational --				
Accuracy (CEP) (Ft) 1/	(b)(1)	N/A	N/A	(b)(1)

c. (U) Previous Change Explanations -- Approved Program and Current Estimate was changed from 30,000 lb to 37,000 lb missile in accordance with the sense of Congress expressed in the FY 87 Authorization Conference report.
-- Payload reflects USD(A) baseline approval.

d. (U) Current Change Explanations -- None.

e. (U) References --

Development Estimate: Secretary of Defense Memorandum, Nov 1, 1983, and National Security Decision Directive, dated 10 Jul 85.

Approved Program: No currently approved DAE Baseline for this program.

1/ CEP is defined in terms of Circular Error Probable (CEP).

11. (U) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. (U) Cost

	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	9776.6	N/A	5621.3 1/
Procurement	22207.2	N/A	(104.1) 2/
Missile Flyaway	(9044.4)	N/A	(104.1) 2/
Other Weapon System	(7121.4)	N/A	TBD 2/
Peculiar Support	(4191.0)	N/A	TBD 2/
Initial Spares	(1850.4)	N/A	TBD 2/
Construction (MILCON)	1727.2	N/A	TBD 3/
Total FY84 Base-Year	33711.0	N/A	5725.4 4/
Escalation	11016.9	N/A	1549.7
Development (RDT&E)	(1873.2)	N/A	(1508,8)
Procurement	(8470.3)	N/A	(40.9)
Construction (MILCON)	(673.4)	N/A	TBD
Total Then-Year $	44727.9	N/A	7275.1

b. (U) Quantities --

Development (RDT&E)	22	TBD	16
Procurement	623	TBD	TBD 5/
Total	645	TBD	TBD

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- N/A

e. (U) Reference --

Development Estimate: Secretary of Defense memorandum, Nov 1, 1983 and National Security Decision Directive, dated 10 Jul 85.

Approved Program: A DAE baseline has not been approved for this program.

1/ Includes basing development funds in support of a 1997 IOC.
2/ Includes only FY 94 funds for advance procurement in support of the directed 1997 IOC. Since force size and basing locations have not been selected all remaining procurement funding beyond FY 94 is "To Be Determined".
3/ Since force size and basing locations have not been selected MILCON funding is "To Be Determined".
4/ Includes RDT&E basing development funds and only one year (FY 94) of procurement funding in support of the directed 1997 IOC; does not include any MILCON funding. Since force size and basing locations have not been selected, procurement and MILCON beyond FY 94 are "To Be Determined".
5/ Since force size and basing locations have not been selected quantities are "To Be Determined".

12. (U) Program Acquisition/Current Procurement Unit Cost Summary — In accordance with section 2433, Title 10 USC, unit cost reporting shall not apply, since the President's Budget does not contain funding for any fully configured end items.

13. (U) Cost Variance Analysis:

a. (U) Summary — (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Dev Estimate	11649.8	30677.5	2400.6	44727.9
Previous changes				
Economic	-7.7	235.0	7.3	234.6
Quantity		-12604.8	—	-12604.8
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	23.4	145.0	—	168.4
Other	-6425.4	0.0	-2407.9	-8833.3
Support	—	-18307.7	—	-18307.7
Subtotal	-6409.7	-30532.5	-2400.6	-39342.8
Current Changes				
Economic	87.4	—	—	87.4
Quantity	457.9	—	—	457.9
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	1.5	—	—	1.5
Other	1343.2	—	—	1343.2
Support	—	—	—	—
Subtotal	1890.0	—	—	1890.0
Total Changes Baseline Adjstmts	-4519.7	-30532.5	-2400.6	-37452.8
Our Estimate	1/ 7130.1	2/145.0	3/TBD	4/7275.1

1/ Includes basing development funds in support of a 1997 IOC.
2/ Includes only FY 94 funds for advance procurement in support of the directed 1997 IOC. Since force size and basing locations have not been selected all remaining procurement funding beyond FY 94 is "To Be Determined".
3/ Since force size and basing locations have not been selected MILCON funding is "To Be Determined".
4/ Includes RDT&E basing development funds and only one year (FY 94) of procurement funding in support of the directed 1997 IOC; does not include any MILCON funding. Since force size and basing locations have not been selected procurement and MILCON beyond FY 94 are "To Be Determined".

13. (U) Cost Variance Analysis: (Cont)

a. (U) Summary -- (Current (Base-Year 84$) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Dev Estimate	9776.6	22207.2	1727.2	33711.0
Previous changes				
Quantity	0.0	-9044.4	---	-9044.4
Schedule	---	---	---	---
Engineering	---	---	---	---
Estimating	20.9	110.0	---	130.9
Other	-5358.7	0.0	-1727.2	-7085.9
Support	---	-13162.8	---	-13162.8
Subtotal	-5337.8	-22097.2	-1727.2	-29162.2
Current Changes				
Quantity	300.0	---	---	300.0
Schedule	---	---	---	---
Engineering	---	---	---	---
Estimating	1.4	---	---	1.4
Other	881.1	-5.9	---	875.2
Support	---	---	---	---
Subtotal	1182.5	-5.9	---	1176.6
Total Changes Baseline Adjstmts	-4155.3	-22103.1	-1727.2	-27985.6
Current Estimate	1/5621.3	2/104.1	3/TBD	4/5725.4

1/ Includes basing development funds in support of a 1997 IOC.
2/ Includes only FY 94 funds for advance procurement in support of the directed 1997 IOC. Since force size and basing locations have not been selected all remaining procurement funding beyond FY 94 is "To Be Determined".
3/ Since force size and basing locations have not been selected MILCON funding is "To Be Determined".
4/ Includes RDT&E basing development funds and only one year (FY 94) of procurement funding in support of the directed 1997 IOC; does not include any MILCON funding. Since force size and basing locations have not been selected procurement and MILCON beyond FY 94 are "To Be Determined".

13. (U) Cost Variance Analysis: (Cont)

b. (U) Previous Change Explanations

RDT&E:

Economic:	Revised Economic Escalation Indices
Estimating:	Adjustment for Current and Prior Year Escalation
Other:	Deletion of 19 Flight Test Units and congressional recision action in FY 87 funding line
	Amended FY 90/91 Presidents Budget, reprogramming of $100M in FY 89 and the required funds to support a 1997 IOC

Procurement:

Economic:	Revised Economic Escalation Indices
Quantity:	Deletion of 623 Missiles
Support:	Deletion of support requirement associated with 623 missiles
Estimating:	Advanced procurement funds
Other:	Amended FY 90/91 Presidents Budget and the required funds to support a 1997 IOC

MILCON:

Economic:	Revised Economic Escalation Indices
Other:	Program reduction caused by replanned FY 89 and beyond President's budget

13. (U) Cost Variance Analysis: (Cont)

(Dollars in Millions)

c. (U) Current Change Explanations --		BY84$	TY$
RDT&E:			
Economic	Revised Economic Escalation Indicies	$ 0.0	$ 87.4
Quantity:	6 additional RDT&E units	$300.0	$ 457.9
Estimating:	Current and Prior Year Adjustment	$ 1.4	$ 1.5
Other:	Amended FY90/91 President's Budget with remaining missile and basing development leading toward a 1997 IOC	$881.1	$1343.2
	Correction for miscategorization of addition of 7 flight test units	$350.0 $-350.0	$458.8 $-458.8
Procurement:			
OTHER:	Adjustment to correct base year content of 30 Jun 89 SAR	$ -5.9 1/	$ 0.0

1/ 31 Jun 89 SAR was submitted by OSD with $110M BY84$ instead of the correct BY84$ of $103.1. The -$5.9 is the adjustment to correct for this error.

14. Program Acquisition Unit Cost (PAUC) History: In accordance with section 2433, Title 10 USC, unit cost reporting shall not apply, since the President's Budget does not contain funding for any fully configured end items.

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E —

	Initial Contract Price		
	Target	Ceiling	Qty
Small ICBM Hard Mobile Basing	$559.8M 1/	$592.8M	N/A
Boeing Aerospace Co			
Seattle WA			
F04704-87-C-0054, FPIF/AF			
Awarded: 23 December 1986			
Definitized: 23 December 1986			

Current Contract Price 2/			Estimated Price at Completion 3/	
Target	Ceiling	Qty	Contractor	Program Manager
$300.1M	$311.8M	1.0	$306.2M	$306.2M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-6.9M	$ 0.0M
Cum. Variances to Date (31 Oct 89)	$-0.1M	$ 0.0M
Net Change	$+6.8M	$ 0.0M
Cumulative Variance Change Percent	+98.5%	0.0%

Explanation of Change: The cost variance change (+$6.8M) is due to the implementation of a BSD directed single point adjustment at the end of the partially terminated program (Sep accounting data). No program impact. These values include the restart program change order.

1/ Initial Contract Price Target includes basic cost, fee, and 100% of award fee pool at start of contract.

2/ Current Contract Target price information based on fixed price cost/incentive profit and cost reimbursable/fixed fee, but not award fee (includes authorized unpriced work). Current Contract Ceiling price information is based on FPIF cost only with authorized unpriced work.

3/ Estimated price at completion includes negotiated cost, profit/fee, Authorized unpriced work, the current award fee/pool, and cost plus fixed fee line items.

15a. ~~(U)~~ RDT&E — (Cont)

	Initial Contract Price		
	Target	Ceiling	Qty
Post Boost Vehicle/Assembly & Test			
Martin Marietta, Denver CO	$333.5M 1/	$376.0M	N/A
F04704-85-C-0039, FPIF			
Awarded: 26 June 1985			
Definitized: 26 June 1985			

Current Contract Price 2/			Estimated Price at Completion 3/	
Target	Ceiling	Qty	Contractor	Program Manager
$405.0M	$414.4M	3.0	$407.5M	$407.5M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$- 9.4M	$- 0.9M
Cumulative Variances to Date (31 Oct 89)	$- 0.2M	$- 1.7M
Net Change	$+ 9.2M	$- 0.8M
Cumulative Variance Change Percent	+97.8%	-88.9%

Explanation of Change: The cost variance change (+$9.2M) is due to implementation of a BSD directed single point adjustment to the performance measurement baseline at the end of the partially terminated program (Sep accounting data). The schedule variance change (-$0.8M) is due to resources being focused on maintaining the FIM-1 launch date, and the ensuing anomaly investigation. No program impact. These values include the restart program change order.

1/ Initial Contract price target includes basic cost and fee.

2/ Current Contract Target price information based on fixed price cost/incentive profit and cost reimbursable/fixed fee, but not award fee (includes authorized unpriced work). Current Contract Ceiling price information is based on FPIF cost only with authorized unpriced work.

3/ Estimated price at completion includes negotiated cost, authorized unpriced work, profit/fee, and cost plus fixed fee line items.

15a. (U) RDT&E — (Cont)

	Initial Contract Price		
	Target	Ceiling	Qty
Guidance and Control Integration			
Rockwell International (Autonetics)	$501.1M 1/	$529.2	N/A
Anaheim CA			
F04704-87-C-0077, FPIF/AF			
Awarded: 5 Oct 1987			
Definitized: 30 Nov 1987			

Current Contract Price 2/			Estimated Price at Completion 3/	
Target	Ceiling	Qty	Contractor	Program Manager
$147.6M	$148.4M	3.0	$153.4M	$153.4M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-3.1M	$-0.5M
Cumulative Variances to Date (31 Mar 89)	$+0.8M	$+0.7M
Net Change	$+3.9M	$+1.2M
Cumulative Variance Change Percent	+125.8%	+240.0%

Explanation of Change: The cost variance change (+$3.9M) is due to slower manning of the restart change order than anticipated, and favorable overhead costs. The schedule variance (+$1.2M) is due to early material/component deliveries. No program impact. These values include the restart program change order.

1/ Initial contract target includes basic cost, fee, and 100% of award fee pool at start of contract.

2/ Current Contract Target price information based on fixed price cost/incentive profit and cost reimbursable/fixed fee, but not award fee (includes authorized unpriced work). Current Contract Ceiling price information is based on FPIF cost only with authorized unpriced work.

3/ Includes negotiated cost, authorized unpriced work, profit/fee, the current award fee/pool, and cost plus fixed fee line items.

15a. (U) RDT&E — (Cont)

	Initial Contract Price		
	Target	Ceiling	Qty
Missile Stage II			
Aerojet Nevada Rocket Operations	$186.4M 1/	$201.2M	N/A
Sacramento CA			
F04704-87-C-0050/FPIF/AF			
Awarded: 23 December 1986			
Definitized: 23 December 1986			

Current Contract Price 2/			Estimated Price at Completion 3/	
Target	Ceiling	Qty	Contractor	Program Manager
$132.4M	$134.9M	3	$137.3M	$137.3M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-7.0M	$-0.5M
Cumulative Variances to Date (31 Oct 89)	$-3.5M	$-0.3M
Net Change	$+3.5M	$+0.2M
Cumulative Variance Change Percent	+50.0%	+40.0%

Explanation of Change: The cost (+$3.5M) and schedule (+$0.2M) variance changes are due to implementation of a BSD directed single point adjustment to the performance measurement baseline at the end of the partially terminated program (Sep accounting data). No program impact. These values include the restart program change order.

1/ Initial contact price target includes basic cost, fee, and 100% of award fee pool at start of contract.

2/ Current Contract Target price information based on fixed price cost/incentive profit and cost reimbursable/fixed fee, but not award fee (includes authorized unpriced work). Current Contract Ceiling price information is based on FPIF cost only with authorized unpriced work.

3/ Estimated price at completion includes negotiated cost, profit/fee, authorized unpriced work, the current award fee/pool, and cost plus fixed fee line items.

15a. ~~(89)~~ RDT&E — (Cont)

	Initial Contract Price		
	Target	Ceiling	Qty
Missile Stage III			
Hercules, Inc.	$173.3M 1/	$189.1M	N/A
Magna UT			
F04704-87-C-0051/FPIF/AF			
Awarded: 23 December 1986			
Definitized: 23 December 1986			

Current Contract Price 2/			Estimated Price at Completion 3/	
Target	Ceiling	Qty	Contractor	Program Manager
$108.0M	$110.2M	3	$109.8M	$109.8M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-7.3M	$-1.0M
Cumulative Variances to Date (31 Oct 89)	$+0.1M	$-0.1M
Net Change	$+7.4M	$+0.9M
Cumulative Variance Change Percent	+101.4%	+90.0%

Explanation of Change: The cost (+$7.4M) and schedule (+$0.9M) variance changes are due to implementation of a BSD directed single point adjustment to the performance measurement baseline at the end of the partially terminated program (Sep accounting data). No program impact. These values include the restart program change order.

1/ Initial contract price target includes basic cost, fee, and 100% of award fee pool at start of contract.

2/ Current Contract Target price information based on fixed price cost/incentive profit and cost reimbursable/fixed fee, but not award fee (includes authorized unpriced work). Current Contract Ceiling price information is based on FPIF cost only with authorized unpriced work.

3/ Estimated price at completion includes negotiated cost, authorized unpriced work, profit/fee, the current award fee/pool, and a cost plus fixed fee line item.

15a. (U) RDT&E — (Cont)

	Initial Contract Price		
	Target	Ceiling	Qty
Ordnance Firing System			
Hercules, Inc	$ 83.8M1/	$ 92.0M	N/A
Magna, UT			
F04704-86-C-0165, FPIF/AF			
Awarded: 18 Jul 1986			
Definitized: 18 Jul 1986			

Current Contract Price 2/			Estimated Price at Completion 3/	
Target	Ceiling	Qty	Contractor	Program Manager
$ 93.3M	$ 97.4M	3	$ 94.8M	$ 94.8M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-8.5M	$-0.5M
Cumulative Variances to Date (31 Oct 89)	$-0.7M	$ 0.0M
Net Change	$+7.8M	$+0.5M
Cumulative Variance Change Percent	+91.8%	+100.0%

Explanation of Change: The cost variance (+$7.8M) change is due primarily to accounting adjustments made to reflect favorable completion of subcontract negotiations. Additionally, the cost and schedule (+$0.5M) change is due to implementation of a BSD directed single point adjustment to the performance measurement baseline at the end of the partially terminated program (Sep accounting data). No program impact. These values include the restart program change order.

1/ Initial contract price includes negotiated cost, authorized unpriced work, profit/fee, current award fee/pool, and cost plus fixed fee line items.

2/ Current Contract Target price information based on fixed price cost/incentive profit and cost reimbursable/fixed fee, but not award fee (includes authorized unpriced work). Current Contract Ceiling price information is based on FPIF cost only with authorized unpriced work.

3/ Includes negotiated cost, authorized unpriced work, profit, the current award fee/pool, and cost plus fixed fee line items.

b. (U) Procurement — None

c. (U) MILCON — None

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status —

(1) Percent Program Completed: 63.6% (7 yrs/11) 1/

(2) Percent Program Cost Appropriated: 45.9% ($3338.1/7275.1) 1/

b. (U) Appropriation Summary — 1/

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY84-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-TC)	Total	
RDT&E	3238.1	100.0	202.2	3589.8	7130.1	2/
Procurement	0.0	0.0	0.0	145.0	145.0	3/
MILCON	0.0	0.0	0.0	TBD	TBD	4/
Total	3238.1	100.0	202.2	3734.8	7275.1	5/

1/ Since force size and basing locations have not been selected procurement and MILCON beyond FY 94 are "To Be Determined", therefore we cannot complete the program status portion of this SAR.

2/ Includes basing development funds in support of a 1997 IOC.

3/ Includes only FY 94 funds for advance procurement in support of the directed 1997 IOC. Since force size and basing locations have not been selected all remaining procurement funding beyond FY 94 is "To Be Determined".

4/ Since force size and basing locations have not been selected MILCON funding is "To Be Determined".

5/ Includes RDT&E basing development funds and only one year (FY 94) of procurement funding in support of the directed 1997 IOC; does not include any MILCON funding. Since force size and basing locations have not been selected procurement and MILCON beyond FY 94 are "To Be Determined".

c. [redacted] Annual Summary —

Fiscal Year	Qty	Flyaway - FY84 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1984				321.9	328.3	313.7	313.7	3.8
1985				435.8	458.5	454.7	454.7	3.4
1986				537.7	581.2	577.8	572.6	2.8
1987				736.2	820.1	819.5	792.0	2.7
1988				606.6	700.0	699.2	615.4	3.1
1989				290.7	350.0	231.1	87.9	4.2
1990				79.8	100.0	35.2	3.3	4.0
1991 3/				155.3	202.2			4.2
1992 3/				410.5	555.0			4.0
1993 3/				427.6	598.2			3.7
1994 3/				428.4	619.0			3.4
TC 1/				1190.8	1817.6			
Sub - Total 2/	16			5621.3	7130.1	3131.2	2839.6	—

1/ Fiscal year spread is TBD.

2/ Includes basing development funds in support of a 1997 IOC.

3/ The FY91-94 inflation was not adjusted correctly. If the inflation were applied correctly, the appropriate BY84$ total would be $5631.6 and the FY$ total would be $7146.6.

c. (U) Annual Summary — (Cont)

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year$	Total Then-Year $			Escl Rate
		Nonrec	Rec		Program	Obli-gated	Ex-pended	(%)
Appropriation: Procurement								
1994 1/				104.1	145.03/			3.4
TC 2/				TBD	TBD			
Sub - Total 3/				104.1	145.0			—
Total 4/				5725.4	7275.1			

1/ Provides for advance procurement in support of a 1997 IOC.

2/ Since force size and basing locations have not been selected all remaining Procurement funding beyond FY 94 is "To Be Determined".

3/ Outyear funding has not been adjusted for inflation and will be reported in the next annual SAR. If the inflation was applied the correct then year dollar would be $157.7.

4/ The FY91-94 inflation for RDT&E was not adjusted correctly. If the inflation were applied correctly, the appropriate BY84$ total would be $5735.7 and the TY$ would be $7304.3.

17. (U) Production Rate Data: N/A

18. (U) Operating and Support Costs:

a. (U) No applicable O&S estimate
b. (U) No applicable O&S estimate
c. (U) Contractor Support Costs - N/A

AF-29 TITAN IV

SAR-89-092

SELECTED ACQUISITION REPORT (RCS: DD-COMP(QA)823)
PROGRAM: Titan IV

AS OF DATE: December 31, 1989

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CLEARED
FOR OPEN PUBLICATION
MAR 1 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

1. Designation and Nomenclature (Popular Name): Titan IV, formerly Complementary Expendable Launch Vehicle (CELV)

2. DoD Component: United States Air Force

3. Responsible Office and Telephone Number:

Titan Systems Program Office
Space Systems Division,
Los Angeles AFB, CA 90009

Col Charles F. Stirling
Assigned: October 1, 1989
AV 833-0210, COMM (213)643-0210

4. Program Elements/Procurement Line Items:

RDT&E: PE 0305119F (Shared funding)
PE 0305171F (Shared funding)
PE 0304111F (Shared funding)

PROCUREMENT: MILCON, O&M
PE 0305119F (Shared funding) 3020 Appn ICN MSBSTR
PE 0304111F (Shared funding)

5. Related Programs:

Defense Support Program (DSP); Milstar; Defense Systems Communications Satellite (DSCS); Boost and Surveillance Tracking System (BSTS); Space Shuttle Operations (IUS); Classified Payloads

SAF/PAS
90-099 -T
#31

Mission and Description:

The Titan IV program will not replace any defense programs. It will assure continued access to space for the nation's highest priority space systems. The Titan IV system evolved from the basic family of Titan systems, namely, the Titan IIIB, C, D, E and 34D, which have contributed to national space objectives for more than 25 years. The Titan IV consists of a liquid propellant core of two stages with a pair of large solid rocket motors attached to the core to provide the initial stage of boost from liftoff. While a variety of upper stages may be compatible with the booster, the two upper stages baselined for use on the Titan IV are the Inertial Upper Stage (IUS) and the Titan Centaur. When configured with the Centaur, a single stage liquid propellant restartable upper stage, the Titan IV is capable of placing a 10,000 pound payload into geosynchronous orbit (GSO). The Titan IV/IUS configuration is capable of placing a 5,200 pound payload into GSO. When configured without an upperstage, the Titan IV NUS can place a 31,100 pound payload into a 100 nmi circular, polar orbit.

7. Program Highlights:

a. Significant Historical Developments -- Development of the Titan IV program is in direct response to a National Security Decision Directive, which directed the DoD to provide assured access to space for critical DoD satellites. The initial contract for development, qualification and production of 10 Titan IVs with Centaur upper stages was awarded in February 1985. This contract included the activation and operation of a single Titan IV/Centaur launch facility at Cape Canaveral AFS, FL (CCAFS). The program has since completed Program Design Reviews - all major sub-systems including the new Solid Rocket Motor Upgrade (SRMU). The Titan IV system has not undergone any IOT&E.

As a result of the 28 January 1986 Space Shuttle Challenger accident, the DoD embarked upon a recovery plan which included the acquisition of 13 additional Titan IV boosters, activation and operation of an existing Titan launch pad at Vandenberg AFB, CA (VAFB), the development and construction of a new Titan IV/Centaur launch pad at VAFB, and STS/Titan IV dual compatibility for some AF satellites launched from the east coast. The resulting 23 vehicle Titan IV program was placed on contract in December 1987, and was structured to account for the impacts of the April 1986 Titan 34D accident and the June 1986 NASA/Centaur cancellation.

The DoD has since embarked upon an increased capacity plan which includes the modification of an additional launch pad at CCAFS, the acquisition of 18 additional Titan IV boosters and associated facility and plant enhancements, and a replenishment procurement of 10 vehicles per year in 1995 and out. The current 41 vehicle program was definitized in Dec 89 and includes an option for 8 more vehicles.

b. Significant Developments Since Last Report -- Structural testing and qualification of the core vehicle was completed in Jan 89. The payload fairing qualification program for the first vehicle was completed in March 89. Those tests resulted in the first fully qualified Titan IV vehicle that successfully launched it's payload into space in June 89.

b. Significant Developments (cont) -- The Cape has received it's fourth vehicle and Vandenberg has received it's second vehicle. The prime contractor took delivery of SLC-4E, the Titan 34D pad that was refurbished to be Titan IV compatible, in august of 1989. The SRMU will have a 1992 IOC and increase booster reliability and performance in all configurations. The Test and Evaluation Master Plan (TEMP) for the SRMU development testing program was coordinated and approved in June 1989. This plan includes 5 full static firings prior to the first SRMU launch. Component qualification of the TIV/Centaur is scheduled for completion in May 1990. No IOT&E has been performed.

The system is expected to satisfy mission requirements.

c. Changes Since "As of Date" -- None.

8. Threshold Breaches:

There are no breaches against the DAE baseline dated 18 Dec 89. The Titan IV is not a DAB program.

9. Schedule:

a. Milestones --

	Development Estimate	Approved Program	Current Estimate	
Initial Contract Award	Feb 85	Feb 85	Feb 85	
Production Start	Oct 85	N/A	Oct 85	
System Prelim. Design Review	Apr 86	N/A	Apr 86	
System Critical Design Review	Nov 86	Nov 86	Oct 86	
Addition of 13 Vehicles	N/A	Dec 87	Dec 87	
First Core Delivery to CCAFS	N/A	Jan 88	Jan 88	
First Delivery to CCAFS	Feb 88	N/A	Apr 88	
Initial Launch Capability (IUS)	Oct 88	Feb 89	Feb 89	(Ch-1)
Titan IV/NUS (WIR) IOC	N/A	Oct 90	Dec 90	(Ch-3)
Titan IV/Centaur IOC	N/A	Jun 91	Jun 91	(Ch-4)
First SRMU Flight	N/A	1st Qtr 92	1st Qtr 92	(Ch-6)
Addition of 18 Vehicles	N/A	N/A	Dec 89	(Ch-2)
SLC-40 IOC	N/A	4th Qtr 92	4th Qtr 92	(Ch-5)
Second West Coast Pad IOC (SLC-7 IOC)	N/A	3rd Qtr 96	1st Qtr 96	(Ch-5)
Centaur Structural Test	N/A	Jul 89	Nov 90	(Ch-5)
SRMU Static Firing	N/A	Mar 90	Jun 90	(Ch-5)
SRMU IOC	N/A	1st Qtr 92	1st Qtr 92	

b. Previous Change Explanations -- Due to favorable progress driven by the Preliminary Design Review, the Systems Critical Design Review was moved forward from November 1986 to October 1986. Favorable progress by the core contractor led to the first Titan IV core delivery to CCAFS one month ahead of schedule. However, solid rocket motor and payload fairing deliveries were rescheduled to February 1988 and April 1988, thus delaying delivery of the last vehicle components to CCAFS until april 1988. Certain DAE Baseline milestones and significant program milestones have been incorporated into the SAR after the Development Estimate.

c. Current Changes -- (Ch-1) The delay of the IUS ILC was driven by a delay in the launch pad Ground System Test procedures required to perform the propellant "hot flow" test. (Ch-2) Incorporation of significant program milestones into SAR. (Ch-3) The TIV/NUS at WTR has been delayed by electrical modifications to the modular mobile service tower, incomplete ground system test for the launch complex and the growth in the non-recurring testing required for the spacecraft. (Ch-4) The delayed launch of the first TIV caused a slip in the TIV/Centaur ILC due to the directed stand down caused by STS/IUS scheduling conflicts and late availability of the SLC-41 pad for Centaur modifications. It has also been moved out due to increased spacecraft facility modifications, the allocation of the first stiff boattail Payload Fairing (PLF) to VAFB in lieu of CCAFB missions, and delays in the Centaur upperstage testing. (Ch-5) Incorporation of approved DAE baseline milestones. (Ch-6) Milestone changed from a vehicle effectivity to a firm date in order to line up with DAE baseline.

d. References --
Development Estimate: FY87 President's Budget, February 1986.
Approved Baseline: DAE Baseline Approved 18 December 1989.

10. Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate	
a. Technical --					
Systems Reliability (%)	98	98/96	N/A	96	(Ch-2)
Solid Rocket Motors: **					
Thrust (M-lbs) 1/	1.6	N/A N/A	N/A	1.6	
Solid Rocket Motor Upgrade:					
Thrust (M-lbs) 1/	N/A	N/A N/A	N/A	1.6	
Core Vehicle:					
Stage One: 1/					
Engine Thrust (k-lbs)	546.0	N/A N/A	N/A	546.0	
Stage Two: 1/					
Engine Thrust (k-lbs)	104.0	N/A N/A	N/A	104.0	
b. Operational --					
Payload to geosynchronous Orbit (k-lbs) (TIV/Cent/SRM)	10.0	10.0/10.0	N/A	10.0	
(TIV/Cent/SRMU)		11.5/11.5*	N/A	11.5*	(Ch-1)
Payload to geosynchronous Orbit (k-lbs) (TIV/IUS/SRM)	N/A	5.0 /5.0	N/A	5.2	
Payload to low earth polar orbit (k-lbs) (TIV/NUS/SRM)	N/A	32.0/32.0	N/A	30.9	(Ch-3)
(TIV/NUS/SRMU)	N/A	40.0/40.0	N/A	38.3	(Ch-3)

* 13.5 (k-lbs) is attainable with structural modifications to the Centaur.

1/ Data elements are not valid measure of boosters capability and will be deleted in from a future SAR.

** Engine thrust data elements will be deleted from future SARs since they are not valid determinants of system performance.

c. Previous Change Explanations -- Incorporation of DAE Baseline values.

d. Current Change Explanation -- (Ch-1) Incorporation of DAE Baseline values. (Ch-2) The previous estimate was based on analytical analysis of system design parameters. The current estimate also incorporates operational parameters and historical data from previous Titan programs. (Ch-3) first flight performance and ground system testing indicated performance at these values. Efforts are arbitrary to improve performance.

e. References --
Development Estimate: FY87 President's Budget, February 1986.
Approved Program: DAE Baseline Approved 18 December 1989.

11. **Program Acquisition Cost** (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	$ 579.7	1813.5	2207.0
Program Development	(488.7)	(1719.0)	(2212.0)
RDT&E Funded Centaurs	(91.0)	(94.5)	(95.0)
Procurement	1570.8	7523.3	10302.0
Total Flyaway	(1106.6)	(6830.0)	(9527.1)
Other Weapon Systems Costs	(464.2)	(693.3)	(774.9)
Construction (MILCON)	0.0	105.3	111.3
Total FY 85 Base-Year $	2150.5	9442.0	12620.3
Escalation	378.7	2166.2	4388.8
Development (RDT&E)	(61.4)	(285.6)	(509.6)
Procurement	(317.3)	(1854.9)	(3848.3)
Construction (MILCON)	(0.0)	125.7	(30.9)
Total Then-Year $	$ 2529.2	11608.3	17009.1
b. Quantities --			
Development (RDT&E)	-	-	-
Procurement	10	55	75*
Total	10	55	75*

c. Foreign Military Sales -- None
d. Nuclear Costs -- None
e. References --
Development Estimate: FY87 President's Budget, February 1986.
Approved Program: DAE Baseline 18 Dec 89.

12. **Program Acquisition/Current Procurement Unit Cost Summary:**
(Current (Then-Year) Dollars in Millions)

	Current Estimate (Dec 89 SAR)	Current Year UCR Baseline (Dec 88 SAR)	Budget Year UCR Baseline (Dec 89 SAR)
a. Program Acquisition --			
(1) Cost	$17009.1	$12201.3	$17009.1
(2) Quantity	75	57	75
(3) Unit Cost	$ 226.788	$ 214.058	$ 226.788
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)*	(FY 1991)
(1) Cost	$ 960.2	$ 960.2	$ 913.3
Less CY Adv Proc	- 50.3	- 50.3	- 0.0
Plus PY Adv Proc	+317.7	+317.7	+180.5
Net Total	$1227.6	$1227.6	$1101.8
(2) Quantity	5	5	5
(3) Unit Cost	245.520	245.520	220.360

* Adjusted to reflect FY90 Appropriations Act in accordance with Congressional change to SAR law.

- Cost Variance Analysis:

a. Summary --

(Current (Than-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	641.1	1888.1	0.0	2529.2
Previous Changes:				
Economic	-8.3	-20.1	-.1	-28.5
Quantity		+6835.7		+6835.7
Schedule		-36.2	+5.0	-31.2
Engineering	+298.1	-1374.3		-1076.2
Estimating	+759.1	+2404.8	+214.6	+3378.5
Other Support	+297.0	+296.8		+593.8
Subtotal	+1345.9	+8106.7	+219.5	+9672.1
Current Changes:				
Economic	+17.2	+428.5	+7.5	+453.2
Quantity		+3248.4		+3248.4
Schedule		+51.2		+51.2
Engineering	+10.3	-909.1		-898.8
Estimating	+410.4	+1266.1	-84.8	+1591.7
Other Support	+291.7	+70.4		+362.1
Subtotal	+729.6	+4155.5	-77.3	+4807.8
Total Changes	+2075.5	+12262.2	+142.2	+14479.9
Current Estimate	2716.6	14150.3	142.2	17009.1

1985 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	579.7	1570.8	0.0	2150.5
Previous Changes:				
Quantity		+5301.6		+5301.6
Schedule				
Engineering	+255.1	-1028.7		-773.6
Estimating	+638.7	+1877.7	+175.4	+2691.8
Other Support	+254.1	+272.5		+526.64
Subtotal	+1147.9	+6423.1	+175.4	+7746.4
Current Changes:				
Quantity		+2030.4		+2030.4
Schedule				
Engineering	+7.7	-566.4		-558.7
Estimating	+252.2	+805.9	-64.1	+994.0
Other Support	+219.5	+38.2		+257.7
Subtotal	+479.4	+2308.1	-64.1	+2723.4
Total Changes	+1627.3	+8731.2	+111.3	+10469.8
Current Estimate	2207.0	10302.0	111.3	12620.3

b. Previous Change Explanations --

RDT&E

Economic: Revised economic escalation indices.

Engineering: Design effort for satellite dual compatibility; continued effort for a second west coast Titan IV launch pad at Vandenberg AFB, CA; continued development of an upgraded solid rocket motor.

Estimating: Recurring payload integration for additional payloads; lifting of Centaur stop-work order; acceleration and compression of non-recurring payload integration; additional engineering support; transfer to procurement of funds for previously designated Shuttle missions; transfer of outyear funds from procurement; Gramm/Rudman/Hollings reductions; reductions from budget cycle reviews; adjustment for current and prior year escalation rates; adjustment for outyear escalation; lower Centaur unit price as a result of negotiations; additional payload integration requirements; funding for Centaur development, funding for projected contractor overrun, additional FCRC support for increased program scope, facility design support for the Solid Motor Assembly & Readiness Facility (SMARF) and Centaur Off-line Processing Facility.

Support: Additional support equipment for accelerated activation at the CCAFS, FL, launch site; initial funds for facility modification at the launch sites.

Procurement

Economic: Revised economic escalation indices.

Quantity: Hardware costs for an additional 34 vehicles.

Schedule: Accelerated buy of original 23 vehicles.

Engineering: Additional hardware to accommodate satellite dual compatibility and mission requirements precluding Centaur upperstages; initial hardware for an upgraded solid rocket motor.

Estimating: Recategorization of Flyaway/Support costs reported in December 1985 SAR, procurement of additional tooling; transfer from RDT&E of funds for previously designated Shuttle missions; transfer of outyear funds to RDT&E; outyear Centaur procurement due to STS/Centaur cancellation; deletion of classified user operations and maintenance funds; Gramm/Rudman/Hollings reductions; funding reductions due to budget cycle reviews; provisions for engineering change orders; contractor launch incentives and propellant requirements for increased launches; unit price benefits of increase quantity buy; adjustment for current and prior year escalation changes; adjustment for outyear escalation; realignment of outyear funds to support programmatic changes; increased government involvement in plant inspections; additional tooling to support higher productivity capacity; additional Federal Contract Research Center engineering support as a result of increased program scope; procurement of an additional payload fairing to support satellite integration on Titan IV; funds for engineering change orders based upon increased program scope, funding for payload integration for increased program scope.

- Previous Change Explanations (cont)--

Support: Accelerated procurement of support equipment at the CCAFS, FL, launch site and recategorization of Flyaway/Support costs reported in December 1985 SAR; adjustment for current and prior year escalation rates; budget reductions due to budget cycle reviews; initial AGE and communication equipment requirements to support increased launch requirements at CCAFS, FL and VAFB, CA.

MILCON

Schedule: Realignment of costs for new LSC-7 Launch PAD.

Economic: Revised economic escalation indices.

Estimating: Funds added to program to construct a second Titan IV launch pad at Vandenberg AFB, CA; adjustment for outyear escalation; realignment of the second Titan IV launch pad costs into outyears. Funds added for SMARF and the Centaur Off-line processing facility at CCAFS, FL.

c. Current Change Explanations --	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised economic escalation indices. (Economic)	N/A	+17.2
Continued development of the Solid Rocket Motor Upgrade for FY94-95. (Engineering)	+7.7	+10.3
Vehicle configuration design changes. (Estimating)	+6.7	+15.1
Adjustment for current and prior year escalation. (Estimating)	-2.2	-2.8
Payload integration of missions due to increased program scope for FY96-97. (Estimating)	+36.4	+77.1
Provisions for increased program scope. (Estimating)	+181.8	+284.7
Increased other contract costs due to increased program scope. (Estimating)	+29.5	+36.3
Federal Contract Research Center (FCRC) support for decreased study efforts. (Support)	-4.3	-4.6
Facility design for the new Centaur Off-line Processing Facility and upgrades to the SRM testing facility at CCAFS, FL. (Support)	+16.3	+23.4

c. Current Change Explanations (cont) --	(Dollars in Millions) Base-Year	Then-Year
Design of modernized AGE at CCAFS, FL to support increased program scope and duration. (Support)	+116.6	+145.0
Second west coast launch pad modifications to change from a Shuttle to a Titan IV capability at VAFB, CA. (Support)	+90.9	+127.9
(2) Procurement		
Revised economic escalation indices. (Economic)	N/A	+428.5
Additional buy of 18 replenishment vehicles.		
-- Additional hardware costs for 18 vehicles. (Quantity)	(+2030.4)	(+3248.4)
-- Mission requirements preclude the need to procure Centaur upperstages for 11 Titan IVs. (Engineering)	(-581.8)	(-929.1)
-- Contractor launch incentives required through FY97 for additional vehicles. (Estimating)	(+115.1)	(+182.0)
-- Propellant requirements through FY97 for additional vehicles. (Estimating)	(+75.1)	(+114.4)
-- Additional funds for FCRC support of increased program scope. (Estimating)	(+48.9)	(+76.1)
-- Payload integration of additional missions due to increased program scope. (Estimating)	(+470.0)	(+705.3)
-- Provisions for changes in the program in support of 18 additional vehicles. (Estimating)	(+276.5)	(+433.3)
Decrease in unit price of 18 vehicles due to negotiation of the follow on buy. (Estimating)	-143.0	-206.2
Change due to rephasing of production build sequence. (Schedule)	N/A	+51.2
Tooling to support an increased production rate at contractors facility. (Engineering)	+15.4	+20.0

Current Change Explanations (cont) --	(Dollars in Millions) Base-Year	Then-Year
Adjustment for current and prior year escalation offset. (Estimating)	-21.8	-39.0
Production hardware changes due to vehicle configuration changes. (Estimating)	+163.9	+235.8
Revised user vehicle cost estimate. (Estimating)	-53.0	-110.5
Revised propellant estimate. (Estimating)	-82.6	-115.2
Revised contractor incentive plan. (Estimating)	-44.3	-57.7
Multiyear rephase funding adjustment. (Estimating)	0.0	+92.4
Incremental funding adjustment for users. (Estimating)	0.0	-48.1
Communication equipment for second west coast launch pad at VAFB, CA. (Estimating)	+1.1	+3.5
AGE requirements for second west coast launch pad at VAFB, CA. (Support)	+2.0	+24.4
AGE requirements at CCAFS, FL to support increased program scope and duration. This scope includes the new SMARF (Support)	+36.2	+46.0
(3) MILCON		
Revised economic escalation indices. (Economic)	N/A	+7.5
Realignment of construction costs for SLC-6 launch pad at VAFB, CA due to congressional direction. (Estimating)	-60.4	-80.1
Realignment of construction costs for the SMARF at CCAFS, FL. (Estimating)	-2.8	-3.5
Realignment of construction costs for centaur Off-line Processing Facility at CCAFS, FL. (Estimating)	-.9	-1.2

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

Initial SAR/Development Estimate to Current Estimate --

PAUC (Initial SAR/Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Engr	Est	Oth	Spt	Total	
252.920	+5.663	-84.743	+.267	-26.333	+66.269		+12.745	-26.132	226.788

15. Contract Information: (Then-Year Dollars in Millions)

RDT&E/Procurement --

Titan IV:	Initial Contract Price		
	Target	Ceiling	Qty
Martin Marietta Corp., Denver, CO	$2095.8	$2287.8	10

F04701-85-C-0019, FPIF
Award: February 28, 1985
Definitized: March 1, 1985

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$5341.1	$5624.0	23	$5622.0	$5753.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-130.4	$- 92.6
Cumulative Variances To Date (Nov 89)	$-229.2	$-160.3
Net Change	$- 98.8	$- 67.7
Cum Change in %	-75.8%	- 73.1%

Explanation of Change: The unfavorable Cost Variance is due to late engineering changes, new and rework tooling requirements, late engineering releases by McDonnell Douglas, design complexities, test article design analysis and test problems, anomalies resolution-launch head failure, Centaur design complexities, inexperience of personnel, and low quality performance. The negative schedule variance is due to missed milestones by avionics, and the late delivery of subcontract components at Chemical Systems Division. These areas are expected to contribute to the continued overrun status of the contractor until the second quarter of FY91.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --
(1) Percent Program Complete: 46.2% (6 yrs/13yrs)
(2) Percent Program Cost Appropriated: 36.1% ($6137.8/$17009.1)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Prior Years (FY85-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-97)	Total
RDT&E	1230.7	351.4	177.8	956.7	2716.6
Missile Proc	3506.5	960.2	913.3	8739.5	14119.5
Other Proc	0.0	0.0	0.0	30.8	30.8
MILCON	0.0	89.0	29.2	24.0	142.2
Total	4737.2	1400.6	1120.3	9751.0	17009.1

c. Annual Summary -- (Dollars in Millions)

Fiscal Year	Qty	FY85 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Total Then-Year $ Program	*Obligated	*Expended	Escl Rate (%)
Appropriation: RDT&E 1/								
1985				37.5	38.2	38.2	38.2	3.4
1986				248.3	259.5	259.5	211.4	2.8
1987				189.2	203.8	203.8	161.6	2.7
1988				299.2	333.9	333.9	297.2	3.1
1989				339.6	395.3	395.3	235.3	4.2
1990				289.9	351.4	68.5	0.0	4.0
1991				141.0	177.8			4.2
1992				81.9	107.2			4.0
1993				72.9	98.8			3.7
1994				63.4	88.7			3.4
1995				164.4	237.0			3.1
1996				79.4	118.0			3.1
1997				200.3	307.0			3.1
Subtotal				2207.0	2716.6	1299.2	943.7	-
Appropriation: Missile Procurement								
1985				42.9	45.0	45.0	45.0	3.4
1986				438.6	477.7	477.7	477.7	2.8
1987	2	65.0	140.0	787.7	890.1	890.1	890.1	2.7
1988	6	216.7	466.5	1013.8	1192.2	1192.2	980.2	3.1
1989	5	205.8	443.0	728.8	901.5	891.7	286.4	4.2
1990	5	205.8	443.0	747.2	960.2	175.9	0.0	4.0
1991	5	238.3	513.0	685.7	913.3			4.2
1992	6	216.7	466.5	775.8	1068.3			4.0
1993	6	270.6	582.5	899.5	1278.2			3.7
1994	10	368.2	793.0	947.9	1389.5			3.4
1995	10	411.5	886.0	1105.2	1670.0			3.1
1996	10	411.5	886.0	1064.3	1658.2			3.1
1997	10	411.5	886.0	1043.1	1675.3			3.1
Sub	75	3021.6	6505.5	10280.5	14119.5	3672.6	2679.4	-
Appropriation: Other Procurement								
1993				9.7	13.7			3.7
1994				9.7	14.0			3.4
1995				2.1	3.1			3.1
Subtotal				21.5	30.8	0.0	0.0	-
Appropriation: MILCON								
1990				71.1	89.0	0.0	0.0	4.0
1991				22.4	29.2			4.2
1992				17.8	24.0			4.0
Subtotal				111.3	142.2	0.0	0.0	-
Total	75	3021.6	6505.5	12620.3	17009.1	4971.8	3623.1	-

1/ FYs 86, 87, and 88 amounts include the purchase of two RDT&E funded Centaurs originally designed for the Shuttle RDT&E missions.
* Reflects Program Office records as of 31 Dec 89.

17. Production Rate Data:

a. Annualized Production Rates -- (Note: All funded delivery periods are 12 months. The Production Estimate and Maximum Economic are not applicable until the program moves to a production phase.)

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1987	1	N/A	2	N/A
1988	3	N/A	6	N/A
1989	2	N/A	5	N/A
1990	2	N/A	5	N/A
1991	2	N/A	5	N/A
1992		N/A	6	N/A
1993		N/A	6	N/A
1994		N/A	10	N/A
1995		N/A	10	N/A
1996		N/A	10	N/A
1997		N/A	10	N/A

b. Cost Variance -- not applicable

c. Schedule Variance -- not applicable

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
Procurement	4/4

e. Approved Design to Cost Goal -- not applicable

18. Operating and Support Costs:

a. Assumptions and Ground Rules -- Launch costs are based upon actual contract values for the current Titan IV program and projected contract values for the follow-on missions. The average annual cost per launch is based upon the cost to launch at a rate of three in 1990, 5 in 1991 and six per year there after out of Cape Canaveral AFS, FL (CCAFS). The costs include contractor launch support at CCAFS and indirect support required at the Martin Marietta and subcontractor plants. Range costs are based upon current and historical data from the Titan IV and Titan 34D programs.

b. Costs -- (FY 1985 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per Titan IV Launch	*
Launch Support	20.3	
Range Support	4.1	
Total	24.4	

c. Contractor Support Costs -- N/A

* No antecedent

SAR-89-058

AF-16 JSTARS [redacted]

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

Program: Joint STARS

AS OF DATE: December 31, 1989

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CLEARED
FOR OPEN PUBLICATION
AS AMENDED
MAR 1 1990
DIRECTORATE FOR FREEDOM OF INFORMATION
AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

1. (U) Designation and Nomenclature (Popular Name): Joint Surveillance Target Attack Radar System (Joint STARS)

2. (U) DoD Component: U.S. Air Force, U.S. Army

3. Responsible Office and Telephone Number:

Joint Stars Program Office
Electronic Systems Division
Hanscom AFB, MA 01731-5000

PM: Col Harry H. Heimple
Assigned: 1 Sep 1989
AUTOVON: 478-5724
Commercial: (617)-377-5724

4. (U) Program Elements/Procurement Line Items:

RDT&E: 0603770F
0604770A
0604770D
0604770F
0604616F
0604270F (Shared Funding) Project # 3894, Self Defense Development

PROCUREMENT: APPN 3010 ICN JSTARS
APPN 2035A ICN 7310 BA 1080

MILCON: 0604770F

5. (U) Related programs: Global Positioning System (GPS), Joint Tactical Information Distribution System (JTIDS), Single Channel Ground Air Radar System (SINCGARS), Inertial Navigation Unit (INU), E-8 (formally C-18), HAVE QUICK, E-6, HAVE SYNC.

~~Classified by: Joint STARS Classification Guide, 31 Jul 87~~
~~Declassify on: OADR~~
This page is ~~unclassified~~

[redacted]

6. [redacted]ission and Description: The Joint Surveillance Target Attack Radar System (Jo[redacted]TARS) is a Joint Army and Air Force Program, with the Air Force as lead service. Joint STARS fills a critical need for effective capability to detect, delay, disrupt, and destroy first and second echelon Warsaw Pact mobile targets. Joint STARS is unique because it is a closed-loop system for real-time detection, tracking, and attack of enemy ground moving targets, using moving target indicator and synthetic aperture radar techniques. Joint STARS integrates the accurate attack of enemy forces by providing position updates and precise enemy locations in real-time to direct attack aircraft, friendly artillery, and standoff missiles. The Army Corps Commander requires wide area surveillance information to understand enemy force buildups and scheme-of-maneuver, in order to apply effective and timely maneuver of forces, battlefield management, and targeting of artillery and rockets. There is no other system planned to provide real-time wide area surveillance of the Corps battlefield, closed-loop target detection and tracking and real-time attack targeting against first and second echelon armor. Joint STARS provides a 2-5 day advance look at enemy second echelon force buildups, force movements, and the enemy's scheme-of-maneuver on the battlefield. This early information on the enemy's battle plan will allow the Corps Commander to react, before the enemy plan is executed, and maneuver with economy of force to engage the enemy at a time and place of the Corps Commander's own choosing. Additionally, Joint STARS' closed-loop moving target detection, tracking and real-time targeting permits the direction of direct attack aircraft, artillery, and standoff missiles against moving ground targets in real-time, compared with current interdiction missions which are performed on a preplanned basis.

7. [redacted]Program Highlights:

(U) Significant Historical Developments -- In May 82, an OSD/ USDRE memorandum directed that a Joint Air Force/Army Program Management Office be established, under Air Force lead, to develop a single multi-mode target acquisition and weapon guidance system. The Joint STARS Program resulted from this directive and was organized from PAVE MOVER and SOTAS Program Offices. Based on the May 84 agreement by Air Force and Army Chiefs of Staff, the joint program began development of the airborne segment using the E-8A (a Boeing 707-320 class aircraft converted to military use). The Army Ground Station Module (GSM) FSED contract was awarded to Motorola Corporation in Aug 84. Following the meeting of the Defense System Acquisition Review Council in Aug 85 (Milestone IIA), a Secretary of Defense Decision Memorandum directed initiation of Full Scale Development (FSD) of the airborne segment. On 27 Sep 85 the FSD contract for the airborne segment of Joint STARS was awarded to Grumman Aerospace Corporation. Boeing Military Airplane Company, a subcontractor to Grumman Melbourne System Division (GMSD), completed refurbishment and modification of the first Joint STARS FSD aircraft and delivered it to GMSD, Jul 87. Due to the complexity of the software design task, the software development schedule was restructured into incremental builds with emphasis on Wide Area Surveillance. In 1987, software algorithms for extracting moving targets from tough clutter models were successfully tested with three operational but not flight qualified Programmable Signal Processors and Radar Data Processors working together at the Grumman laboratories. All the computers and software that control the mechanical (elevation) movement of the radar were programmed and tested using an antenna mass simulator. The Army Downsized Ground Station Module (DGSM) FSED contract was awarded to Motorola Corporation in Mar 86. In Dec 86, the Army directed the Limited Procurement Urgent acquisition of n[redacted]round Station Modules. The basing of all Joint STARS (airborne) testing was c[redacted]dated to the contractor's facility in Melbourne, FL, for test efficiency, a[redacted]ough numerous military test ranges will still be used. The OSD-directed

Ope[redacted]nal Utility Evaluation (OUE) I was completed during 1987 and concluded that the proposed Joint STARS system was the only alternative that would meet the Air Force/Army requirements under realistic conditions. The study also concluded Joint STARS would survive in European wartime conditions and that survivability would be enhanced by an electronic self defense suite. In Apr 88, the first flight test of the Joint STARS aircraft took place and the System Preliminary Design Review (PDR) was conducted. Milestone IIB was completed with a signed Air Force Acquisition Decision Memorandum, dated 5 Jul 88. Direction approved Procurement of 21 new 707 aircraft vs 10 used, a Self Defense Suite (SDS) development, Mission and Flight Simulators, and Reliability improvements. The first Phase IV radar flight occurred on 22 Dec 88. During Dec 88, the restructure of the GSM program was approved, the first increment of the Critical Design Review (CDR) was conducted, and an operating Joint STARS radar flew for the first time. Under the Airborne Radar Demonstrator (ARDS) Program, the Joint STARS Program began a technical data exchange with the UK and France and a GSM was deployed to the UK.

b. [redacted]Significant Developments Since Last Report -- Moving Target Indication (MTI) data was successfully transmitted from the aircraft via the SCDL to the GSM at GMSD and displayed on the GSM's Operator Work Station (OWS). The Nunn-funded Airborne Radar Demonstrator System (ARDS) international cooperative program made significant progress towards combined French/UK/US interoperability demonstrations planned for early 1990. In support of the ARDS Memorandum of Understanding, a SCDL Air Data Terminal and Ground Data Terminal (ADT/GDT) passed the Acceptance Test Pr[redacted]re (ATP) and will be shipped to the UK in early Jan 90. A major hurdle in the GM[redacted]bic contractual relations was cleared when an agreement was signed on 11 Oct 89[redacted]ling the Cubic claim against GMSD. The claim had severely impacted business between the two parties for approximately 1.5 years. The Joint Program Office (JPO) received a Contract Change Proposal which will ensure that all requirements previously documented in separate hardware (B1) and software (B5) specifications are incorporated into the six Joint STARS Subsystem Specifications. The JPO received another submittal of the Radar, Communications, SCDL, Operations & Control (O&C), and OWS Subsystem Specifications (specs). There are still some problems with these specs but there is a GMSD/JPO spec closure plan for each subsystem that should have them closed Apr thru Aug 90. Interstate Electronics Corp. (IEC) has successfully built the Enhanced Graphics Display Unit and have started qualification testing. Self Defense Suite (SDS) was kicked off with a meeting at GMSD in Jul 89. Aircraft #1 and #2 underwent MILVAX modification. Aircraft #2 was at Hanscom AFB the week of 11 Oct 89 for a NATO Four Power National Armament Directors meeting. Cost and schedule identified with the new aircraft program due to closure of 707 production line drove the 3rd FSD and production cost for a new aircraft well above available budget. The Acquisition Decision Memorandum (ADM) signed by Defense Acquisition Executive (DAE) on 9 Nov 89 approved the restructured program as presented by the Air Force, which resulted in direction for used 707 aircraft as the Joint STARS platform. Acquisition strategies, which may include early buy out of low rate initial production (LRIP) aircraft, are being explored. The JPO is working the System Specification, Acquisition Plan, SOW, and other contractual documentation for the Third Aircraft program. Delivery of the first full capability Surveillance Control Data Link (SCDL) occurred in Mar 89.

c. (U) Changes since "As of" Date -- None.

8. (U) Threshold Breaches: There are currently no DAE baseline breaches.

9. (U) Schedule:

a. Milestones --	Development Estimate	Approved Program	Current Estimate	
(1) Air Force				
Milestone IIA (AF & A)	Sep 85	Sep 85	Sep 85	
Radar/Aircraft FSD Award	Sep 85	Sep 85	Sep 85	
PDR Hardware	May 86	May 86	May 86	
PDR Software	Mar 87	Mar 87	Mar 87	
First Test Flight	Apr 88	Apr 88	Apr 88	
CDR Hardware	Dec 86	Dec 86	Dec 86	
CDR System	Nov 88	Nov 88	Nov 88	
Milestone IIB	Apr 88	Apr 88	Apr 88	
Contractor DT&E	Apr 89	Apr 89	Apr 89	
System level perf verif start	Nov 90	Mar 91	Mar 91	(Ch-1)
GDT&E/IOT&E start	Feb 91	Jun 91	Jun 91	(Ch-1)
Milestone III	Dec 91	N/A	N/A	(Ch-2)
Milestone IIIA	N/A	2Qtr93	TBD	(Ch-2&3)
Milestone IIIB	N/A	1Qtr95	TBD	(Ch-2&3)
SDS Flight Test	Dec 92	3Qtr95	TBD	(Ch-3)
SDS Production Decision	Oct 93	2Qtr97	TBD	(Ch-3)
First Production AC Delivery	Mar 94	2Qtr95	TBD	(Ch-3)
First SDS Installation	Jan 95	N/A	TBD	(Ch-3)
IOC	FY 96	2Qtr 97	TBD	(Ch-3)
Last AC Delivery	FY 00	FY 00	TBD	(Ch-3)
Software Support Facility Deliv	N/A	4Qtr94	TBD	(Ch-3)
Flight/Mission Sim Delivery	N/A	1Qtr95	TBD	(Ch-3)
First Trng Squad Ready for Trng	N/A	3Qtr95	TBD	(Ch-3)
Depot Activation	N/A	3Qtr95	TBD	(Ch-3)
SDS Test Complete	N/A	4Qtr96	TBD	(Ch-3)
PMRT	N/A	2Qtr97	TBD	(Ch-3)
Mature Reliability	N/A	FY 98	TBD	(Ch-3)

9. (U) Schedule:

a. Milestones --	Development Estimate	Approved Program	Current Estimate	
(2) Army				
Interim GSM (FSED)				
GSM Contract Award	Aug 84	Aug 84	Aug 84	
CDR	Feb 85	Feb 85	Feb 85	
Force DT&E	Feb 90	N/A	N/A	(Ch-4)
Joint SLPV/GD/CA	Oct 90	Sep 90	Sep 90	(Ch-5)
First Unit Equipped	Oct 93	Oct 93	Oct 93	
Limited Production Urgent (LPU)				
Contract Award	Sep 87	Sep 87	Sep 87	
FDT&E Start	Jun 89	Aug 89	Aug 89	(Ch-6)
First US unit equipped	Jun 90	May 90	May 90	(Ch-7)
Block I GSM				
Contract Award (FSD)	Aug 89	Sep 89	Sep 89	(Ch-6)
PDR	Mar 90	N/A	Mar 90	(Ch-8)
CDR	N/A	Jul 90	Nov 90	(Ch-8)
Milestone III	Nov 92	Nov 92	Nov 92	
Production Contract Award	Dec 92	Dec 92	Dec 92	
First Unit Equipped	Sep 94	Sep 94	Sep 94	

9. Schedule: a. Milestones -- Block II GSM	Development Estimate	Approved Program	Current Estimate
Contract Award (FSD)	Oct 92	Oct 92	Oct 92[f]
CDR	Apr 93	Apr 93	Apr 93
FDT&E Start	Jan 94	Apr 94	Apr 94 (Ch-7)
Production Award	Mar 95	Mar 95	Mar 95
First Unit Equipped	Mar 97	Mar 97	Mar 97
Production IPR	N/A	Dec 94	Dec 94
First Production Delivery	N/A	Apr 96	Apr 96

9. b. (U) Previous Change Explanations --

Delay in SDS program due to reduction in funding by PBD 904.

c. (U) Current Changes Explanations --

(Ch-1) Milestones rescheduled to agree with Oct 89 DAB restructured program. Platform changed from new to used 707 aircraft and quantity changed to include 2 refurbished PSD aircraft in production.

(Ch-2) Milestone III broken out into IIIA (Low Rate Production) and IIIB (Full Production).

(Ch-3) The Joint STARS System cannot meet ADM directed schedule requirements with the inadequate funding directed in the FY91 Amended President's Budget.

(Ch-4) Milestone has been deleted per MSG R202140Z JUL 89, Subj: Withdrav of Force Development Test and Experimentation (FDT&E) for JSTARS IGSM.

(Ch-5) Milestone name changed from Joint IOT&E to Joint SLPV/GD/OA in accordance with JSTARS MST&E Planning Schedule (5 DEC 89).

(Ch-6) Milestones changed to reflect actuals.

(Ch-7) First Unit Equip. changed from Jun 90 to May 90 and Block II FDT&E changed from Jan 94 to Apr 94 due to program office reporting errors.

(Ch-8) Correction of previous error. PDR milestone had been mislabeled as CDR. Correct CDR milestone is added.

d. (U) References --

Development Estimate: Air Force ADM dated 5 Jul 88, subject "Joint Surveillance Target Attack Radar System: Milestone IIB Acquisition Decision Memorandum." Army ADM dated 8 Mar 89, subject "Joint STARS Ground Station Module (GSM) Acquisition Decision Memorandum."

Approved Program: Air Force: DAE Baseline dated Mar 90. Army: DAE Baseline dated Mar 90.

10. (U) Technical/Operational Characteristics: These values predicated on conditions stated in the referenced documents.

	Development Estimate	Approved Program Goal/Threshold	Demonstrated Perf.	Current Estimate
a. (U) Technical --				
(U) Radar Revisit Time	(b)(1)	(b)(1)	-	(b)(1)
(U) MTI Detection Range			-	
(U) Min Detect Velocity			-	(Ch-1)
(U) Target Location Accuracy			Ch-1)	(Ch-1)
	(b)(1) area requirement coverage from (b)(1)		-	(b)(1) (Ch-1)
	(b)(1) (b)(1) of GRCA requirement coverage from (b)(1) (b)(1)	(b)(1) (Ch-1)		(b)(1) (Ch-1)
(U) Synthetic Aperture Radar Resolution		(b)(1) (Ch-1)		(Ch-1)
(U) SCDL Comm Range, E-8A to GSM		(b)(1)		

0. Technical/Operational Characteristics:

	Development Estimate	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
b. (U) Operational --				
(U) Aircraft Mission Time	9 hrs	9 hrs	-	9 hr
(U) R/M Airborne Segment				
(U) Reliability-MTBF	62 hrs	62 hrs	-	62 hrs
(U) Maintainability				
(U) Mission Capable Rate	80%	80%	-	80%
(U) PME MTTR				
(U) LRU	40 min	40 min	-	40 min
(U) SRU	80 min	80 min	-	80 min
(U) Fault Isolation & Auto & Manual Detection	95%	95%	-	95%
(U) BIT Detect	72%	72%	-	72%
Isolate LRU	78%	78%	-	78%
3	76%	76%	-	76%
1	56%	56%	-	56%

c. Previous Change Explanations -- None.

d. (U) Current Change Explanations -- (Ch-1) The current program estimate meets these thresholds, which are also in the 27 Oct 89 APB signed by SAE.

e. (U) References --

Development Estimate: 6 Apr 88 Decision Coordination Paper. Air Force ADM dated 5 Jul 1988, subject "Joint Surveillance Target Attack Radar System: Milestone IIB Acquisition Decision Memorandum." Army ADM dated 8 Mar 1989, subject "Joint STARS Ground Station Module (GSM) Acquisition Decision Memorandum."

Approved Program: Air Force DAE baseline dated Mar 90. Army: DAE Baseline dated Mar 90.

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Program Acquisition Cost: (Current Estimate in Millions of Dollars)
Air Force & Army

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	1820.2	2365.6	1983.6
Procurement	3752.5	3342.1	3281.9
Flyaway	(3173.2)	(2790.9)	(2684.1)
Recurring	(2944.8)	(2717.2)	(2613.8)
Non-Recurring	(228.4)	(73.7)	(70.3)
Other Weapon System Cost	(299.7)	(551.2)	(344.8)
Initial Spares	(279.6)		(253.0)
Construction (MILCON)	87.7	90.1	80.4
Total FY Base-Year $	5660.4	5797.8	5345.9
Escalation	2373.1	2448.8	2864.5
Development (RDT&E)	(391.4)	608.9	(511.8)
Procurement	(1941.6)	1799.0	(2305.3)
Construction (MILCON)	(40.1)	40.9	(47.4)
Total Than-Year $	8033.5	8246.6	8210.4

b. Quantities -- (see individual Air Force and Army Sections)
c. Foreign Military Sales -- None
d. Nuclear Costs -- None
e. References --

Development Estimate: Air Force ADM dated 5 Jul 1988, subject "Joint Surveillance Target Attack Radar System: Milestone IIB Acquisition Decision Memorandum." Army ADM dated 8 Mar 1989, subject "Joint STARS Ground Station Module (GSM) Acquisition Decision Memorandum."

Approved Program: Air Force: DAE Baseline dated Mar 90.
Army: DAE Baseline dated Mar 90.

11. Program Acquisition Cost (Current Estimate in Million of Dollars)
Air Force Only

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	1448.2	1993.6	1617.5
Procurement	3192.8	2759.1	2815.4
Flyaway	(2663.8)	(2286.6)	(2245.6)
Recurring	(2481.1)	(2258.3)	(2214.8)

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	Development Estimate	Approved Program	Current Estimate
Non-Recurring	(182.7)	(28.3)	(30.8)
Other Weapon System Cost	(286.4)	(472.5)	(333.1)
Initial Spares	(242.6)		(236.7)
Construction (MILCON)	87.7	90.1	80.4
Total FY Base-Year $	4728.7	4842.8	4513.3
Escalation	2013.2	2070.0	2456.1
Development (RDT&E)	(315.0)	(532.4)	(429.4)
Procurement	(1658.1)	(1496.7)	(1979.3)
Construction (MILCON)	(40.1)	(40.9)	(47.4)
Total Then-Year $	6741.9	6912.8	6969.4
b. Quantities --			
Development (RDT&E)	3*		3**
Procurement	21*		21**
Total	24*	N/A	24**

c. Foreign Military Sales -- None
d. Nuclear Costs -- None
e. References - same as previous page

* 1 FSD unit refurbished in production.
** 2 FSD units refurbished in production.

Program Acquisition Cost (Current Estimate in Millions of Dollars)
Army Only

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	372.0	372.0	366.3
Procurement	559.7	583.0	466.5
Flyaway	(509.4)	(504.3)	(438.5)
Recurring	(463.7)	(458.9)	(399.0)
Non-Recurring	(45.7)	(45.4)	(39.5)
Other Weapon System Cost	(13.3)	(22.9)	(11.7)
Initial Spares	(37.0)	(55.8)	(16.3)
Construction (MILCON)	-	-	-
Total FY83 Base-Year $	931.7	955.0	832.8
Escalation	359.9	378.8	408.2
Development (RDT&E)	(76.4)	(76.5)	(82.2)
Procurement	(283.5)	(302.3)	(326.0)
Construction (MILCON)	-	-	-
Total Then-Year $	1291.6	1333.8	1241.0

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[redacted]ogram Acquisition Cost (Current Estimate in Millions of Dollars) (continued)

	Development Estimate	Approved Program	Current Estimate
b. Quantities --			
Development (RDT&E)	15	17	16
Procurement	97	97	97
Total	112	114	113

c. Foreign Military Sales -- None
d. Nuclear Costs -- None
e. References - same as previous page.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)
Air Force Only

	Current Year		Budget Year
	Current Est	UCR Baseline	UCR Baseline
a. Program Acquisition	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	6969.4	6741.9	6969.4
(2) Quantity	21*	21*	21*
(3) Unit Cost	331.876	321.043	331.876

* This value has been revised to exclude R&D units that are not planned to be [redacted]t of the inventory objective. Such R&D units are not considered [redacted]ly-configured end items for the purpose of this calculation.

b. Current Procurement -- N/A

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)
Army Only

	Current Year		Budget Year
	Current Est	UCR Baseline	UCR Baseline
a. Program Acquisition	(Dec 89 SAR)	(Feb 89 UCER)	(Dec 89 SAR)
(1) Cost	1241.0	1291.6	1241.0
(2) Quantity	113	112	113
(3) Unit Cost	10.982	11.532	10.982

	Current Year		Budget Year
b. Current Procurement	(FY 1990)	(FY 1990) APPN	(FY 1991)
(1) Cost	0.0**	0.0	0.0
Less CY Adv Proc	NA	0.0	NA
Plus PY Adv Proc	NA	0.0	NA
Net Total	0.0**	0.0	0.0
(2) Quantity	0	0	0
(3) Unit Cost	0	0	0

[redacted]justed to reflect FY 90 Appropriations Act in accordance with Congressional [redacted]ange to SAR law.

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13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

Air Force and Army

	RDT&E	PROC	MILCON	TOTAL
Development Est	2211.6	5694.1	127.8	8033.5
Previous Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	+25.7	-	+25.7
Engineering	-	-	-	-
Estimating	-40.6	-71.4	-	-112.0
Other	-	-	-	-
Support	-	-24.0	-	-24.0
Subtotal	-40.6	-69.7	0	-110.3
Current Changes:				
Economic	+25.4	+642.7	+11.7	+679.8
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+299.0	-673.5	-11.7	-386.2
Other	-	-	-	-
Support	-	-6.4	-	-6.4
Subtotal	+324.4	-37.2	0	+287.2
Total Changes	+283.8	-106.9	0	+176.9
Current Estimate	2495.4	5587.2	127.8	8210.4

FY 1983 Constant Dollars (Base-Year) in Millions

	RDT&E	PROC	MILCON	TOTAL
Development Est	1820.2	3752.5	87.7	5660.4
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-31.3	-51.1	-	-82.4
Other	-	-	-	-
Support	-	-18.2	-	-18.2
Subtotal	-31.3	-69.3	0	-100.6
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+194.7	-397.2	-7.3	-209.8
Other	-	-	-	-
Support	-	-4.1	-	-4.1
Subtotal	+194.7	-401.3	-7.3	-213.9
Total Changes	+163.4	-470.6	-7.3	-314.5
Current Estimate	1983.6	3281.9	80.4	5345.9

13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

Air Force Only

	RDT&E	PROC	MILCON	TOTAL
Development Est	1763.2	4850.9	127.8	6741.9
Previous Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	+25.7	-	+25.7
Engineering	-	-	-	-
Estimating	-40.6	-71.4	-	-112.0
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-40.6	-45.7	0	-86.3
Current Changes:				
Economic	+16.8	+534.9	+11.7	+563.4
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+307.5	-545.4	-11.7	-249.6
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+324.3	-10.5	0	+313.8
Total Changes	+283.7	-56.2	0	+227.5
Current Estimate	2046.9	4794.7	127.8	6969.4

FY 1983 Constant Dollars (Base-Year) in Millions

	RDT&E	PROC	MILCON	TOTAL
Development Est	1448.2	3192.8	87.7	4728.7
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-31.3	-51.1	-	-82.4
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-31.3	-51.1	0	-82.4
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+200.6	-326.3	-7.3	-133.0
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+200.6	-326.3	-7.3	-133.0
Total Changes	+169.3	-377.4	-7.3	-215.4
Current Estimate	1617.5	2815.4	80.4	4513.3

1. Cost Variance Analysis (Continued):
Previous Change Explanations -- Air Force Only
(1) ([redacted]) RDT&E
Estimating: Budgetary reprogrammings and reductions to FSD and Self Defense Suite funding.

(2) ([redacted]) PROCUREMENT
Schedule: Deferral of 2 units to FY98.
Estimating: Refinement of program estimate.

c. ([redacted]) Current Change Explanations -- Air Force Only

	(Dollars in Millions) Base-Year	Then-Year
(1) ([redacted]) RDT&E		
Revised Dec 89 Economic Inflation indices (Economic)	N/A	+16.8
Adjustment for current and Prior year escalation changes (Estimating)	-1.2	-0.7
Budgetary reprogrammings and reductions (Estimating)	-48.4	-63.6
Revised estimate to reflect current funding. (Estimating)	+250.2	+371.8
(2) ([redacted]) PROCUREMENT		
Revised Dec 89 Economic Inflation indices (Economic)	N/A	+534.9
Program estimate rephasing (Estimating)	-39.3	-58.2
Revised estimate to reflect current funding. (Estimating)	-287.0	-487.2
(3) ([redacted]) MILCON		
Revised Dec 89 Economic Inflation indices (Economic)	N/A	+11.7
Revised estimate to reflect current funding. (Estimating)	-7.3	-11.7

13. Cost Variance Analysis: Joint STARS, 31 DEC 89

a. Summary -- (Current (Then-Year) Dollars in Millions)

Army Only

	RDT&E	PROC	MILCON	TOTAL
Development Est	448.4	843.2	N/A	1291.6
Previous Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-24.0	-	-24.0
Subtotal	0	-24.0	N/A	-24.0
Current Changes:				
Economic	+8.6	+107.8	-	+116.4
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-8.5	-128.1	-	-136.6
Other	-	-	-	-
Support	-	-6.4	-	-6.4
Subtotal	+0.1	-26.7	N/A	-26.6
Total Changes	+0.1	-50.7	N/A	-50.6
Current Estimate	448.5	792.5	N/A	1241.0
FY 1983 Constant Dollars (Base-Year) in Millions				
	RDT&E	PROC	MILCON	TOTAL
Development Est	372.0	559.7	N/A	931.7
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-18.2		-18.2
Subtotal	0	-18.2	N/A	-18.2
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-5.9	-70.9	-	-76.8
Other	-	-	-	-
Support	-	-4.1	-	-4.1
Subtotal	-5.9	-75.0	N/A	-80.9
Total Changes	-5.9	-93.2	N/A	-99.1
Current Estimate	366.1	466.5	N/A	832.6

1. Cost Variance Analysis (continued):

b. Previous Change Explanations -- Army Only

(1) (U) PROCUREMENT

Support: Reprogramming of initial spares.

c. Current Change Explanations -- Army Only

(1) (U) RDT&E

	(Dollars in Millions) Base-Year	Then-Year
Revised Dec 89 Economic Inflation indices (Economic)	N/A	+8.6
Adjustment for current and prior year escalation changes (Estimating)	-0.2	-0.3
Refinement and Rephasing of Program Estimate (Estimating)	-5.7	-8.2

(2) (U) PROCUREMENT

Revised Dec 89 Economic Inflation indices (Economic)	N/A	+107.8
Adjustment for current and prior year escalation changes (Estimating)	-0.1	-0.1
Refinement Program Estimate (Estimating)	-64.5	-120.4
Budgetary reductions (Estimating)	-6.3	-7.6
Reprogramming of initial spares and support equipment (Support)	-4.1	-6.4

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

a. (U) Initial SAR Estimate to Current Baseline Estimate -- Air Force Only

PAUC* (INITIAL SAR)	Changes (Then-Year Dollars in Millions)								PAUC D/E
	Econ	Qty	Sch	Engr'g	Est	Other	Supp't	Total	
571.400	-3.096	-442.451	+2.643	+87.591	+41.687	-	+35.352	-278.274	293.126

* This is not a true PAUC - this number was derived by dividing RDT&E costs in the initial SAR by the two FSD units.

a. (U) Initial SAR Estimate to Current Baseline Estimate -- Army Only

PAUC* (INITIAL SAR)	Changes (Then-Year Dollars in Millions)								PAUC D/E
	Econ	Qty	Sch	Engr'g	Est	Other	Supp't	Total	
30.675	-.219	-22.589	+0.665	+2.437	-0.583	-	+1.146	-19.143	11.532

* This is not a true PAUC - this number was derived by dividing RDT&E costs in the initial SAR by the eight FSD units.

b. (U) Development Estimate to Current Baseline Estimate -- Air Force Only

PAUC D/E	Changes Then-Year Dollars in Millions)								PAUC C/E
	Econ	Qty	Sch	Engr'g	Est	Other	Supp't	Total	
321.043*	+26.829	-	+1.224	-	-17.22	-	-	+10.833	331.876

* The acquisition quantity has been revised to exclude R&D units that are not planned to be part of the inventory objective, per OUSD(A) letter dated 19 Dec 89. Such R&D units are not considered fully-configured end items for the purposes of this calculation.

b. (U) Development Estimate to Current Baseline Estimate -- Army Only

PAUC D/E	Changes (Then-Year Dollars in Millions)								PAUC C/E
	Econ	Qty	Sch	Engr'g	Est	Other	Supp't	Total	
11.532	+1.030	-0.103*	-	-	-1.209	-	-0.268	-0.550	10.982

* This adjustment shows the lower cost per unit resulting from an increase of one unit with no additional cost.

Joint STARS, 31 DEC 89

1. Contract Information: (Then-Year Dollars in Millions)

(U) RDT&E

Radar/Aircraft Platform	Initial Contract Price Target	Ceiling	Qty
Grumman Aerospace Corp., Bethpage, NY	657.0	657.0	2

F19628-85-C-0053 FPIF
Award: 27 September 1985
Definitized: 27 September 1985

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
834.3	846.5	2	914.2	(FOUO)* 1000.0

* This includes typical ECO historical levels and options that have not yet been exercised.

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-165.2	-109.2
Cumulative Variance to Date (10/31/89)	-172.7	-110.2
Net Change	-7.5	-1.0
Cumulative Variance Change Percent	-4.6%	-1.0%

Schedule variance is due to late material deliveries from subcontractors and by prime contractor's in-house late software design. Cost variance is primarily caused by prime contractor's increased in-house effort for software design, system engineering and test. Additional cost variance is the amount caused by unbudgeted negotiatied changes between the prime and the subcontractors which the prime must absorb. The [illegible]mpact to the government is limited to the ceiling price which is $12M greater t[illegible]e target price.

GSM FSED Contract	Initial Contract Price Target	Ceiling	Qty
Motorola Inc., Tempe, AZ	31.5	33.5	6

DAAK-20-84-C-0879 FPIF
Award: 10 August 1984
Definitized: 10 August 1984

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
77.7	91.3	8	90.8	92.2

	Cost Variance	Schedule Variances
Previous Cumulative Variances	-11.1	-3.1
Cumulative Variances to Date (11/25/89)	0.0	-1.9
Net Change	+11.1	+1.2
Cumulative Variance Change Percent	100%	+38.7%

The major contributor to the schedule variance is the delays in the Enhanced Capabilities system engineering effort. Existing problems in the IGSM software are currently being addressed and corrected. Because of this, work was delayed on the Spotlight effort until problems in the existing software are corrected. These problems are not expected to cause critical delays in overall program schedule. The cost variance is attributed to lower cost personnel for some administrative tasks and the use of less personnel for many planned management activities.

[illegible]. Procurement -- NA

c. MILCON -- NA

UNCLASSIFIED

1 Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status -- Air Force and Army
(1) Percent Program Completed: 42.9% (9 yrs/21 yrs)
(2) Percent Program Cost Appropriated: 19.4% (1,590.5/8,210.4)

b. Appropriation Summary --

	(Then-Year Dollars in Millions)				
Appropriation	Prior Years (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-02)	Total
RDT&E	1419.2	132.0	304.5	639.7	2495.4
Procurement	38.5	0.0	0.0	5548.7	5587.2
MILCON				127.8	127.8
	1457.7	132.0	304.5	6316.2	8210.4

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status -- Air Force Only
(1) Percent Program Completed: 52.9% (9 yrs/17 yrs)
(2) Percent Program Cost Appropriated: 18.3% (1,272.2/6,969.4)

b. Appropriation Summary -

	(Then-Year Dollars in Millions)				
Appropriation	Prior Years (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-98)	Total
RDT&E	1172.6	99.6	266.2	508.5	2046.9
Procurement				4794.7	4794.7
MILCON				127.8	127.8
	1172.6	99.6	266.2	5431.0	6969.4

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status -- Army Only
(1) Percent Program Completed: 42.9% (9 yrs/21 yrs)
(2) Percent Program Cost Appropriated: 25.6% (318.3/1,241.0)

b. Appropriation Summary --

	(Then-Year Dollars in Millions)				
Appropriation	Prior Years (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-02)	Total
RDT&E	246.6	32.4	38.3	131.2	448.5
Procurement	38.5	0.0	0.0	754.0	792.5
MILCON					
	285.1	32.4	38.3	885.2	1241.0

UNCLASSIFIED

16. Program Funding Summary (Continued): (Current Estimate in Millions of Dollars)

c. Annual Summary -- Air Force and Army

Fiscal Year	Qty	FY83 Base-Year Dollars Nonrec	FY83 Base-Year Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl. Rate (%)
Appropriation: RDT&E								
1982				37.7	36.7	36.7	36.7	9.277.6
1983				66.5	67.8	67.8	67.8	4.9
1984				102.7	108.8	108.8	108.5	3.8
1985				70.8	77.3	77.3	74.9	3.4
1986				176.6	198.2	198.2	192.4	2.8
1987				282.6	326.7	326.1	277.9	2.7
1988				291.1	348.7	348.2	209.7	3.1
1989				204.0	255.0	211.5	84.8	4.2
1990				101.5	132.0	8.6	.3	4.0
1991				225.1	304.5			4.2
1992				97.6	137.1			4.0
1993				112.4	163.4			3.7
1994				67.9	101.8			3.4
1995				45.1	69.8			3.1
1996				36.7	58.6			3.1
1997				33.4	55.0			3.1
1998				31.9	54.0			3.1
Sub-Total				1983.6	2495.4	1383.2	1053.0	
Appropriation: Procurement (3010 is Air Force Procurement, 2035 is Army Procurement -- see individual Air Force and Army sections for funding profiles)								
Appropriation: MILCON								
1992	-	-	-	2.3	3.4			4.0
1993	-	-	-	18.4	27.5			3.7
1994	-	-	-	19.0	29.3			3.4
1995	-	-	-	6.8	10.9			3.1
1996	-	-	-	20.6	33.7			3.1
1997	-	-	-	2.3	3.9			3.1
1998	-	-	-	11.0	19.1			3.1
Sub-Total	-	-	-	80.4	127.8			
Total	N/A	70.3	2613.8	5346.1	8210.4	1419.3	.1071.4	

Obligations and expenditures reflect program office records as of 31 Dec 89.

16. Program Funding Summary (Continued): (Current Estimate in Millions of Dollars)

c. Annual Summary -- Air Force Only

Fiscal Year	Qty	FY83 Base-Year Dollars		Total Base Year $	Total Then-Year $			Excl. Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1982	-	-	-	33.5	32.6	32.6	32.6	9.277.6
1983	-	-	-	30.7	31.3	31.3	31.3	4.9
1984	-	-	-	38.7	41.0	41.0	41.0	3.8
1985	-	-	-	44.5	48.6	48.6	48.6	3.4
1986	-	-	-	139.1	156.1	156.1	156.1	2.8
1987	-	-	-	259.7	300.2	299.6	259.0	2.7
1988	-	-	-	276.1	330.7	330.2	198.6	3.1
1989	-	-	-	185.7	232.1	188.7	77.0	4.2
1990	-	-	-	76.6	99.6			4.0
1991	-	-	-	196.8	266.2			4.2
1992	-	-	-	67.4	94.7			4.0
1993	-	-	-	92.0	133.8			3.7
1994	-	-	-	50.0	75.0			3.4
1995	-	-	-	35.5	55.0			3.1
1996	-	-	-	31.3	50.0			3.1
1997	-	-	-	30.4	50.0			3.1
1998	-	-	-	29.5	50.0			3.1
Sub-Total	3	-	-	1617.5	2046.9	1128.1	844.2	
Appropriation: Procurement								
1992	1	4.0	122.4	191.8	293.9			4.0
1993	1	3.0	218.7	371.7	587.6			3.7
1994	2	3.2	230.9	379.7	619.2			3.4
1995	4	5.0	395.4	467.6	786.0			3.1
1996	4	5.3	427.2	480.7	833.0			3.1
1997	4	5.1	404.3	489.6	875.0			3.1
1998	5	5.2	415.9	434.3	800.0			3.1
Sub-Total	21	30.8	2214.8	2815.4	4794.7			
Appropriation: MILCON								
1992	-	-	-	2.3	3.4			4.0
1993	-	-	-	18.4	27.5			3.7
1994	-	-	-	19.0	29.3			3.4
1995	-	-	-	6.8	10.9			3.1
1996	-	-	-	20.6	33.7			3.1
1997	-	-	-	2.3	3.9			3.1
1998	-	-	-	11.0	19.1			3.1
Sub-Total	-	-	-	80.4	127.8			
Total	24	30.8	2214.8	4513.3	6969.4	1128.1	844.2	

Obligations and expenditures reflect program office records as of 31 Dec 89.

16. Program Funding Summary (Continued): (Current Estimate in Millions of Dollars)
c. Annual Summary -- Army Only

Fiscal Year	Qty	FY83 Base Year Dollars Flyaway Nonrec	Flyaway Rec	Total Base Year $	Total Then-Year $ Program	Obligated	Expended	Excl. Rate (%)
Appropriation: RDT&E								
1982	-	-	-	4.2	4.1	4.1	4.1	9.2/7.6
1983	-	-	-	35.8	36.5	36.5	36.5	4.9
1984	-	-	-	64.0	67.8	67.8	67.5	3.8
1985	-	-	-	26.3	28.7	28.7	26.3	3.4
1986	-	-	-	37.5	42.1	42.1	36.3	2.8
1987	-	-	-	22.9	26.5	26.5	18.9	2.7
1988	-	-	-	15.0	18.0	18.0	11.1	3.1
1989	-	-	-	18.3	22.9	22.8	7.8	4.2
1990	-	-	-	24.9	32.4	8.6	0.3	4.0
1991	-	-	-	28.3	38.3			4.2
1992	-	-	-	30.2	42.4			4.0
1993	-	-	-	20.4	29.6			3.7
1994	-	-	-	17.9	26.8			3.4
1995	-	-	-	9.6	14.8			3.1
1996	-	-	-	5.4	8.6			3.1
1997	-	-	-	3.0	5.0			3.1
1998	-	-	-	2.4	4.0			3.1
Sub-Total	16	-	-	366.1	448.5	255.1	208.8	

c. Annual Summary -- Army Only

Fiscal Year	Qty	FY83 Base Year Dollars Flyaway Nonrec	Flyaway Rec	Total Base Year $	Total Then-Year $ Program	Obligated	Expended	Excl. Rate (%)
Appropriation: Procurement								
1987	3	1.1	10.9	12.2	14.7	14.7	10.0	2.7
1988	6	1.5	15.6	17.6	21.9	21.4	8.4	3.1
1989	-	0.0	0.0	1.5	1.9			4.2
1990	-	0.0	0.0	0.0	0.0			4.0
1991	-	0.0	0.0	0.0	0.0			4.2
1992	-	2.0	20.2	24.2	35.4			4.0
1993	6	2.1	23.3	28.9	43.7			3.7
1994	6	1.7	21.7	25.9	40.4			3.4
1995	9	5.3	50.1	57.3	92.1			3.1
1996	9	4.2	41.6	48.4	80.1			3.1
1997	9	4.1	38.8	45.0	76.9			3.1
1998	9	3.8	36.6	41.5	73.0			3.1
1999	9	3.7	34.5	39.7	72.0			3.1
2000	9	3.7	32.7	38.5	72.1			3.1
2001	9	3.6	31.6	37.1	71.5			3.1
2002	13	2.7	41.4	48.7	96.8			3.1
2003	-	-	-	-	-			3.1
Sub-Total	97	39.5	399.0	466.5	792.5	36.1	18.4	
Total	113	39.5	399.0	832.6	1241.0	291.2	227.2	

Obligations and expenditures reflect program office records as of 31 Dec 89.

17. Production Rate Data

Air Force Only -- NA

Army Only

a. Annualized Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate/DE	Maximum Economic
1987	3	N/A	3	N/A
1988	6		6	
1989				
1990				
1991				
1992				
1993	6		6	
1994	6		6	
1995	9		9	
1996	9		9	
1997	9		9	
1998	9		9	
1999	9		9	
2000	9		9	
2001	9		9	
2002	13		13	
Total	97		97	

b. Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE - PDE)	Current Estimate	Variance (CE - Max)	Maximum Economic
Prog Acq Cost (BY$)	N/A	N/A	832.6	N/A	N/A
(TY$)	N/A		1241.0		
Pauc (BY$)	N/A		7.368		
(TY$)	N/A		10.982		

c. Schedule Variance --

Item	Production Estimate	Variance (CE - PDE)	Current Estimate	Variance (CE - Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	9/87	N/A	N/A
Duration (in Months)			195		
End Date (Mo/Yr)			12/02		

d. Deliveries (Plan/Actual) --

	To Date
	Air Force Only
RDT&E	0/0
Procurement	0/0
	Army Only
RDT&E	9/9
Procurement	0/0

Approved Design-To-Cost Goal -- Air Force - Design-To-Cost (DTC) was considered during the planning phase of the basic Joint STARS but was not incorporated into the contract as an enforceable requirement. At this point in the FSD phase of Joint STARS, it is not considered practicable to introduce the concept of Design-To-Cost.

Army - No Design-To-Cost Goals on existing production contract but anticipated by implementation during Block I.

18. Operating and Support Costs:

a. Assumptions and Ground Rules -- Air Force Only
O&S costs were based on 21 used Boeing 707s. The support concept assumed Government two level (organizational/depot) support of the prime mission equipment (PME) and Government organizational level support with contractor support at intermediate and depot level for the airframe. The costs of the PME and the airframe were estimated individually then added together to estimate the system cost. The PME costs were estimated by the prime contractor using a Government supplied Life Cycle Cost model while the airframe costs were estimated using the cost model contained in AFR 173-13. The planned buy program was used to estimate the actual O&S costs incurred with an End of Year aircraft population used to estimate the magnitude and timing of the O&S costs. This system is a new start system without an antecedent system. Significant O&S cost drivers fall into four categories: Manpower, Fuel, Spares and Depot.

b. Costs -- Air Force Only (FY83 Base-Year Dollars in Millions)

Cost Element	15 Years	25 Years
Manpower	1160.0	1817.0
Fuel	417.0	663.0
Spares	640.0	1005.0
Depot	544.0	906.0
TOTAL	2761.0	4391.0

c. Contractor support cost: N/A

Operating and Support Costs:

a. Assumptions and Ground Rules -- Army Only
O&S costs were based on 112 Ground Station Modules. Total Life Cycle Costs were based on operating for a 20 year cycle after introduction into the field through the year 2020. The Life Cycle Costs were derived individually using life cycle cost models, program estimate experience and learning curve data, then added together to estimate the system cost. Sustainment is based on cumulative costs quantity of personel and subsystems in the field each year and are the basis for year by year sustainment cost estimates. This estimate was for the Acquisition Program Baseline dated 15 Nov 89.

b. Costs -- Army Only (Then-Year Dollars in Millions)

Cost Category	Total LCC
Development	449.6
Production	809.3
Military Construction	0.0
Fielding	42.3
Sustainment	2538.4
TOTAL	3839.6

c. Contractor support cost: N/A

AF-25 SFW ~~CONFIDENTIAL~~ SAR-89-086

This Page is ~~Unclassified~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: Sensor Fuzed Weapon (SFW)

AS OF DATE: December 31, 1989

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AS AMENDED
MAR 1 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

SAF/PAS
90-099 -T
06

1. Designation and Nomenclature (Popular Name): CBU-97/B, SFW

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

Program Director, Air-to-Surface Ballistic Weapons
Munitions Systems Division
Eglin AFB, Fl 32542

PD: Col Donald C. Pulley
Assigned: Oct 31, 1988
AV 872-5382, Comm (904) 882-5382

4. Program Elements/Procurement Line Items:

RDT&E: PE 0604607F Project 642961
PE 0604604F Project 643086 (Shared Funding)
PE 0604602F Project 643244 (Shared Funding)

PROCUREMENT: PE 0208030F APPN 3080 ICN 813520 (Shared Funding)

OTHER: ARMY APPN 2034

5. Related Programs: SUU-64/B Tactical Munitions Dispenser
CNU-411 Container
FZU-39 Proximity Sensor

OFFICE OF ORIGIN:
Deputy for the Air-to-Surface
Ballistic Weapons Armament Division
Eglin Air Force Base, Florida 32542

~~CLASSIFIED BY: SFW Security Classification Guide, 11 Jan 89~~
~~DECLASSIFY ON: OADR~~

This Page is ~~Unclassified~~

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Mission and Description: The objective of the SFW program is to develop and produce a conventional munition capable of multiple vehicle kills per pass against operating armored vehicles, air defense units, and other support vehicles. The SFW does not replace any existing system but will enhance current capabilities. The requirement for SFW is the HQ TAC System Operational Requirements Document (SORD) (TAF 302-78-I/II/III-A, 11 May 89).

7. Program Highlights:

a. Significant Historical Developments (through Dec 88) —

During formulation of the FY85 Program Objective Memorandum, the Air Force separated the development of conventional submunitions from the development and integration of these submunitions into a weapon system (i.e., CBU). This decision was made to preclude termination of promising submunition designs when the carrier vehicles were terminated. Hence, the BLU-108/B submunition development was funded by program element 64604F while program element 64607F funds development of the SFW system. The Army/DARPA Assault Breaker and the Air Force Extended Range Antiarmor Munition (ERAM) Programs provided technology used in the SFW design. The development of the SFW was divided into two phases -- Risk Reduction and FSD. The Risk Reduction Phase testing was successfully completed in September 1985, during which four warheads were simultaneously released from a single BLU-108/B submunition and each warhead hit a different tank target resulting in significant target damage. The Preliminary Design Review (PDR) was successfully conducted in October 1985, SAF/AL authorized the SFW program to proceed into the FSD phase. The FSD contract option was signed on 29 November 1985. A second SFW live submunition drop was successfully completed 6 June 1986. The drop consisted of four warheads each hitting a different tank target in a 14 target array. Beginning in FY87, both the submunition and the integration of the submunition into the carrier vehicle were funded in program element 64607F. The 31 December 1986 SAR implemented the new Development Estimate baseline that was transitioned in the 30 Jun 86 SAR. During 1987 numerous contractor and government sponsored tests were conducted to test the CBU-97/B, BLU-108/B, warhead, sensor and altimeter. The 30 September 1987 SAR revised several program milestones as a result of technical problems related to the BLU-108/B structure which were revealed during those tests. During 1988 a significant pre-Critical Design Review (CDR) test program was completed allowing Textron to begin fabricating hardware for the DT&E/IOT&E program. After the CDR was conducted 19-24 Apr 88, DT&E began in Dec 88 with the testing of a munition with all ballistic (inert) submunitions. This test was unsuccessful due to mechanical damage to internal components. A number of multiple-submunition tests and single projectile tests were added during 1988 to assess the suspected sympathetic firing problem.

b. Significant Developments Since Last Report (1 Jan 89 through 31 Dec 89) --

(1) A series of projectile tests were completed in Jan 89 to verify solutions to problems discovered in the Nov 88 many-on-many test. The many-on-many retest on 16 Feb 89 verified correction of the problem identified in Nov 88 and unmasked a new problem. A joint government/industry/Textron team was formed to investigate the new problem and recommend a "fix." Subsequent retest on 18 Jul 89 was a success. This test culminated an extensive test program, answered the one outstanding CDR action, and allowed closure of the CDR.

(2) DT&E test number two was conducted on 22 Feb 89. The submunitions failed to be ejected from the dispenser. Subsequent failure analysis revealed electronic component failure due to mechanical shock loads. Circuit board mounting was modified and the next six DT&E tests conducted from Jul through Dec 89 were successful.

(3) The Bush Amendment to the FY90 Amended President's Budget caused a slower production ramp up. This reduction in early deliveries directly affected IOC by approximately six months. This revised funding profile also reduced the level of planned producibility and production transition efforts. Efforts to bring on an SFW second source producer were also affected because the FY91 reductions created a gap in the planned effort.

(4) Due to a series of test failures and repeated schedule slips, the Air Force issued a Cure Notice to Textron Defense Systems on 18 Apr 89. In Jun 89 the Air Force accepted the Cure Plan which outlined a revised schedule and a number of management initiatives to get the program back on track and keep it there. To date, progress has been positive.

(5) As a result of the test failures, schedule delays and budget changes, the program was restructured. Production start and second sourcing were delayed until FY92 and funding realignment was requested. The restructured program includes additional testing to better define performance margins, a Multi-Stage Improvement Program (MSIP) to address future changes in the threat, and a more realistic schedule.

(6) The restructured program was briefed to SAF/AQ on 30 Aug 89 and was approved on 27 Nov 89. The OSD Conventional Systems Committee (CSC) was briefed on 19 Sep 89 and the USD (Acquisition) was briefed on 31 Oct 89. Based on the CSC approval and USD(A) endorsement, the rebaselined program was approved by the SAE on 27 Nov 89 and forwarded to the DAE for final approval.

(7) The goals and thresholds cited in this report are per the approved SORD and are reflected in the SFW Acquisition Program Baseline (APB).

(8) The FY91 President's Budget incorporated the restructured program as modified with the new OSD inflation indices. However, the start of MSIP was delayed until FY92 and $10 million (FY91) was transferred to the Army for production facilities.

(9) The culmination of the above events resulted in the breach conditions discussed in section 8.

(10) The SFW program is expected to satisfy mission requirements.

8. Threshold Breaches: The SFW program has experienced a greater than 6 months slip in five major milestones and production acquisition unit cost has increased 21 percent. The restructured program has been rebaselined. The APB was signed by the SAE on 27 Nov 89 and is now at the DAE for approval pending a revision to reflect the FY91 PB.

9. Schedule:

a. (C) Milestones --	Development Estimate	Approved Program	Current Estimate
Advanced Development Contract Start	Jul 84	N/A	Jul 84
Preliminary Design Review (Risk Reduction Phase Completion)	Oct 85	N/A	Oct 85
Milestone II (SAF/AL)	Nov 85	Nov 85	Nov 85
Critical Design Review	Jul 87	Apr 88	Aug 89 (Ch-1)
Complete DT&E/IOT&E	Jun 89	Apr 90	Jan 92 (Ch-2)
Milestone IIIA (DAB)	Nov 88	Aug 89	Sep 91 (Ch-2)
Production Contract Award	Dec 88	Dec 90	Dec 91 (Ch-2)
IOC (C)	N/A	(b)(1)	(Ch-3)

b. Previous Change Explanations -- The CDR date was moved from Jul 87 to Oct 87 based on contractor hardware procurement and test delays and then slipped from Oct 87 to Mar 88 and Apr 88 due to design problems on the BLU-108/B structure and verification/validation of design improvements. DT&E/IOT&E completion slipped from Jun 89 to Apr 90 due to the CDR adjustment and the necessity to accommodate a cold weather test environment requirement and nonavailability of DT&E test assets precluding DT&E start. Milestone IIIA was slipped from Nov 88 to Aug 89 due to the slip in CDR. The subsequent slip from Aug 89 to Mar 90 allowed more of the IOT&E testing to be completed prior to the Milestone IIIA decision. The production contract award milestone was changed from Dec 88 to Dec 90 as a direct result of the slips in CDR and IOT&E.

c. Current Change Explanations --

(Ch-1) CDR was held Apr 88 with final design approval Aug 89.

(Ch-2) The current estimate reflects the restructured program which resulted from test failures, design changes, schedule delays and budget impacts.

(Ch-3) Due to the restructured program, current IOC estimate was revised by HQ TAC.

d. References --

Development Estimate: OSD/CAIG Briefing, May 1986 (Approved by OSD) (Production Estimate based on Competitive Dual Source).

Approved Program: DAE Baseline dated 31 Dec 88. APB approved by the SAR on 27 Nov 89 and is at the DAE for approval pending a revision to reflect the FY91 PB.

10. Technical/Operational Characteristics:

a. (b)(1) Technical --

	Dev Est	Approved Program Goals/Thresholds	Demonstrated * Performance	Current Estimate
Weight	1,000 lb Class Mun	N/A / N/A	1,000 lb Class Mun	1,000 lb Class Mun
Delivery**				
Altitude	200' AGL-20,000' MSL	N/A / N/A	Ongoing	200' AGL-20,000' MSL
Attitude	45° to -45°	N/A / N/A	Ongoing	45° to -45°
Airspeed	200-650 KCAS	N/A / N/A	Ongoing	200-700 KCAS
Acceleration	.5 to 5.0Gs	N/A / N/A	Ongoing	.5 to 5.0Gs
Targets***	Main Battle Tanks, Armored Personnel Carriers, Armored Artillery, Trucks, & Other Sup Vehicles	N/A / N/A	Ongoing " " " " " "	Main Battle Tanks, Armored Personnel Carriers, Armored Artillery, Trucks, & Other Sup Vehicles
Lethality **** (b)(1) Kills Per Pass	Multiple	(b)(1) [redacted]		

* Due to the large number of system/subsystems performance parameters which must be evaluated to assess system performance and the build up approach to DT&E testing it is not possible to present results until completion of DT&E.

The following references are from HQ TAC, Systems Operational Requirements Document (SORD) (TAF 302-78-I/II/III-A, 11 May 89) for the Sensor Fuzed Weapon (SFW):

** "The SFW requirement for a release altitude of 200 feet AGL to 20,000 feet MSL and a release airspeed of 250 to 650 KCAS to be further defined. The slow speed requirement is due to the A-10 aircraft. The A-10 will probably drop SFW at altitudes commensurate with safe escape (480 KCAS or higher)."

*** "The Reinforced Regimental Advanced Guard (RRAG) main force target set was derived by the US Army Training and Doctrine Command (TRADOC). The target set represents "typical" targets behind the Forward Line of Own Troops (FLOT) considered interdiction targets. Vehicles in the RRAG include main battle tanks, armored personnel carriers, armored artillery and trucks/support equipment."

**** (b)(1) (57 percent of the time) for release of 4 TMDS/pass versus RRAG target set. (b)(1) [redacted] This number represents the average expected performance of all dive and level deliveries.

b. Operational --

	Dev Est	Approved Program Goals/Thresholds		Demonstrated Performance	Current Estimate
System Reliability *	.90	N/A	N/A	N/A	.89
Shelf Life	10 yrs	N/A	N/A	N/A	10 yrs
Service Life	1 yr	N/A	N/A	N/A	1 yr
Aircraft Compatibility	F-4	N/A	N/A	N/A	N/A
	F-16	N/A	N/A	N/A	F-16ABCD
	F-15	N/A	N/A	N/A	F-15E
	F-111	N/A	N/A	N/A	F-111ADEFG
	A-7	N/A	N/A	N/A	N/A(Ch-1)
	A-10	N/A	N/A	N/A	A-10
	B-52GH	N/A	N/A	N/A	N/A(Ch-1)
	NATO Aeft	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A(Ch-2)

c. Previous Change Explanations -- Airspeed was changed to 200-650 KCAS (threshold) and 200-700 KCAS (goal) per the 11 May 89 SORD. Aircraft compatibility was changed by deleting the F-4 and adding suffix designators for the A-7, F-15, F-16, and F-111.

d. Current Change Explanations --

(Ch-1) The A-7 and B-52 aircraft requirements were deleted (Ref HQ TAC Msg 131313Z Nov 89 and HQ SAC Msg 291356Z Dec 89)

(Ch-2) The USMC/USN aircraft elements were added per the 11 May 89 SORD.

e. References --

Development Estimate: DAE Baseline, 16 Sep 87.

Approved Program: 31 Dec 88 approved DAE baseline; APB was signed at the SAE level on 27 Nov 89 and is at the DAE for approval pending a revision to reflect the FY91 PB.

* Includes TMD, adapter kit, and submunition

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1. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost --	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
Development (RDT&E)	80.0	110.7	121.3
Procurement	1139.8	1458.3	1543.2
Total Flyaway	(1127.7)	(1442.8)	(1526.6)
Other Weapon System Cost	(12.1)	(15.5)	(16.6)
Initial Spares	(0.0)	(0.0)	(0.0)
Construction (MILCON)	0.0	0.0	0.0
TOTAL FY 79 BASE-YEAR$	1219.8	1569.0	1664.5
Escalation	1186.0	1641.8	2213.9
Development (RDT&E)	(47.7)	(69.6)	(79.6)
Procurement	(1138.3)	(1572.2)	(2134.3)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
TOTAL THEN-YEAR $	2405.8	3210.8	3878.4

b. Quantities --			
Development (RDT&E)	84	97	155
Procurement	14000	19803	19803
TOTAL	14084	19900	19958

c. Foreign Military Sales -- None.

d. Nuclear Costs -- None.

e. Development Estimate: OSD/CAIG Briefing, May 1986 (Approved by OSD).

f. Approved Program: DAE Baseline, 31 Dec 88. The APB was approved at the SAE level on 27 Nov 89 and is at the DAE for approval pending a revision to reflect the FY91 PB.

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12. Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions)

		Current Year		Budget Year
		Current Estimate Dec 89 SAR	UCR Baseline Dec 88 SAR	UCR Baseline Dec 89 SAR
a.	Program Acquisition —			
	(1) Cost	3878.4	3210.8	3878.4
	(2) Quantity *	19803	19803	19803
	(3) Unit Cost *	.196	.162	.196
b.	Current Procurement -	(FY1990)	(FY1990)	(FY1991)
	(1) Cost	N/A	N/A	N/A
	Less CY Adv Proc	N/A	N/A	N/A
	Plus PY Adv Proc	N/A	N/A	N/A
	Net Total	N/A	N/A	N/A
	(2) Quantity	N/A	N/A	N/A
	(3) Unit Cost	N/A	N/A	N/A
		Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
c.	Program Acquisition -	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
	(1) Cost (BY 79$)	1664.5	1569.0	1664.5
	(2) Unit Cost (BY 79$) *	.084	.079	.084
d.	Current Procurement -	(FY 1990)	(FY 1990 APPN)	(FY 1991)
	(1) Cost (BY 79$)	N/A	N/A	N/A
	Less CY Adv Proc	N/A	N/A	N/A
	Plus PY Adv Proc	N/A	N/A	N/A
	Net Total	N/A	N/A	N/A
	(2) Unit Cost	N/A	N/A	N/A

* This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation. (Ref OUSD memorandum of 19 Dec 89)

e. Changes from the Baseline Report

		Change in Dollars/Qty	Percent Change
(1)	PAUC (TY $)	+.034	+21.0
(2)	CPUC (TY $)	N/A	N/A
(3)	Quantity	0	0
(4)	PAUC (BY 79$)	+.005	+6.3
(5)	CPUC (BY 79$)	N/A	N/A

f. Changes from the Previous SAR

		Dollars/Qty	Percent
(1)	PAUC (TY $)	+.034	+21.0
(2)	CPUC (TY $)	N/A	N/A
(3)	Quantity	0	0
(4)	PAUC (BY 79$)	+.005	+6.3
(5)	CPUC (BY 79$)	N/A	N/A

g. Initial SAR

		Jun 86 (Development Estimate)
(1)	Program Acquisition Cost (TY)	2405.8
(2)	Program Acquisition Cost (BY 79$)	1219.8

h. Unit Cost Changes.

(1) PAUC. The current estimate of the Program Acquisition Unit Cost of $.196 represents a Breach Condition of 21.0 percent increase from the SAR baseline of $.162. Of the $667.6M increase in total cost, $101.8M is attributed to a one year slip in production start (FY91 to FY92); $229.1M is due to changes in Acquisition Strategy to include a Production Transition Program (PTP), additional testing, lab and government analysis and moving competition to the fifth year of production; $3.8M is due to data price increases and $332.9M is a result of changes to the OSD inflation guidelines as of 15 Dec 89.

(2) CPUC. N/A

i. Program Management/Control (Also at page # 1)

PEO: MGen Kenneth E. Staten, MSD/CC
PD: Col Donald C. Pulley, MSD/YB
PM: Lt Col James M. Bellan, MSD/YBS

j. Cost Control Actions. Reviews of pertinent cost information are performed on a regular basis. The monthly Cost Performance Report (CPR) is analyzed and reviewed in order to monitor contractor cost activity. All significant variances and trends are reviewed to get an understanding of their causes and potential effects on the program. A schedule control board is convened on a monthly basis to ensure that all schedules are up-to-date and reflecting accurate information.

k. Impact of Performance or Schedule Changes on Unit Costs. Increases in the unit cost are attributed to test failures, design problems, and redesign efforts. these problems caused program slips and an overall restructuring of the SFW program. (Also see sections 7 and 9).

l. Contract Information (in Millions of Then-Year Dollars).

(1) Textron Defense Systems
(2) Contract Title: Sensor Fuzed Weapon (SFW) Program
(3) Contract Number: F08635-84-C-0182
(4) Actual Cost of Work Performed (ACWP) to Date: $145.5M
(5) Percent contract completed (BCWP/target cost: 90.7 percent complete
(6) Variances:

	Cost Variance ($/%)	Schedule Variance ($/%)
UCR Baseline	-$20.7/-22.4%	-$11.6/-11.2%
Previous SAR	-$20.7/-22.4%	-$11.6/-11.2%
Current values	-$1.9/-1.3%	-$4.7/-3.2%
Change frombaseline Report	+$18.8/+21.2%	+$6.9/+8.0%
Change from the Previous SAR	+$18.8/+21.2%	+$6.9/+8.0%

The significant difference in the cost and schedule variances since the Nov 88 report period are primarily due to the Over-Target-Baseline (OTB) that was implemented during the Jun 89 report period. The purpose for the OTB, which zeroed all cost and schedule variances, was to allow for more accurate cost/schedule measurement of the remaining effort. The cumulative cost and schedule variances were -$31.9M and -$9.8M respectively before the OTB.

(7) A major portion of the schedule variance is due to test failures and late receipt of subcontracted items and material. The unfavorable cost variance was primarily due to repetition of work, unplanned shipping charges, and difficulties experienced in the area of subcontracting.

(8) The $145.5M of ACWP is $47.9M greater than the contract ceiling price of $97.6M.

(9) The variance experienced in R&D will have no direct impact on the production units.

m. Contracts Exceeding Contract Cost Baseline Thresholds. None.

13. Cost Variance Analysis:

a. Summary — (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	127.7	2278.1	—	2405.8
Previous Changes:				
Economic	-1.2	-47.9	—	-49.1
Quantity	+5.9	+750.9	—	+756.8
Schedule	—	+82.7	—	+82.7
Engineering	—	—	—	—
Estimating	+47.9	-41.2	—	+6.7
Other	—	—	—	—
Support	—	+7.9	—	+7.9
Subtotal	+52.6	+752.4	—	+805.0
Current Changes:				
Economic	+ .1	+332.8	—	+332.9
Quantity	—	—	—	—
Schedule	—	+101.8	—	+101.8
Engineering	—	—	—	—
Estimating	+20.5	+208.6	—	+229.1
Other	—	—	—	—
Support	—	+ 3.8	—	+ 3.8
Subtotal	+20.6	+647.0	—	+667.6
Total Changes	+73.2	+1399.4	—	+1472.6
Current Estimate	200.9	3677.5	—	3878.4

(FY1979 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	80.0	1139.8	—	1219.8
Previous Changes:				
Economic	—	—	—	—
Quantity	+3.6	+340.6	—	+344.2
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	+27.1	-25.5	—	+1.6
Other	—	—	—	—
Support	—	+3.4	—	+3.4
Subtotal	+30.7	+318.5	—	+349.2
Current Changes:				
Economic	—	—	—	—
Quantity	—	—	—	—
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	+10.6	+83.8	—	+94.4
Other	—	—	—	—
Support	—	+1.1	—	+1.1
Subtotal	+10.6	+84.9	—	+95.5
Total Changes	+41.3	+403.4	—	+444.7
Current Estimate	121.3	1543.2	—	1664.5

b. Previous Change Explanations —

RDT&E

Economic:	Revised economic escalation indices.
Quantity:	Increased RDT&E units by five for Life Cycle Surveillance Testing and eight units for IOT&E.
Estimating:	Offset to quantity increase - reduced management flexibility in executing program; adjustment for prior year escalation; addition of funds in FY87 Appropriations Bill to accelerate SFW program development; adjustment for Air Force assessments - reduced scope of effort to accelerate SFW development; increase for SEEK EAGLE test requirements; Increase for Pre-Production Process Verification, additional testing and SPO support requirements.

Procurement

Economic:	Revised economic escalation indices.
Quantity:	Increased flyaway costs to procure 5,803 additional SFWs in accordance with the revised Program Management Directive (PMD) to incorporate latest assessment of Air Force quantity requirements.
Schedule:	Impact of revised schedule in accordance with the revised PMD to incorporate latest assessment reflected in the FY88-92 NCAA. First procurement buys scheduled for FY89 changed to FY91.
Estimating:	New pricing methodology used Risk Reduction Hardware Actuals. Competition starts two years earlier. Cost savings resulted from a revised Alternate Source Strategy.
Support:	Increased data costs associated with 5,803 SFWs added to the program. Price adjusted based on actuals.

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c. Current Change Explanations -- (Dollars in Millions)

	Base-Year $	Then-Year $
(1) RDT&E		
Revised Economic Escalation Indices (Economic)	N/A	+0.1
Increase for Production Transition Program (PTP), Additional Testing and Lab and Government Analysis (Estimating)	+10.7	+20.6
Adjustment for Current and Prior year Escalation Offset (Estimating)	-.1	-.1
(2) Procurement		
Revised Economic Escalation Indices (Economic)	N/A	+332.8
First Procurement Buys were Changed from FY91 to FY92 (Schedule)	N/A	+101.8
Changes in Acquisition Strategy reflected in restructured program, Competition at 5th Year (Estimating)	+83.8	+208.6
Data Pricing Increase (Support)	+1.1	+3.8

4. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

a. Initial SAR/Planning Estimate (PE) to Development Estimate (30 Jun 86 SAR) — There was no PAUC in the original PE.

PAUC (Initial SAR/PE	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
-	-	-	-	-	-	-	-	-	0.171

b. Development Estimate to Current Estimate —

PAUC (Dev * Est)	Changes								PAUC (Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
+0.171	+.014	-.011	+.009	-	+.012	-	+.001	+.025	0.196

* This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation. (Ref OUSD memorandum of 19 Dec 89)

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5. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E —

Sensor Fuzed Weapon	Initial Contract Price * Target	Ceiling	Qty
TEXTRON DEFENSE SYSTEMS Wilmington MA F08635-84-C-0182, FPIF Award: July 9, 1984 Definitized: July 9, 1984	$25.6	$27.6	-0-

* Risk reduction phase only. Contract structured in two phases. FSD option not included in original target and ceiling price.

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$89.0	$97.6	155	$156.4	$161.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances (27 Nov 88)	-20.7M	-11.6M
Cumulative Variances To Date (26 Nov 89)	- 1.9M	- 4.7M
Net Change	+18.8M	+ 6.9M
Cumulative Variance Change Percent	+21.1%	+ 8.0%

Explanation of Change: The significant difference in the cost and schedule variances since the November 88 report period are primarily due to the Over-Target-Baseline (OTB) that was implemented during the June 89 report period. The purpose for the OTB, which zeroed all cost and schedule variances, was to allow for more accurate cost/schedule measurement of the remaining effort. The cumulative cost and schedule variances were -$31.9M and -$9.8M respectively before the OTB.

A major portion of the schedule variance is due to test failures and late receipt of subcontracted items and material. The unfavorable cost variance was primarily due to repetition of work, unplanned shipping charges, and difficulties experienced in the area of subcontracting.

b. Procurement — None.

c. MILCON — None.

6. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status —

(1) Percent Program Completed: 42.1% (8 yrs/19 yrs) (Years Funds Appropriated/Total Program Years).

(2) Percent Program Cost Appropriated: 4.6% ($177.0/$3878.4) (Funds Appropriated To Date in Millions/Total Program Funding in Millions).

b. Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY83-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-01)	Total
RDT&E	151.9	25.1	23.9	0	200.9
Procurement	-0-	-0-	-0-	3677.5	3677.5
MILCON	-0-	-0-	-0-	-0-	-0-
Total	151.9	25.1	23.9	3677.5	3878.4

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c. Annual Summary --

Fiscal Year	Qty	Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Program	Obligated	Expended	Escl Rate %
Appropriation: RDT&E *								
1983				2.9	4.2	4.2	4.2	4.9
1984				11.2	16.7	16.7	16.7	3.8
1985				23.1	35.4	35.2	35.2	3.4
1986				15.6	24.6	24.5	24.5	2.8
1987				14.2	23.1	22.9	16.5	2.7
1988				13.1	22.0	21.7	6.5	3.1
1989				14.8	25.9	24.1	2.9	4.2
1990				13.8	25.1			4.0
1991				12.6	23.9			4.2
Sub-total	155	**	**	121.3	200.9	149.3	106.5	
Appropriation: Procurement * **								
1992	110	6.2	56.0	62.5	128.4			4.0
1993	895	8.6	108.5	118.3	251.2			3.7
1994	1490	13.9	159.3	174.9	383.0			3.4
1995	1830	7.7	176.1	185.7	419.3			3.1
1996	2880	0	195.7	198.0	460.9			3.1
1997	2880	0	182.1	184.3	442.3			3.1
1998	2880	0	180.6	182.7	452.2			3.1
1999	2880	0	181.6	183.7	468.7			3.1
2000	2880	0	181.7	183.8	483.4			3.1
2001	1078	0	68.6	69.3	188.1			3.1
Sub-total	19803	36.4	1490.2	1543.2	3677.5	N/A	N/A	
Appropriation: MILCON								
Sub-total		--	--	--	--	--	--	
Total	19958	36.4	1490.2	1664.5	3878.4	--		N/A

* $10M (FY91) Army Funds APPN 2034 not included.

** Information not applicable.

*** Seek Eagle Funding is not included.

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7. Production Rate Data:

a. Annualized Production Rates -- (NOTES: The Current Estimate differs from the Development Estimate due to the revised production planning in accordance with the updated Program Management Directive and current acquisition strategy. The funded delivery period is 12 months.)

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1989	400	N/A	0	N/A
1990	745	N/A	0	N/A
1991	1275	N/A	0	N/A
1992	1500	N/A	110	N/A
1993	2000	N/A	895	N/A
1994	2500	N/A	1490	N/A
1995	2700	N/A	1830	N/A
1996	2880	N/A	2880	N/A
1997		N/A	2880	N/A
1998		N/A	2880	N/A
1999		N/A	2880	N/A
2000		N/A	2880	N/A
2001		N/A	1078	N/A

b. Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost (BY$)	N/A	N/A	1664.5	N/A	N/A
(TY$)	N/A	N/A	3878.4	N/A	N/A
PAUC (BY$)	N/A	N/A	0.084*	N/A	N/A
(TY$)	N/A	N/A	0.196*	N/A	N/A

* This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation. (Ref OUSD memorandum of 19 Dec 89)

c. Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)**	N/A	N/A	12/92	N/A	N/A
Duration (in Months)	N/A	N/A	155	N/A	N/A
End Date (Mo/Yr)***	N/A	N/A	11/03	N/A	N/A

** Projected date of Contract Award
*** Projected date of last delivery

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	14/10
Procurement	0/0

e. Approved Design-To-Cost Goal -- None.

18. Operating and Support Costs: Not Available.

A-1 AAWS-M ~~CONFIDENTIAL~~ 89 138

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)
PROGRAM: ADVANCED ANTITANK WEAPON SYSTEM - MEDIUM

AS OF DATE: December 31, 1989

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AS AMENDED
CLEARED
FOR OPEN PUBLICATION
MAR 22 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

1. (U) Designation and Nomenclature: Advanced Antitank Weapon System - Medium (AAWS-M)

2. (U) DoD Component: U. S. Army (Lead) / U. S. Marine Corps

3. (U) Responsible Office and Telephone Number:

Advanced Antitank Weapon System Project Office
Program Executive Office, Fire Support
Redstone Arsenal, AL 35898-5720

Col Earl W. Finley
Assigned: 25 Jan 1988
AV 746-4266
COMM (205) 876-4266
FAX AV 746-5941
FAX COMM (205) 876-5941

4. (U) Program Elements/Procurement Line Items:

RDT&E: PE 63612A Project Number D308
PE 64611A Project Number D499 (Shared funding)

PROCUREMENT: APPN 2032 SSN C99300 (Army
APPN 1109 RCN 038061 (USMC

(b)(1)

MILCON: None

5. (U) Related Programs: None

REGRADED ~~UNCLASSIFIED~~
WHEN SEPARATED FROM CLASSIFIED INCLOSURE(S)

~~CLASSIFIED BY: AAWS-M SCG 28 JUL 88~~
~~DECLASSIFY ON:~~ OADR

OASD(PA) DFOISR 90-T-0703/1

~~CONFIDENTIAL~~

6. (U) Mission and Description: The Advanced Antitank Weapon System - Medium (AAWS-M) is a one-manportable antitank weapon system designed to provide high lethality against advanced armor and is envisioned as a simple-to-operate, easily and economically maintained, rugged and reliable infantry system for the U.S. Army and U.S. Marine Corps (USMC). The AAWS-M is comprised of two major components: a reusable Command and Launch Unit (CLU) and a missile sealed in a disposable launcher container. The CLU incorporates an integrated day/night sight and provides target engagement capability in adverse weather. The CLU may be used in a stand alone mode for battlefield surveillance and target detection for operation of the system, the round must be mated with the CLU. The CLU will provide a go/no-go status of the CLU and round. The missile, with a warhead designed against both conventional and reactive armor, may be used at the gunner's discretion in top attack or direct fire mode. The direct fire mode is for engaging targets under cover. The AAWS-M will replace the DRAGON.

7. (U) Program Highlights:

a. Significant Historical Developments -- In April 1984, a draft AAWS-M Required Operational Capabilities (ROC) was released to industry for comment. In September 1984, a technology briefing was given to industry and a draft Request for Proposal (RFP) was released for comment. The RFP called for a competitive design validation phase of 27 months followed by a 30-month Full Scale Development (FSD) phase and a concurrent Low Rate Initial Production (LRIP). The AAWS-M Army System Acquisition Review Council (ASARC) process was completed on 16 August 1985. The Secretary of the Army Milestone Decision Review I (MDR I) approval memorandum, dated 9 October 1985, authorized the AAWS-M and the AAWS-H entry into the Proof of Principle (POP) phase, subject to Defense System Acquisition Review Council (DSARC) review. On 4 April 1986, a Joint Services Operational Requirement (JSOR) was approved by HQDA and HQMC. The AAWS-M DSARC I was held on 11 April 1986, and the Secretary of Defense Decision Memorandum (SDDM) was issued on 15 May 1986. On 2 May 1986, an AAWS-M RFP for the POP phase was released to industry. Three AAWS-M POP contracts, $30 million each for a period of performance of 27 months, were awarded on 28 August 1986 to Ford Aerospace and Communications Corporation, Hughes Aircraft Company, and Texas Instruments, Incorporated. The FSD/LRIP RFP was released on 6 September 1988, and the proposals were received on 7 November 1988. An ASARC Preliminary review was held on 2 February 1989. On 9 February 1989, the Army announced that the Texas Instruments and Martin Marietta Imaging Infrared Fire-&-Forget (IIR F&F) technology was selected for the FSD contract award, contingent upon DA and OSD program approval.

The AAWS-M ASARC II process was completed on 10 March 1989. The Under Secretary of the Army Acquisition Decision Memorandum, dated 17 March 1989, authorized the AAWS-M to proceed into the FSD phase, subject to Defense Acquisition Board (DAB) review.

7. (U) Program Highlights: (cont.)

The AAWS-M DAB II review was held on 1 June 1989, and the Secretary of Defense Acquisition Decision Memorandum (ADM) was issued on 19 June 1989 approving entry into the (FSD) phase with the infrared fire and forget focal plane array technology. Contract award to a Texas Instrument/Martin Marietta Joint Venture was completed on 21 June 1989. The ADM required a seeker/tracker evaluation in a robust environment by Oct 90 with results to be reported by Dec 90.

b. Significant Developments Since Last Report --An Alternate Warhead Program contract was awarded 25 Oct 89 to Conventional Munitions Systems (CMS), Arlington, VA and the initial Program Review with Government representatives was held 8 Dec 89. Subcontractor Preliminary Design Reviews (PDRs) and a system level PDR were conducted in Nov 89. A "Mini DAB" was conducted 13 Nov 89 to address Baseline Test Issues. As a result, the MDR II ADM has been modified to conduct seeker/tracker evaluation in Oct 90 in lieu of Oct 89. No change was required to the DAB approved program schedule. In Dec 89, a wrap-up Software Specification Review, a Training Device System Design Review, and the Subsequent Application Review (SAR) of the cost collection systems (Texas Instruments, Joint Venture TI/Martin and Martin Marietta) were completed.

AAWS-M is expected to meet mission requirements.

c. Changes Since "As Of" Date -- None

8. (U) Threshold Breaches: There are currently no breaches to the DAE Approved Baseline dated March 1990.

9. (U) Schedule:

a. (U) Milestones --

Milestones --	Development Estimate	Approved Program	Current Estimate
(U) JSOR approved	Apr 86	Apr 86	Apr 86
(U) Milestone I (DAB)	May 86	May 86	May 86
(U) Pop contract award	Aug 86	Aug 86	Aug 86
(U) Pop complete	Dec 88	Dec 88	Dec 88
(U) Milestone II (DAB)	Jun 89	May 89	Jun 89
(U) FSD contract award	Jun 89	Jun 89	Jun 89
(U) PPQT start	Jun 90	Jun 90	Jun 90
(U) PPQT complete	Jan 92	Jan 92	Jan 92
(U) Training FDTE start	Mar 91	Mar 91	Mar 91
(U) Prototype delivery	Apr 91	Apr 91	Apr 91
(U) Training FDTE complete	Aug 91	Aug 91	Aug 91
(U) IOT start	Jan 92	Jan 92	Jan 92
(U) IOT complete	Apr 92	Apr 92	Apr 92
(U) Milestone IIIa	Jun 92	Jun 92	Jun 92
(U) LRIP I contract award	Jun 92	Jun 92	Jun 92
(U) LRIP II contract award	Jun 93	Jun 93	Jun 93
(U) First LRIP delivery	Sep 93	Sep 93	Sep 93
(U) PQT start	Sep 93	Sep 93	Sep 93

9. (U) Schedule: (cont.)

a. (U) Milestones --

	Development Estimate	Approved Program	Current Estimate
(U) PQT complete	Feb 94	Feb 94	Feb 94
(U) LFT start	Feb 94	Feb 94	Feb 94
(U) LFT complete	May 94	May 94	May 94
(U) FUE	Feb 94	Feb 94	Feb 94
(U) Milestone III	Jun 94	Jun 94	Jun 94
(U) FSP contract award	Jun 94	Jun 94	Jun 94
(U) First FSP delivery	Jun 95	Jun 95	Jun 95

(b)(1) (b)(1)

FDTE - Force Development Test and Experimentation
FSD - Full Scale Development
FSP - Full Scale Production
FUE - First Unit Equipped
IOC - Initial Operational Capability
IOT - Initial Operational Test
JSOR - Joint Service Operational Requirement
LFT - Live Fire Test
LRIP - Low Rate Initial Production
POP - Proof of Principle
PQT - Production Qualification Test
PPQT - Pre Production Qualification Test

b. (U) Previous Change Explanations -- None

c. (U) Current Change Explanations -- None

d. (U) References --

Development Estimate: DAE Baseline Approved 15 June 1989

Approved Program: DAE Baseline Approved March 1990.

10. (U) Technical/Operational Characteristics:

a. (U) Technical[1] --	Dev Est@	Approved Program Goal/Threshold@	Demonstrated Perf	Current Est
(U) System Weight (Pounds)	35	35/45	___	35
(b)(1)		(b)(1)		
(U) CLU operational[2] MTBOMF (hrs)	88	88/75	___	88
(U) CLU maintainability[3] MTTR (hrs)	<1.5	<1.5/1.5	___	<1.5

10. (U) Technical/Operational Characteristics: (cont.)

b. (U) Operational [1] --	Dev Est@	Approved Program Goal/Threshold@	Demon-strated Perf	Current Est
(b)(1)				

c. (U) Previous Change Explanations -- None

d. (U) Current Change Explanations -- None

e. (U) References --

Development Estimate: DAE Baseline Approved 15 June 1989.

Approved Program: DAE Baseline Approved March 1990.

Note: @ - at MS IIIA

1 (U) Values shown are goals representing desired performance and minimum acceptable thresholds.

2 (U) Mean Time Between Operational Mission Failures.

3 (U) Mean Time To Repair.

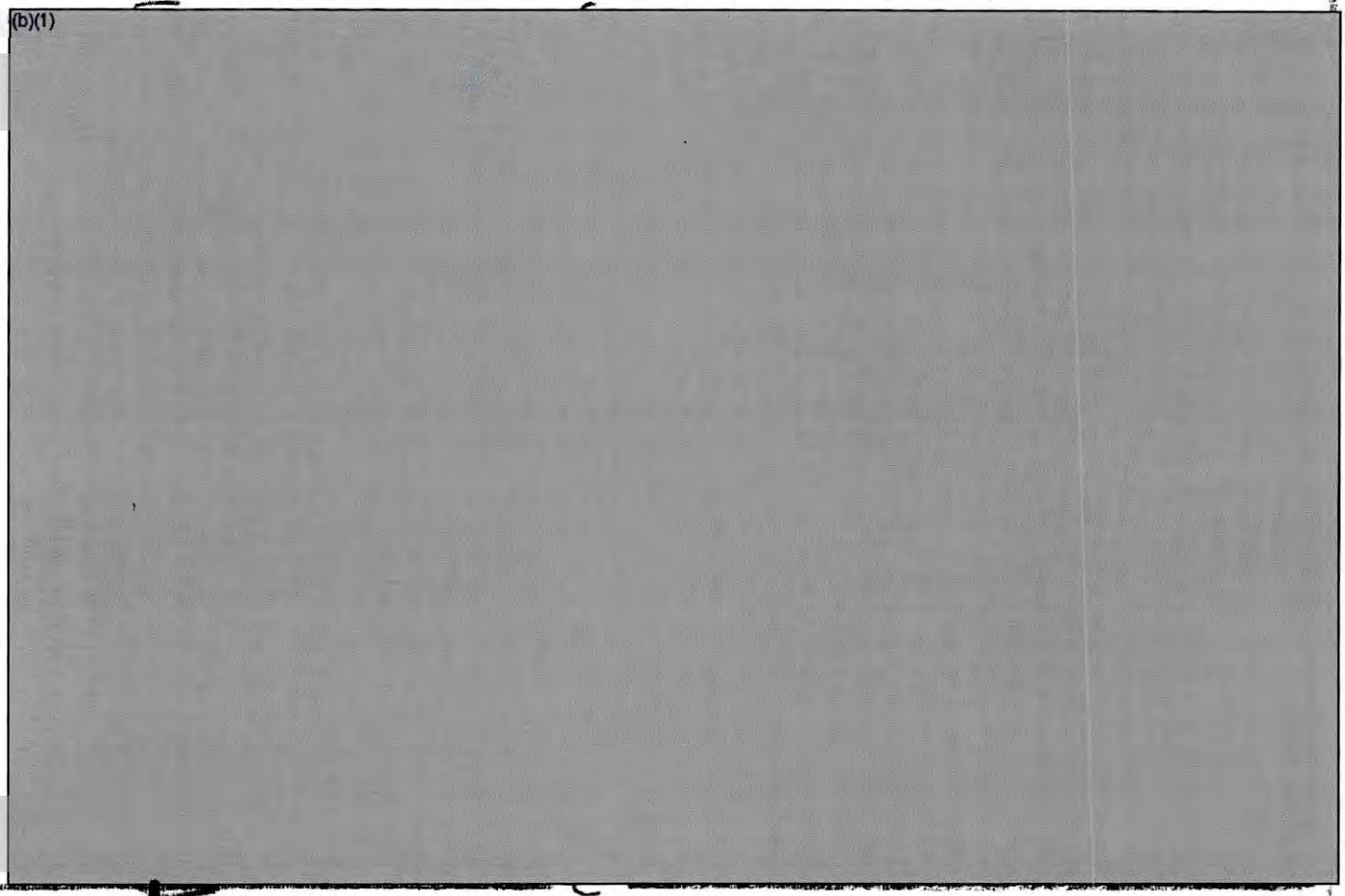
4 (U) Full lethality must be met at this range.

5 (U) Probability of hit given a reliable round.

(b)(1)

10. (U) Technical/Operational Characteristics: (cont.)

(b)(1)



11. (U) Program Acquisition Cost:

(Millions of dollars - FY 90 Base-Year)

(Army)

	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
a. (U) Cost			
Development (RDT&E)	$ 549.2	$ 494.6	$ 484.6
POP (Sunk Cost)	(140.6)	(140.2)	(140.2)
FSD	(408.6)	(354.4)	(344.4)
Procurement	2356.4	2386.8	2386.8
Missile (Round) Flyaway	((2035.4))	((2025.1))	((2025.1))
CLU Flyaway	((191.2))	((221.2))	((221.2))
Other Flyaway	((76.5))	((87.4))	((87.4))
Total Flyaway	(2303.1)	(2333.7)	(2333.7)

11. (U) Program Acquisition Cost: (cont.)

(Millions of dollars - FY 90 Base-Year)

(Army)

a. (U) Cost (cont.)	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
Other Weapon System Cost	(31.6)	(29.2)	(29.2)
Initial Spares	(21.7)	(23.9)	(23.9)
Construction (MILCON)	0.0	0.0	0.0
Total FY 90 Base-Year	$ 2905.6	$ 2881.4	$ 2871.4
Escalation	$ 440.7	$ 641.9	$ 640.9
Development (POP & FSD)	(-1.4)	(0.9)	(-0.1)
Procurement	(442.1)	(641.0)	(641.0)
Total Then-Year	$ 3346.3	$ 3523.3	$ 3512.3

(USMC)

	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
Development (RDT&E)	$ 0.0	$ 0.0	$ 0.0
Procurement	493.2	509.1	509.1
Missile (Round) Flyaway	((411.8))	((418.0))	((418.0))
CLU Flyaway	((49.1))	((60.4))	((60.4))
Other Flyaway	((20.2))	((18.2))	((18.2))
Total Flyaway	(481.1)	(496.6)	(496.6)
Other Weapon System Cost	(7.4)	(5.7)	(5.7)
Initial Spares	(4.7)	(6.8)	(6.8)
Construction (MILCON)	0.0	0.0	0.0
Total FY 90 Base-Year	$ 493.2	$ 509.1	$ 509.1
Escalation	$ 97.0	$ 138.5	$ 138.5
Development	(0.0)	(0.0)	(0.0)
Procurement	(97.0)	(138.5)	(138.5)
Total Then-Year	$ 590.2	$ 647.6	$ 647.6

11. (~~U~~) Program Acquisition Cost: (cont.)

(Total)

	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
Development (RDT&E)	$ 549.2	$ 494.6	$ 484.6
POP (Sunk Cost)	(140.6)	(140.2)	(140.2)
FSD	(408.6)	(354.4)	(344.4)
Procurement	2849.6	2895.9	2895.9
Missile (Round) Flyaway	((2447.2))	((2443.1))	((2443.1))
CLU Flyaway	((240.3))	((281.6))	((281.6))
Other Flyaway	((96.7))	((105.6))	((105.6))
Total Flyaway	(2784.2)	(2830.3)	(2830.3)
Other Weapon System Cost	(39.0)	(34.9)	(34.9)
Initial Spares	(26.4)	(30.7)	(30.7)
Construction (MILCON)	0.0	0.0	0.0
Total FY 90 Base-Year	$ 3398.8	$ 3390.5	$ 3380.5
Escalation	$ 537.7	$ 780.4	$ 779.4
Development (POP & FSD)	(-1.4)	(0.9)	(-0.1)
Procurement	(539.1)	(779.5)	(779.5)
Total Then-Year	$ 3936.5	$ 4170.9	$ 4159.9

b. (~~U~~) Quantities

		(Army)		
Development (RDT&E)	- Rounds	314	314	314
	CLUs	51	54	51
Procurement	- Rounds	58000	58000	58000
	- CLUs	5000	5000	5000
Total	- Rounds	58314	58314	58314
	- CLUs	5051	5054	5051
		(USMC)		
Development (RDT&E)	- Rounds	0	0	0
	CLUs	0	0	0
Procurement	- Rounds	12550	12550	12550
	- CLUs	1486	1486	1486
Total	- Rounds	12550	12550	12550
	- CLUs	1486	1486	1486

11. (U) Program Acquisition Cost: (cont.)

b. (U) Quantities (cont.)

(Total)

		DEVELOPMENT ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
Development (RDT&E)	- Rounds	314	314	314
	CLUs	51	54	51
Procurement	- Rounds	70550	70550	70550
	- CLUs	6486	6486	6486
Total	- Rounds	70864	70864	70864
	- CLUs	6537	6540	6537

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References --

Development Estimate: ABS, 27 April 1989.

Approved Program: DAE Baseline Approved March 1990.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary :

(Current (Then-Year) Dollars In Millions)

	Current Estimate (Dec 89 SAR)	Current Year UCR Baseline (Sep 89 SAR)	Budget Year UCR Baseline (Dec 89 SAR)
a. Program Acquisition			
(1) Cost	4159.9	3936.5	4159.9
(2) Quantity	70550	70550[1]	70550
(3) Unit Cost	.059	.056	.059
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	N/A	N/A	15.6
Less CY Adv Proc	N/A	N/A	15.6
Plus PY Adv Proc	N/A	N/A	0
Net Total	N/A	N/A	0
(2) Quantity	N/A	N/A	0
(3) Unit Cost	N/A	N/A	0

1 (U) This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation.

13. ~~(U)~~ Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	Total
Development Estimate	547.8	3388.7	0	3936.5
Previous Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0	0	0	0
Current Changes:				
Economic	+4.5	+233.8		+238.3
Quantity				
Schedule		-6.1		-6.1
Engineering		+52.4		+52.4
Estimating	-67.8	+6.4		-61.4
Other				
Support		+0.2		+0.2
Total Changes	-63.3	+286.7	0	+223.4
Current Estimate	484.5	3675.4	0	4159.9

(FY 90 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	Total
Development Estimate	549.2	2849.6	0	3398.8
Previous Changes:				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0	0	0	0

13. ~~(U)~~ Cost Variance Analysis: (cont.)

a. Summary -- (Cont.)

(FY 90 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	Total
Current Changes:				
Quantity				
Schedule				
Engineering		+41.3		+41.3
Estimating	-64.6	+4.8		-59.8
Other				
Support		+0.2		+0.2
Total Changes	-64.6	+46.3	0	-18.3
Current Estimate	484.6	2895.9	0	3380.5

b. Previous Change Explanations -- None (Initial SAR, September 1989)

c. Current Change Explanations --

	(Dollars in Millions) Base-Year $	Then-Year $
(1) RDT&E		
Revised escalation indices (Ecomonic)	N/A	+4.5
Current and prior year inflation offset (Estimating)	-1.0	-1.0
Revised due to Technology Selection (Estimating)	-63.6	-66.8
(2) Procurement)		
Revised escalation indices (Ecomonic)	N/A	+233.8
Revised Delivery schedules (Schedule)	0.0	-6.1
Add Built In Test Equipment (BITE) to CLU (Engineering)	+41.3	+52.4
Revised Trainer Cost (Estimating)	+8.9	+11.6
Refined Missile Cost (Estimating)	-4.1	-5.2
Additional costs due to revised delivery schedule (Support)	+0.2	+0.2

13. (U) Cost Variance Analysis:

c. Current Change Explanations -- (Cont.)

(3) MILCON

None

14. (U) Program Acquisition Unit Cost (PAUC) History[1]:
(Millions of Then-Year Dollars)

a. Initial SAR Estimate (Development Estimate) to Current Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
.056	+.003	0	0	0	0	0	0	+.003	.059

b. N/A

1 (U) This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation.

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. RDT&E -- (FSD)
Contractor: TI/MM
AAWS-M Joint Venture
Denton, Texas
DAAH01-89-C-A012, CPIF
Award: 21 Jun 1989
Definitized: 21 Jun 1989
Comment: Contractor proposed no award fee.

Initial Contract Price		
Target	Ceiling	Qty
$169.7	N/A	246 Rounds 43 CLUs

Current Contract Price		
Target	Ceiling	Qty
$170.7	N/A	246 Rounds 43 CLUs

Estimated Price At Completion	
Contractor	Program Manager
$174.7	$174.7

	Cost Variance	Schedule Variance
Previous Cumulative Variance	None	None
Cumulative Variance to Date (12/31/89)	- 5.8	- 4.7
Net Change	- 5.8	- 4.7

Explanation of Change: Although the backlog of system specifications and requirements has been reduced, the residual effect continues to impact cumulative variances. Aggressive actions to control system weight continue to require a high program priority and are, in some cases, causing additional

15. (U) Contract Information: (cont.)

analyses and re-design. Corrective plans to work-around delays in order to meet the hardware build plan are adding to cost in areas such as additional drafting support and cost premiums required to exercise rapid reaction options for purchased and fabricated parts. Problems with collection of computer costs and labor have been resolved, however transferring of incurred costs will not occur until the January time frame. Based on recommendations from the Subsequent Application Review (SAR) Team and experience from the first four months, work packages planned after Jan 90 will be better defined, more numerous, planned to reflect actual need dates and better tailored to the budgeted cost. In Sep 89, overhead rates increased and represent 41.3% or $ 2.4 M of the total cumulative cost variance through 31 Dec 89. The contractor will conduct a "bottoms-up" latest revised estimate (LRE) in the Jan-Feb 90 timeframe.

b. Procurement -- N/A

c. MILCON -- None

16. (U) Program Funding Summary:
(Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 41.7% (5 yrs/12 yrs)

(2) Percent Program Cost Appropriated: 8.8% ($364.2/$4159.9)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current + Prior Yrs (FY 86-89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance to Complete (FY 92-97)	Total
RDT&E	226.3	137.9	76.8	43.5	484.5
Procurement			15.6	3659.8	3675.4
Army			(15.6)	(3012.2)	(3027.8)
USMC				(647.6)	(647.6)
MILCON					0.0
Total	226.3	137.9	92.4	3703.3	4159.9

16. ~~(U)~~ Program Funding Summary: (cont.)
(Current Estimate in Millions of Dollars)
c. Annual Summary -- Total Program

FISCAL YEAR	QTY	FLYAWAY FY90 DOLLARS		TOTAL BASE YEAR $	TOTAL THEN-YEAR $			ESCL RATE (%)
		NONREC	REC		PROGRAM	OBLI-GATED	EX-PENDED	
Appropriation: RDT&E								
1986				61.8	55.2	55.1	55.0	2.8
1987				46.2	42.5	42.0	41.6	2.7
1988				31.2	29.6	29.6	29.4	3.0
1989				100.3	99.0	99.2	16.1	4.2
1990				134.2	137.9	45.6	.5	4.0
1991				71.9	76.8			4.2
1992				34.0	37.7			4.0
1993				3.7	4.2			3.7
1994				1.3	1.6			3.4
SUB-TOTAL	314			484.6	484.5	271.5	142.6	
Appropriation: Procurement								
1991		0.0	14.0	14.0	15.6			4.2
1992	1214	0.0	137.6	142.9	164.9			4.0
1993	6144	0.0	307.1	315.6	375.9			3.7
1994	10971	21.7	539.5	583.3	716.3			3.4
1995	13695	22.3	545.6	585.7	741.6			3.1
1996	18660	15.3	648.4	670.4	875.1			3.1
1997	19866	15.4	563.4	584.0	786.0			3.1
SUB-TOTAL	70550	74.7	2755.6	2895.9	3675.4			
TOTAL	70864	74.7	2755.6	3380.5	4159.9	271.5	142.6	

16. ~~(U)~~ Program Funding Summary: (cont.)
(Current Estimate in Millions of Dollars)

FISCAL YEAR	QTY	FLYAWAY FY90 DOLLARS		TOTAL BASE YEAR $	TOTAL THEN-YEAR $			ESCL RATE (%)
		NONREC	REC		PROGRAM	OBLI-GATED	EX-PENDED	
Appropriation: Procurement - Army								
1991		0.0	14.0	14.0	15.6			4.2
1992	1214	0.0	137.6	142.9	164.9			4.0
1993	4470	0.0	224.5	230.6	274.7			3.7
1994	9398	18.1	456.5	492.5	604.8			3.4
1995	11177	18.3	437.9	469.9	594.9			3.1
1996	15836	13.0	541.2	559.7	730.7			3.1
1997	15905	12.3	460.3	477.2	642.2			3.1
SUB-TOTAL	58000	61.7	2272.0	2386.8	3027.8			
Appropriation: Procurement - USMC								
1993	1674	0.0	82.6	85.0	101.2			3.7
1994	1573	3.6	83.0	90.8	111.5			3.1
1995	2518	4.0	107.7	115.8	146.7			3.1
1996	2824	2.3	107.2	110.6	144.4			3.1
1997	3961	3.1	103.1	106.9	143.8			3.1
SUB-TOTAL	12550	13.0	483.6	509.1	647.6			

17. (U) Production Rate Data:

a. Annualized Production Rates --

Round

FISCAL YEAR BUY	PRODUCTION RATES (QUANTITY/YEAR)			
	DEVELOPMENT ESTIMATE	PRODUCTION ESTIMATE	CURRENT ESTIMATE	MAXIMUM ECONOMIC
1992	1214		1214	
1993	5567		6144	
1994	10653		10971	
1995	13689		13695	
1996	19420		18660	
1997	20007		19866	

CLU

FISCAL YEAR BUY	PRODUCTION RATES (QUANTITY/YEAR)			
	DEVELOPMENT ESTIMATE	PRODUCTION ESTIMATE	CURRENT ESTIMATE	MAXIMUM ECONOMIC
1992	120		138	
1993	424		522	
1994	809		1370	
1995	1386		1425	
1996	1881		1854	
1997	1866		1177	

17. (U) Production Rate Data: (cont.)

b. Cost Variance -- (Dollars in Millions)

ITEM	PRODUCTION ESTIMATE	VARIANCE (CE LESS PdE)	CURRENT ESTIMATE	VARIANCE (CE LESS MAX)	MAXIMUM ECONOMIC
PROG ACQ COST (BY $)			3380.5		
(TY $)			4159.9		
PAUC (BY $)			.048		
(TY $)			.059		

c. Schedule Variance --

	PRODUCTION ESTIMATE	VARIANCE (CE LESS PdE)	CURRENT ESTIMATE	VARIANCE (CE LESS MAX)	MAXIMUM ECONOMIC
START DATE (MO/YR)			6/92		
DURATION (IN MONTHS)			75		
END DATE (MO/YR)			9/98		

d. Deliveries (Plan/Actual) --

		To Date
RDT&E --	Round	59/59
	CLU	8/8
Production --	Round	0/0
	CLU	0/0

e. Approved Design-To-Cost Goal -- N/A

18. (U) Operating and Support Costs:

a. Assumptions and Ground Rules -- The maintenance concept for AAWS-M will be developed to conform to the existing 4-level (or less) maintenance concept for deployment and support. Unit maintenance of the system will be limited to quick and simple visual inspection, cleaning, self-test using Built In Test (BIT), and replacement of consumables (such as batteries/gas bottles) (there will be no rechargeable gas bottles).

Direct support maintenance will consist of: system check-out using the systems Built In Test Equipment (BITE) and/or the Intermediate Forward Test Equipment (IFTE) Contact Test Set (CTS); replacement of faulty components; and possibly component screening, using the IFTE Base Station Test Facility (BSTF), and evacuation of

18. ~~(U)~~ Operating and Support Costs: (cont.)

repairable components to depot.

Government Depot capability will be established in 1993. Depot maintenance will consist of complete repair of the CLU's economically repairable circuit cards, and assemblies, and components using the IFTE Commercial Equivalent Equipment (CEE). Missile Depot repair (resulting from surveillance checks) is expected to be performed by the system's prime contractor. No Government Depot repair is currently being considered. The AAWS-M training devices will be maintained at field and depot levels via Contractor Logistics Support (CLS) contracts for the life of the system.

Delivery/fielding occurs in the 2nd year following procurement. Initial repair parts represents over 27% of the fielding program costs. Sustainment covers 20 (full deployment) years of operation, maintenance, and modification. Military pay and allowances represents over 81% of the sustainment program costs. Sustainment for the antecedent system, DRAGON, covers 33 (full deployment) years of operation, maintenance and modification.

Personnel costs cover military pay and allowances less costs associated with permanent change of station (PCS). O & S consumables consist of petroleum, oil and lubricants plus ammunition/missiles (training ammo/missiles and war reserve). Direct depot maintenance consists of civilian labor, material, transportation, sustainment of training devices, system software maintenance and training devices software maintenance. Sustaining investment includes repair parts (incl war reserve), spares (incl war reserve), modifications/kits and software upgrades. Other direct costs include field maintenance civilian labor, system specific replacement training, quarters, maintenance and utilities. Indirect cost consists of costs of PCS, system project management, DRAGON stockpile reliability, and other O & M and MIPA funded items less training device software maintenance and software upgrades.

b. Costs -- (FY 1990 Constant (Base Year) Dollars in Millions)

Cost Element	Avg Annual Cost AAWS-M[1]	Avg Annual Cost DRAGON[2]
PERSONNEL	113.3	113.3
O&S CONSUMABLES	0.0	0.0
DIRECT DEPOT MAINTENANCE	8.9	14.2
SUSTAINING INVESTMENT	4.7	20.9
OTHER DIRECT COSTS	3.2	9.5
INDIRECT COSTS	13.3	4.7
TOTAL	143.4	162.6

18. Operating and Support Costs: (cont.)

c. Contractor Support Costs -- N/A

1 - AAWS-M BCE, validated Aug 89, 20 Years Sustainment, Army only, USMC O&S Cost TBD;
2 - DRAGON II Life Cycle Cost Estimate, IAAWS COEA, Oct 1988, 33 Years Sustainment, Army only, USMC O&S Cost TBD.

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AF-30 TRI-TAC

SAR-89-093

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)

PROGRAM: JOINT TACTICAL COMMUNICATIONS (TRI-TAC) PROGRAM

AS OF DATE: December 31, 1989

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1. Designation and Nomenclature (Popular Name): CNCE (AN/TSQ-111), TROPO (AN/TRC-170), and Others/Joint Tactical Communications (TRI-TAC) Program.

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

CTC Systems Program Office
Electronic Systems Division
Hanscom AFB, MA 01731-5000

PM: Mr Jeffrey H. Thurston
Assigned: Aug 24 1989
AV 478-8319
COMM (617) 377-8319

FEB 28 1990

4. Program Elements/Procurement Line Items:

RDT&E: PE 0208010F

PROCUREMENT: APPN 3080 ICN 835100

MILCON: N/A

5. Related Programs: N/A

SAF/PAS
90-099 -T
#23

6. Mission and Description:

The TRI-TAC Program is a multi-service DoD directed effort to develop and acquire joint communications equipment for the tactical forces. Within the TRI-TAC effort, USAF is the executive agent for the development and production of two large programs, the Communications Nodal Control Element (CNCE) and the Troposcatter Radio Terminal (TROPO).

a. CNCE (AN/TSQ-111). The CNCE is an automated technical control facility which provides centralized management and control for a tactical communications node. It provides the interface among analog and digital nodal switches, common-user and dedicated interfaces and the internodal radio and cable transmission networks. The CNCE is a single S-280 shelter configuration. It will eventually replace the AN/TSC-62 Communications Van.

b. TROPO (AN/TRC-170). The TROPO is a family of three tactical, digital, troposcatter radio assemblages designed to provide a capability for transmission and reception of digital voice and data group rates up to 2048 Kb/s. Each assemblage is capable of operating in either line-of-sight or troposcatter mode of propagation in the 4.4-5.0 GHz frequency band. Set V-2 the middle size family member and provides secure communications at nominal ranges up to 150 miles. Set V-3, the smallest member of the family, provides secure communications at nominal ranges of up to 100 miles. The TROPO will eventually replace the AN/TRC-97 radio.

In addition to the two large programs for which it is the executive agent, USAF is the executive for one small program, the TA-954 Digital Non-Secure Voice Terminal (DNVT).

AF is also responsible for procuring TRI-TAC equipment developed by other services including switches (AN/TTC-39, AN/TYC-39, AN/TTC-42, and SB-3865), Tactical Digital Facsimilies, terminals (AN/UGC-144 and CV-3591), and various Digital Group Multiplexers (DGM). COMSEC for TRI-TAC equipment is developed and produced by the National Security Agency (NSA).

7. Program Highlights:

a. Significant Historical Developments --

TRI-TAC was established by the Director, Telecommunications and Command and Control Systems (DTACCS), under DoD Directive No. 5148.7, dated 27 May 1971, Subject: Charter for the Joint Tactical Communications (TRI-TAC) Program (later revised as of 16 February 1976 and 20 January 1978). Under this charter, DTACCS issued Memoranda of Task Assignment and instruction to a particular military Service or the National Security Agency which then became the executive agent for the development of specific equipment. The assigned Service would later provide production acquisition and initial logistics support for all Services. The Memoranda of Task Assignment and Instruction for programs on which USAF is the executive agent were issued as follows: CNCE on 23 September 1972, TROPO on 15 September 1972, and DNVT on 16 July 1974. On 28 December 1983, USD (R&E) directed the Air Force to assume responsibility for the Tactical Digital Facsimile (TDF), which had been developed by the Navy.

7. Program Highlights (Cont'd)

CE. In May 1975, a contract was awarded to Martin Marietta Corporation for the development of four CNCEs. Government test of the CNCE at Ft. Huachuca, AZ, was completed in October 1981. During October 1982 - May 1983, the Army studied a less capable, lower cost alternative to the CNCE. In June 1983, DUSD (C3I) directed the Air Force to explore a descoped alternative to the CNCE which would satisfy minimum Army and Air Force requirements. This resulted in a modular CNCE. An agreement was reached to allow the Army to meet its near-term requirements by modifying the AN/TTC-39 while retaining the option to procure CNCE production units in later years.

A production contract for 58 CNCEs was awarded on 31 August 1984. The contract is firm fixed price with a basic buy of seven CNCEs, with options for 20, 17, and 14 respectively. Option 1 was exercised November 1984, Option 2 was exercised November 1985 and Option 4 was exercised November 1986. Production has continued on schedule with the design, fabrication, and validation of production tools and special test equipment. Development of the initial cadre to support follow-on Test and Evaluation (FOT&E) commenced November 1986 with FOT&E being conducted February/April 1987.

In July 1987 an option for an additional 20 CNCEs (10 USAF, 8 USCENTCOM, and 2 ANG) was exercised . Follow-on test and evaluation was completed in April 1987.

TROPO. In April 1982, a 3-year multi-year, firm fixed price contract was awarded to Raytheon for 105 Air Force and 5 REDCOM radio terminals. An option for Army requirements (51 units) was awarded in April 1983. First production delivery was 3 months early in October 1984 and deliveries continue on or ahead of schedule. A follow-on contract was awarded to Raytheon on 10 September 1985 for 57 additional Army units and October 1986 for radios for the Army and eight sets of materials (4 each V2 and V3). Efforts to initiate competition for FY86-88 units was initiated and the RFP was released in June 1986 with special factory test equipment being procured in August 1986.

A competitive contract was awarded to Raytheon Corporation and Unisys Corporation for procurement of 65 units in May 1987. 46 units were awarded to Unisys and 19 units to Raytheon with an option for 72 units in FY 89 (48 to Unisys and 24 to Raytheon). The Air Force objective is to procure as many AN/TRC-170 radios as possible and at the earliest possible time to reduce O&M costs associated with maintaining two systems (AN/TRC-97 and AN/TRC-170).

TROPO. UNISYS successfully passed the Production Planning Evaluation Review (PPER) I on 19 January 1988. UNISYS also successfully completed PPER II five months ahead of schedule on 20 April 1988 which was required prior to award of the FY 88 option. This option was awarded on 17 May 1988 and consisted of 48 units for the FY 88 option and 20 units on the FY88/A option. Raytheon was awarded their FY 88 option on 15 June 1988 for 38 units. An Invitation For Bid for an additional 20 spares suite was issued to UNISYS and Raytheon. The bids were opened on 28 Sep 88 and an award was made to Raytheon for $4.75M. The TROPO FY 91 acquisition strategy will be a competitive three year multiyear.

Schedule

(1) CNCE

a. Milestones

	Prod Estimate	Approved Program	Current Estimate
Contract Award	May 75	May 75	May 75
Preliminary Design Review - Hardware	Dec 75	Dec 75	Dec 75
Preliminary Design Review - Software	Aug 76	Aug 76	Aug 76
Critical Design Review - Hardware	Apr 77	Apr 77	Apr 77
Critical Design Review - Software Part I	Aug 77	Aug 77	Aug 77
Critical Design Review - Software Part II	Jan 78	Jan 78	Jan 78
Contractor Development Testing Completed	Dec 78	Dec 78	Dec 78
Software Delivery	Jun 80	Jun 80	Jun 80
Service Testing Begins	Aug 80	Aug 80	Aug 80
Service Testing Completed	Oct 81	Oct 81	Oct 81
Variant Development Completed	Dec 83	Dec 83	Dec 83
Production Begins	Jul 84	Aug 84	Aug 84
Initial Operational Capability 1/	N/A	N/A	N/A
First Delivery	Aug 86	Aug 86	Aug 86
Last Delivery	Mar 88	Oct 88	Aug 88

b. Previous Change Explanations -- CNCE production award slipped one month from Jul 84 to Aug 84 due to difficult negotiations, and this date reflects USD(A) Baseline Approval. Last delivery changed from March 88 to June 88 due to the addition of 12 CNCEs and changed from June 1988 to October 1988 due to inclusion of CENTCOM units. The CNCE final delivery was August 88 instead of October 88 due to aggressive management.

c. Current Change Explanations -- None

d. References --

Production Estimate: FY 85 President's Budget, January 1984.

Approved Program: DAE Baseline dated December 1988.

1/ There is no directed or defined IOC for CNCE.

7. Program Highlights (con't)

c. Significant Developments Since Last Report--

TROPO: UNISYS has successfully completed its Reverse Engineering effort on the AN/TRC-170 Program and delivered its first production Radio on 6 December 1989, 5 months ahead of schedule. Unisys is now a qualified Second Source for AN/TRC-170 Radios.

This system is expected to satisfy its mission requirements and comply with all performance requirements.

Final TRI-TAC SAR, TRI-TAC does not meet the one billion FY 80 procurement expenditure criteria or 200 million FY 80 R&D criteria.

c. Changes Since "As Of" Date: A competitive contract was awarded to Raytheon and Unisys Corporation for procurement of 146 units January 1990. 99 units were awarded to Raytheon and 47 units to Unisys.

8. Threshold Breaches: There are currently no DAE Baseline (Dec 88) Breaches.

9. Schedule (cont'd)

	Production Estimate	Approved Program	Current Estimate
(2) TROPO			
a. Milestones			
Production Begins	Apr 82	Apr 82	Apr 82
Initial Operational Capability 1/	N/A	N/A	N/A
First Delivery	Dec 84	Oct 84	Oct 84
Last Delivery 2/	Dec 86	Dec 86	Dec 86
Follow-on Production	Mar 85	Sep 85	Sep 85
First Delivery	-	Aug 87	Aug 87
Last Delivery	-	May 88	May 88
Competitive Procurement	-	May 87	May 87
First Delivery	-	Dec 89	Dec 89
Last Delivery	-	May 91	May 91
First Delivery FY88 Option	-	Jun 90	Jun 90
Last Delivery FY88 Option	-	Nov 92	Nov 92

b. Previous Change Explanations -- TROPO first delivery was three months early in Oct 84 vice Dec 84 due to aggressive management. TROPO Follow-on production award slipped six months from Mar 85 to Sep 85 due to unplanned competition and the time required to obtain reprocurement data. Also this milestone reflects USDA Baseline Approval. Follow-on Production milestones not previously reported (first delivery for follow-on production through last delivery of competitive procurement). FY 88 Option Milestones were not previously reported.

c. Current Change Explanations -- None

d. References --

Production Estimate: FY 85 President's Budget, January 1984.

Approved Program: DAE baseline dated Dec 88.

1/ There is no directed or defined IOC for TROPO.

2/ Last delivery date is the last delivery for USAF units on initial production contract.

10. Technical/Operational Characteristics:

a. Technical	Prod Est	Appr Program Goal/Threshold	Demonstrated Performance	Current Estimate
(1) CNCE				
Capacity				
(Digital Channels)	756	756/756	756	756
(Analog Channels)	390	390/390	390	390
Weight (lbs)	10,000	8,900/10,000	8,900	8,900
Mean Time Between Incidents (MTBI) (Hrs)	50	50/50	N/A	94
Mean Corrective Time (MCT) (MINS)	15	15/15	N/A	9.4
(2) TROPO				
Capacity (Digital Channels)	60	60/60	60	60
Range (Miles, Nominal)				
V-2	150	150/150	150	150
V-3	100	100/100	100	100
Weight (lbs)				
V-2	9,300	9,016/9,300	9,016	9,016
V-3	6,200	6,077/6,200	6,077	6,077
Mean Time Between Failures (MTBF) (Hrs)				
V-2	308	308/308	N/A	520
V-3	472	472/472	N/A	800
Mean Time to Repair (MTTR) (Mins)	15-45	15-45/15-45	N/A	15-30

Technical/Operational Characteristics (Cont'd)

	Prod Est	Appr/Program Goal/Threshold	Demonstrated Performance	Current Estimate
b. Operational				
(1) CNCE				
Footprint				
(No. of Shelters)	1	1/1	1	1
Maximum Set Up/Tear Down				
Times (Min)	45	45/45	45	45
(2) TROPO				
Footprint				
V-2 (No. of Shelters)	1	1	1	1
(No. of Antennas)	2	2	2	2
V-3 (No. of Shelters)	1	1	1	1
(No. of Antennas)	1	N/A	1	1
Maximum Set Up Tear Down (Minimum/Full Site)				
Times (Hrs)				
V-2	2/4	N/A	4/4	4/4
V-3	1/1	N/A	1-1	1-1

c. Previous Change Explanations -- TROPO's Maximum Set Up/Tear Down Time, Range, and Weight were demonstrated during Acceptance Testing at Ft. Huachuca, AZ. TROPO's MTBF current estimate changed as a result of on-going field tests. Demonstrated performance during FOT&E, and production estimate reflects USD (A) Baseline Approval.

d. Current Change Explanations -- None

e. References --

Production Estimate: FY 85 President's Budget, January 1984

Approved Program: DAE baseline dated Dec 88.

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)
System: TRI-TAC (TROPO)

a. Cost	Production Estimate	Approved Program	Current Estimate
Development	37.3	41.8	37.9
Procurement	306.4	290.6	254.3
Total Flyaway	(285.1)	(262.0)	(229.8)
Peculiar Spt Eqp	(17.1)	(22.3)	(20.3)
Other Wpn Costs	(4.2)	(6.3)	(4.2)
Initial Spares	-	-	-
Construction	-	-	-
Total FY 76 Base-Year $	343.7	332.4	292.2
Escalation	353.6	327.0	285.4
Development	(11.2)	(15.9)	(11.8)
Procurement	(342.4)	(311.1)	(273.6)
Construction	-	-	-
Total Then-Year $	697.3	659.4	577.6

b. Quantities --

Development	9	9	9
Procurement	350	474	416
Total	359	483	425

c. Foriegn Military Sales -- Sales to date are 8 units to the United Arab Emirates for a total of $34.8M.

d. Nuclear Costs -- None

e. References --

Production Estimate: FY85 President's Budget, January 1984

Approved Program: DAE baseline dated Dec 88.

Program Acquisition Cost: (Current Estimate in Millions of Dollars)
System: TRI-TAC (Support/Systems Integration/Other)

a. Cost --	Production Estimate	Approved Program	Current Estimate
Development	80.7	82.1	81.8
Procurement	589.8	329.4	301.3
Total Flyaway	-	-	-
Peculiar Spt Eqp	-	-	-
Other Wpn Sys Cost	(478.0)	(255.9)	(227.8)
Initial Spares	(111.8)	(73.5)	(73.5)
Construction	-	-	-
Total FY 76 Base-Year $	670.5	411.5	383.1
Escalation	707.7	408.7	382.1
Development	(35.8)	(39.2)	(38.9)
Procurement	(671.9)	(369.5)	(343.2)
Construction	-	-	-
Total Then-Year $	1378.2	820.2	765.2
b. Quantities --	N/A	N/A	N/A

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Production Estimate: FY 85 President's Budget, January 1984

Approved Program: DAE baseline dated Dec 88.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)
System: TRI-TAC (TROPO)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
a. Program Acquisition --			
(1) Cost	577.6	659.4	577.6
(2) Quantity	416	474	416
(3) Unit Cost	1.388	1.391	1.388*
b. Current Procurement --			
	(FY 1990)	(FY 1990)	(FY 1991)
(1) Cost	0	0	57.6
Less CY Adv Proc	0	0	0
Plus PY Adv Proc	0	0	0
Net Total	0	0	57.6
(2) Quantity	0	0	60
(3) Unit Cost	0	0	0.960

* This value has been revised to exclude the 9 R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully -- configured end items for the purpose of this calculation.

13. Cost Variance Analysis
System: Joint Tactical Communications (TRI-TAC) Program

a. Summary - Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate*	165.0	1910.5	N/A	2075.5
Previous Changes				
Economic	- 2.4	- 86.5		- 88.9
Quantity	-	+ 33.5		+ 33.5
Schedule	-	+ 38.1		+ 38.1
Engineering	+ 15.7			+ 15.7
Estimating	+ 5.8	- 515.3		- 509.5
Other	-	-		-
Support	- 5.1	- 79.7		- 84.8
Subtotal	+ 14.0	- 609.9	-	- 595.9
Current Changes				
Economic	-	+ 26.3	-	+ 26.3
Quantity	-	- 49.0	-	- 49.0
Schedule	-	-	-	-
Engineering	- 8.0	-	-	- 8.0
Estimating	- 0.6	- 89.3	-	- 89.9
Other	-	-	-	-
Support	-	- 16.2	-	- 16.2
Subtotal	- 8.6	- 128.2	-	- 136.8
Total Changes	+ 5.4	- 738.1	-	- 732.7
Current Estimate	170.4	1172.4	-	1342.8

(FY 1976 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate*	118.0	896.2	N/A	1014.2
Previous Changes				
Quantity	-	- 9.7	-	- 9.7
Schedule	-	-	-	-
Engineering	+ 7.2	-	-	+ 7.2
Estimating	+ 2.2	-222.8	-	- 220.6
Other	-	-	-	-
Support	- 3.5	- 43.7	-	- 47.2
Subtotal	+ 5.9	- 276.2	-	- 270.3
Current Changes				
Quantity	-	- 21.4	-	- 21.4
Schedule	-	-	-	-
Engineering	-3.9	-	-	- 3.9
Estimating	-0.3	- 36.0	-	- 36.3
Other	-	-	-	-
Support	-	- 7.0	-	- 7.0
Subtotal	- 4.2	- 64.4	-	- 68.6
Total Changes	+ 1.7	- 340.6	-	-338.9
Current Estimate	119.7	555.6	-	675.3

*CNCE is no longer being reported - program is complete. A total of $442.6 million in then-year dollars has been deleted from the SAR.

Cost Variance Analysis
System: TRI-TAC (TROPO)

a. Summary - Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	48.5	648.8	N/A	697.3
Previous Changes				
Economic	- 1.2	- 32.5	-	- 33.7
Quantity	-	+ 155.9	-	+ 155.9
Schedule	-	+ 38.1	-	+ 38.1
Engineering	+15.7	-	-	+ 15.7
Estimating	- 4.2	- 232.6	-	- 236.8
Other	-	-	-	-
Support	- 1.1	+ 24.0	-	+ 22.9
Subtotal	+ 9.2	- 47.1	-	- 37.9
Current Changes				
Economic	-	+ 9.1	-	+ 9.1
Quantity	-	- 49.0	-	- 49.0
Schedule	-	-	-	-
Engineering	- 8.0	-	-	- 8.0
Estimating	-	- 17.7	-	- 17.7
Other	-	-	-	-
Support	-	- 16.2	-	- 16.2
Subtotal	- 8.0	- 73.8	-	- 81.8
Total Changes	+ 1.2	-120.9	-	-119.7
Current Estimate	49.7	527.9	-	577.6

(FY 1976 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	37.3	306.4	N/A	343.7
Previous Changes:				
Quantity	-	+ 65.6	-	+ 65.6
Schedule	-	-	-	-
Engineering	+ 7.2	-	-	+ 7.2
Estimating	- 2.0	- 91.6	-	- 93.6
Other	-	-	-	-
Support	- 0.7	+ 10.2	-	+ 9.5
Subtotal	+ 4.5	- 15.8	-	- 11.3
Current Changes				
Quantity	-	- 21.4	-	- 21.4
Schedule	-	-	-	-
Engineering	- 3.9	-	-	- 3.9
Estimating	-	- 7.9	-	- 7.9
Other	-	-	-	-
Support	-	- 7.0	-	- 7.0
Subtotal	- 3.9	- 36.3	-	- 40.2
Total Changes	+ 0.6	- 52.1	-	- 51.5
Current Estimate	37.9	254.3	-	292.2

13. Cost Variance Analysis (Cont'd):
System: TRI-TAC (TROPO)

b. Previous Change Explanations --

RDT&E

Economic:	Revised economic escalation indices.
Engineering:	Development of Electronic Counter-Counter Measure (ECCM) Capability.
Estimating:	Development of Electronic Counter-Counter Measure (ECCM) Capability. Adjustment for prior economic escalation. Deletion of Electronic Counter-Counter Measure (ECCM) capability due to budget restrictions.
Support:	Peculiar Support Equipment costs refined to reflect actual experience.

Procurement

Economic:	Revised economic escalation indices.
Quantity:	Addition of 72 units with added production in FY 91. Addition of 18 units with added production in FY 92. Addition of 34 Units (FY88-91).
Schedule:	Rephasing of production schedule due to quantity deletions, competition and programmatic reductions.
Estimating:	Refined estimate for other programmatic costs associated with TROPO production and a refinement of current estimate based upon completion of production units plus a change in the quantity mix being procured. Adjustment for prior year economic escalation and refinement of the production estimate.
Support:	Increased support costs associated with an increase in the number of units (54 through FY 88-93).

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E Deletion of ECCM due to a change in operational concept (Engineering)	- 3.9	- 8.0

(2) Procurement		
Revised economic escalation indicies (Economic)	N/A	+ 9.1
Decrease quantity of TROPOs from 474 to 416	-28.4	-65.2
Flyaway costs associated with quantity reduction (Quantity)	(-21.4)	(-49.0)
Support costs associated with quantity reduction (Support)	(- 7.0)	(-16.2)
Refinement of current production estimate based upon competition of production units and a change in the quantity mix being procured. (Estimating)	- 6.1	- 13.6
Adjustment for current and prior year economic escalation. (Estimating)	- 1.8	- 4.1

13. Cost Variance Analysis
System: TRI-TAC (Support/Systems Integration/Other)

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	116.5	1261.7	N/A	1378.2
Previous Changes				
Economic	- 1.2	- 54.0	-	- 55.2
Quantity	-	-122.4	-	-122.4
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+10.0	-282.7	-	-272.7
Other	-	-	-	-
Support	- 4.0	-103.7	-	-107.7
Subtotal	+ 4.8	-562.8	-	-558.0
Current Changes:				
Economic		+ 17.2	-	+ 17.2
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	- 0.6	- 71.6	-	- 72.2
Other	-	-	-	-
Support	-	-	-	
Subtotal	- 0.6	- 54.4	-	- 55.0
Total Changes	+ 4.2	-617.2	-	-613.0
Current Estimate	120.7	644.5	-	765.2

(FY 1976 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	80.7	589.8	N/A	670.5
Previous Changes:				
Quantity	-	- 75.3	-	- 75.3
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+ 4.2	-131.2	-	- 127.0
Other	-	-	-	-
Support	- 2.8	- 53.9	-	- 56.7
Subtotal	+ 1.4	-260.4	-	-259.0
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	- 0.3	- 28.1	-	- 28.4
Other	-	-	-	-
Support	-	-	-	-
Subtotal	- 0.3	- 28.1	-	- 28.4
Total Changes	+ 1.1	-288.5	-	-287.4
Current Estimate	81.8	301.3	-	383.1

13. Cost Variance Analysis (Cont'd):
System: TRI-TAC (Support/Systems Integration/Other)

b. Previous Change Explanations --

RDT&E
- Economic: Revised economic escalation indices.
- Estimating: Adjustment for prior escalation.
  Deletion of the Tactical Generic Cable Replacement due to budget restrictions.
  Integration planning and interface equipment development extended through 1993.
- Support: DOD transferred management responsibility of JTE to Army.
  Development of Tactical Generic Cable Replacement extension of the integration, planning and interface equipment development schedule, refined estimate for AFOTEC support and unique PSE.

Procurement:
- Economic: Revised economic escalation indices.
- Quantity: Decreased various items of TRI-TAC equipment produced by the other Services.
- Estimating: Adjustment to prior year escalation.
  Decreased various items of TRI-TAC equipment because of budget constraints.
- Support: Adjustment in spares to support prime mission equipment
  Adjustment for correction of categories in previous December 1985 SAR.
  (Quantity/Estimating)

Current Change Explanations --

	(Dollars in Millions) Base-Year	Then Year
(1) RDT&E		
Adjustment for current and prior year economic escalation (Estimating)	+ 0.2	+ 0.5
Deletion of integration tasks due to budget restrictions (Estimating)	- 0.5	- 1.1
(2) Procurement		
Revised economic escalation indicies (Economic)	N/A	+ 17.2
Decreased various items of TRI-TAC equipment produced by the other services because of budget constraints. (Estimating)	- 26.8	- 68.7
Adjustment for current and prior year economic escalation. (Estimating)	- 1.3	- 2.9

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

Initial SAR/ Production Estimate (PdE) to current Estimate (CE)--

TROPO

PAUC (Initial SAR/PdE)	CHANGES								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1.992*	-0.059	-0.068	+0.111	+0.038	-0.673	-	+0.047	-0.604	1.388

* This value has been revised to exclude the 9 R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully -- configured end items for the purpose of this calculation.

Contract Information: (Then-Year Dollars in Millions)

a. RDT&E -- No Active Contracts

b. Procurement

1. TROPO (FOLLOW-ON)

Raytheon Corp, Marlborough, MA
F19628-85-C-0070, FFP*
Award: September 10, 1985
Definitized: September 10, 1987

Initial Contract Price

Target	Ceiling	QTY
39.2	N/A	37

Current Contract Price

Target	Ceiling	Qty
106.0	N/A	90

Estimated Price At Completion

Contractor	Program Manager
106.0	106.0

2. TROPO

Raytheon Corp, Marlborough, MA
F19628-87-C-0087, FFP*
Award: May 29, 1987
Definitized: May 29, 1987

Initial Contract Price

Target	Ceiling	Qty
27.8	N/A	19

Current Contract Price

Target	Ceiling	Qty
62.8	N/A	43

Estimated Price At Completion

Contractor	Program Manager
62.8	62.8

3. TROPO

Unisys Corp, Salt Lake City, UT
F19628-87-C-0092, FFP*
Award: 29 May 1987,
Definitized: 29 May 1987

Initial Contract Price

Target	Ceiling	Qty
38.5	N/A	46

Current Contract Price

Target	Ceiling	Qty
93.4	N/A	114

Estimated Price At Completion

Contractor	Program Manager
93.4	93.4

*Note: No CPRs required on FFP Contracts

16. Program Funding Summary: (Current Estimate in Millions of Dollars)
System: Joint Tactical Communications (TRI-TAC) Program

a. Program Status --

(1) Percent Program Completed: 81.8% (18/22 yrs)

(2) Percent Program Cost Appropriated: 77.7% ($1,043.1M/$1,342.8M)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

	Prior Years	Budget Year	Budget Year	Balance to Complete	Total
	(FY 73-89)	(FY 90)	(FY 91)	(FY 92-94)	
RDT&E	151.9	3.5	4.8	10.2	170.4
Procurement	847.6	40.1	80.4	204.3	1172.4
MILCON	-	-	-	-	-
Total	999.5	43.6	85.2	214.5	1342.8

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)
System: Joint Tactical Communications (TRI-TAC) Program

c. Annual Summary

FISCAL YEAR	QTY	FLYAWAY FY 76 DOLLARS		Total Base Year$	THEN-YEAR DOLLARS $			Escl Rate
		Nonrec	Rec		Program	Obligated 1/	Expended 1/	(%)
Appropriation: RDT&E								
1973				2.3	1.8	1.8	1.8	4.4
1974				4.7	4.0	4.0	4.0	7.9
1975				8.0	7.5	7.5	7.5	10.8
1976				3.9	3.9	3.9	3.9	7.0
197T				2.2	2.2	2.2	2.2	3.2
1977				14.7	15.7	15.7	15.7	3.8
1978				15.3	17.3	17.3	17.3	6.2
1979				9.9	12.7	12.7	12.7	8.4
1980				10.1	14.3	14.3	14.3	9.7
1981				5.8	9.2	9.2	9.2	11.9
1982				6.9	11.6	11.6	11.6	9.2
1983				14.0	24.8	24.8	24.8	4.9
1984				5.6	10.3	10.3	10.3	3.8
1985				2.5	4.7	4.7	4.7	3.4
1986				0.9	1.7	1.7	1.7	2.8
1987				2.9	5.8	5.8	5.8	2.7
1988				1.5	3.2	3.2	2.3	3.1
1989				0.6	1.2	1.2	1.0	4.2
1990				1.6	3.5	0.1		4.0
1991				2.1	4.8			4.2
1992				2.1	5.0			4.0
1993				2.1	5.2			3.7
Subtotal				119.7	170.4	152.0	150.8	
Appropriation: Procurement								
1980				8.0	12.8	12.8	12.8	9.7
1981		9.7	8.9	23.0	39.3	39.3	39.3	11.9
1982		5.2	25.5	64.3	113.5	113.5	113.5	9.2
1983			29.9	51.3	94.0	94.0	94.0	4.9
1984			24.6	41.7	78.8	78.8	78.8	3.8
1985				16.4	31.9	31.9	31.9	3.4
1986		3.3	7.3	50.7	102.1	102.1	102.1	2.8
1987		1.4	4.6	39.0	81.5	81.5	54.7	2.7
1988			28.9	68.2	147.6	127.8	32.7	3.1
1989			38.0	64.2	146.1	30.2	3.2	4.2
1990				17.0	40.1	2.8		4.0
1991			21.2	32.8	80.4			4.2
1992			11.8	38.1	96.7			4.0
1993			9.5	38.6	101.4			3.7
1994				2.3	6.2			3.4
Subtotal		19.6	210.2	555.6	1172.4	714.7	563.0	
Total		19.6	210.2	675.3	1342.8	866.7	713.8	

1/ Reflect Program Office Records as of 31 December 1989

16. Program Funding Summary (Current Estimate in Millions of Dollars)
System: TRI-TAC (TROPO)

a. Program Status --

(1) Percent Program Completed: 84.2% (16/19 yrs)
(2) Percent Program Cost Appropriated: 79.5% ($459.2/$577.6M)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

	Prior Years (FY75-89)	Budget Year (FY-90)	Budget Year (FY-91)	Balance to Complete (FY-92-93)	Total
RDT&E	49.7	-	-	-	49.7
Procurement	409.5	0	57.6	60.8	527.9
MILCON	-	-	-	-	-
	-	-	-	-	-
Total	459.2	0	57.6	60.8	577.6

c. Annual Summary

FISCAL YEAR	QTY	FLYAWAY FY 76 DOLLARS		Total Base Year$	THEN-YEAR DOLLARS			Escl Rate (%)
		Nonrec	Rec		Program	Obligated 1/	Expended 1/	
Appropriation: RDT&E								
1975				0.1	0.1	0.1	0.1	10.8
1976				-	-	-	-	-
197T				1.0	1.0	1.0	1.0	3.2
1977				10.0	10.7	10.7	10.7	3.8
1978				9.1	10.3	10.3	10.3	6.2
1979				6.5	8.3	8.3	8.3	8.4
1980				3.6	5.1	5.1	5.1	9.7
1981				1.1	1.8	1.8	1.8	11.9
1982				0.4	0.7	0.7	0.7	9.2
1983				1.1	2.0	2.0	2.0	4.9
1984				1.5	2.7	2.7	2.7	3.8
1985				0.5	1.0	1.0	1.0	3.4
1986				0.4	0.7	0.7	0.7	2.8
1987				2.4	4.8	4.8	4.8	2.7
1988				0.2	0.5	0.5	0.3	3.1
1989				-			-	-
1990				-			-	-
Subtotal	9			37.9	49.7	49.7	49.5	

1/ Reflects Program Office Records as of 31 December 1989

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)
System: TRI-TAC (TROPO)

c. Annual Summary (Cont'd) --

FISCAL YEAR	QTY	FLYAWAY FY 76 DOLLARS		Total Base Year$	THEN-YEAR DOLLARS			Escl Rate
		Nonrec	Rec		Program	Obligated 1/	Expended 1/	(%)
Appropriation: Procurement								
1981	3	9.7	8.9	21.8	37.2	37.2	37.2	11.9
1982	36	5.2	25.5	31.5	55.7	55.7	55.7	9.2
1983	34		29.9	35.0	64.2	64.2	64.2	4.9
1984	32		24.6	26.4	50.0	50.0	50.0	3.8
1985	-		-	-	-	-	-	-
1986	8	3.3	7.3	11.8	23.7	23.7	23.7	2.8
1987	10	1.4	4.6	6.7	14.0	14.0	5.8	2.7
1988	71		28.9	32.1	69.3	69.3	22.0	3.1
1989	91		38.0	41.9	95.4	0.3		4.2
1990			-	-	-			4.0
1991	60		21.2	23.5	57.6			4.2
1992	39		11.8	13.1	33.2			4.0
1993	32		9.5	10.5	27.6			3.7
Subtotal	416	19.6	210.2	254.3	527.9	314.4	258.6	
Total	425	19.6	210.2	292.2	577.6	364.1	308.1	

1/ Reflects Program Office Records as of 31 December 1989

26. Program Funding Summary (Current Estimate in Millions of Dollars)
System: TRI-TAC (Support/Systems Integration/Other)

a. Program Status --

(1) Percent Program Completed: 81.8% (18/22 yrs)
(2) Percent Program Cost Appropriated: 76.3% ($583.9M/765.2M)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

	Prior Years (FY 73-89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance to Complete (FY 92-94)	Total
RDT&E	102.2	3.5	4.8	10.2	120.7
Procurement	438.1	40.1	22.8	143.5	644.5
MILCON	-	-	-	-	-
Total	540.3	43.6	27.6	153.7	765.2

c. Annual Summary

FISCAL YEAR	QTY	FLYAWAY FY 76 DOLLARS		Total Base Year$	THEN-YEAR DOLLARS			Escl Rate (%)
		Nonrec	Rec		Program	Obligated 1/	Expended 1/	
Appropriation: RDT&E								
1973				2.3	1.8	1.8	1.8	4.4
1974				4.7	4.0	4.0	4.0	7.9
1975				7.9	7.4	7.4	7.4	10.8
1976				3.9	3.9	3.9	3.9	7.0
197T				1.2	1.2	1.2	1.2	3.2
1977				4.7	5.0	5.0	5.0	3.8
1978				6.2	7.0	7.0	7.0	6.2
1979				3.4	4.4	4.4	4.4	8.4
1980				6.5	9.2	9.2	9.2	9.7
1981				4.7	7.4	7.4	7.4	11.9
1982				6.5	10.9	10.9	10.9	9.2
1983				12.9	22.8	22.8	22.8	4.9
1984				4.1	7.6	7.6	7.6	3.8
1985				2.0	3.7	3.7	3.7	3.4
1986				0.5	1.0	1.0	1.0	2.8
1987				0.5	1.0	1.0	1.0	2.7
1988				1.3	2.7	2.7	2.0	3.1
1989				0.6	1.2	1.2	1.0	4.2
1990				1.6	3.5	0.1		4.0
1991				2.1	4.8			4.2
1992				2.1	5.0			4.0
1993				2.1	5.2			3.7
Subtotal				81.8	120.7	102.3	101.3	

1/ Reflects Program Office Records as of 31 December 1989

16. Program Funding Summary (Cont'd) (Current Estimate in Millions of Dollars)
System: TRI-TAC (Support/Systems Integration/Other)

c. Annual Summary

FISCAL YEAR	QTY	FLAWAY FY 76 DOLLARS		Total Base Year$	THEN-YEAR DOLLARS			Escl Rate
		Nonrec	Rec		Program	Obligated 1/	Expended 1/	(%)
Appropriation: Procurement								
1980				8.0	12.8	12.8	12.8	9.7
1981				1.2	2.1	2.1	2.1	11.9
1982				32.8	57.8	57.8	57.8	9.2
1983				16.3	29.8	29.8	29.8	4.9
1984				15.3	28.8	28.8	28.8	3.8
1985				16.4	31.9	31.9	31.9	3.4
1986				38.9	78.4	78.4	78.4	2.8
1987				32.3	67.5	67.5	48.9	2.7
1988				36.1	78.3	58.5	10.7	3.1
1989				22.3	50.7	29.9	3.2	4.2
1990				17.0	40.1	2.8		4.0
1991				9.3	22.8			4.2
1992				25.0	63.5			4.0
1993				28.1	73.8			3.7
1994				2.3	6.2			3.4
Subtotal				301.3	644.5	400.3	304.4	
Total				383.1	765.2	502.6	405.7	

1/ Reflects Program Office Records as of 31 December 1989

17. Production Rate Data

(1) TROPO

a. Annual Production Rates -- (Note: Annual production rates differ from annual funded quantities because the funded delivery period per option varies with the average approximating 12 months).

Fiscal Year	Production Rate (Quantity Year) 1/			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1981/1982	21.2	21.2	21.2	21.2
1983	50.3	50.3	50.3	50.3
1984	54.0	54.0	54.0	54.0
1985				
1986	33.3	33.3	9.6	9.6
1987	55.7	55.7	63.0	63.0
1988	50.7	50.7	44.0	44.0
1989	57.1	57.1	48.0	48.0
1990			0	0
1991			52.0	120.0
1992			39.0	5
1993			76.0	0

b. Cost Variance -- Dollars in Millions (Note: Subject to limitations on production rates above.)

Item		Production Estimate	Variance (CE Less PdE)	Current Estimate	Variance (CE Less Max)	Maximum Economic
Prog Acq Cost	(BY $)	343.7	-51.5	292.2	+ 11.8	280.4
	(TY $)	697.3	-119.7	577.6	+160.0	561.6
PAUC *	(BY $)	0.982	- 0.255	0.702	+ 0.028	0.674
*	(TY $)	1.992	- 0.604	1.388	+ 0.038	1.350

* This value has been revised to exclude the 9 R&D units that are not plann to be part of the inventory objective. Such R&D units are not considered fully -- configured end items for this purpose of calculation.

c. Schedule Variance -- (Note: Subject to limitations on production rates above.)

	Production Estimate	Variance (CE vs (PdE)	Current Estimate	Variance (CE vs Max)	Maximum Economic
Start Date (Mo/Yr)	10/84	-	10/84	-	10/84
Duration (in Months)	102	+49 mos	141	-	126
End Date (Mo/Yr)	4/93	+40 mos	8/96	-	5/95

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	9/9
Procurement V2	95/95
V3	31/31

1/ Maximum economic rate assumes Army/ Marine quantities will be procured on the same production line.

18. Operating and Support Costs:

a. Not available
b. Not available
c. Contractor Support Costs - Not available

✓ DoD-1 WAM

SAR-89-094

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: WAM

AS OF DATE: December 31, 1989

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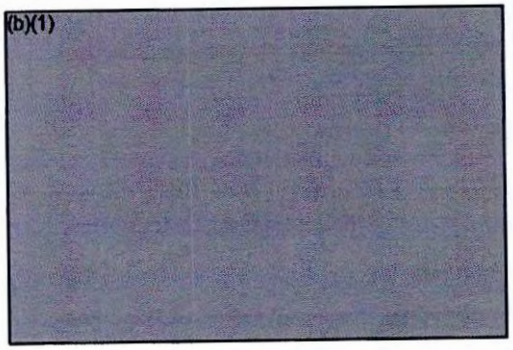
1. **Designation and Nomenclature (Popular Name):** WWMCCS Automated Data Processing Modernization (WAM)
Joint Designation: WAM

2. **DoD Component:** Defense Communications Agency

3. **Responsible Office and Telephone Number:**
DoD/DCA/JDSSC/JM
Program Management Office
(PMO)
Washington, DC 20301-7010

Mr David Miquelon
Assigned: March 6,1989
AV 223-6345 COMM 202-693-6345

4. **Program Elements/Procurement Line Items:**
RDT&E:
PE 33154F
PE 63735F
PE 33152A
PE 33152F
PE 33152N
PE 33152K
PE 33154K
PROCUREMENT:
APPN 3080 ICN 834040 (Air Force)
APPN 2035 ICN BE4100 (Army)
APPN 1810 ICN 8210 (Navy)
APPN 0300 ICN Unknown (DCA/DNA)



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OASD(PA) DFOISR 90-T-0704

4. **Program Elements/Procurement Line Items (Cont'd):**

O & M:
PE 33152F
PE 33152H
PE 33152K

5. **Related Programs:** None.

6. **Mission and Description:** The Worldwide Military Command and Control System (WWMCCS) ADP Modernization Program (WAM) is the modernization program to provide a worldwide data collection and information processing system which allows rapid and reliable exchanges of information to support the employment of forces. The primary mission of WWMCCS and its information processing component is to support the National Command Authorities (NCA) and the Joint Chiefs of Staff by providing command and control capabilities for use in national security decision making, force preparation and planning, implementation of operation plans, and monitoring execution. As a secondary mission, WWMCCS supports command and control systems and the WWMCCS-related management information systems of unified and specified commands, the Services, and other DoD components. This program will modernize and expand the functionality of the existing standard WWMCCS ADP System.
NOTE: The Worldwide Military Command and Control System (WWMCCS) Information System (WIS) Program that was with the Air Force as executive agent was terminated by a Defense Acquisition Board (DAB) decision on 9 February 1989. A portion of the objectives of the WIS program were assigned to the Defense Communication Agency (DCA) as the WWMCCS ADP Modernization (WAM) program. The primary focus of WAM is to establish Joint Operation Planning and Execution System (JOPES) functionality, as defined in the JOPES ROC and the JOPES Increment 1 Functional Description. The strategy for achieving the stated objective has changed from the WIS Block A, B, C approach to frequent, incremental fielding of new software. This approach to modernization minimizes new development by relying on testing of available commercial and government products and integrating qualified products into the existing system. Likewise, the large, centrally managed ADPE procurement aspect of the WIS program has been changed to permit sites to select needed ADPE from an "approved products" list when such acquisitions can be justified on operational need or economic bases.

7. **Program Highlights:**
a. Significant Historical Developments -- On November 5, 1982, the Deputy Secretary of Defense established the WIS Joint Program Manger (WIS JPM) for the WWMCCS ADP modernization program. The Chief of Staff, Air Force was designated Executive Agent. The WIS Joint Mission Element Needs Statement, February 1982, provided the basis for the July 1982 Report to Congress which defined the WIS architecture and development program. The Joint Chiefs of Staff approved the WIS Operational and Information Requirements on July 5, 1983. On May 16, 1984, the Defense Acquisition Executive held a program review and directed the WIS to be developed and

- **Program Highlights (Cont'd):**

deployed in three increments (Blocks). A Secretary of Defense Decision Memorandum, September 11, 1985, capped joint RDT&E funds at $835.8M ($663.8M base year FY82), affirmed tri-Service funding, and approved Block A full scale development, low rate production and installation of up to 15 operational sites. Under the Increment IV contract with GTE, the Local Area Network (LAN) Final Design Review (FDR) and LAN Critical Design Review (CDR) were successfully conducted.

In March 1987, the WIS JPM decoupled the AMHS development from the LAN development because of redesign of the AMHS user interface and a major engineering change proposal. This decoupling allowed the AMHS development to proceed independently of the LAN, and not jeopardize the Block A LAN installation schedule.

A three-release concept was selected for Block B implementation, initially using the existing WWMCCS hardware to provide early release capabilities to the field. Prototype demonstrations to the CINCs have ensured that requirements are being satisfied properly. The System Design Review was conducted September 28-30, 1987.

A 73% congressional reduction in program funds in FY88 has caused a significant disruption to program plans. The WIS restructuring effort, while driven by the reduction in available RDT&E funds, allows the WIS JPMO to address some key technical problems.

The main change in overall system design retained the current WWMCCS communications network, with WIN protocols, as the primary avenue for intersite communication instead of the original plan for a system-wide cutover to DoD protocols. Network access would be available through the LAN gateway. The LAN network access would use DoD protocols for communication between a WIS workstation on one LAN and a host on another LAN. This method of intersite communication would operate in parallel with the primary means. This approach reduced the operational impact and technical risks, and avoided the risk of a system-separate installation and maintenance. In addition to this restructuring, enhancements to the LAN and AMHS for Blocks A and B were postponed in an effort to reduce near-term costs. The schedule in paragraph 9, below, reflects the restructuring.

As recommended in the FY88 Appropriations Bill the Air Force decided to consolidate the management organizational structure and briefed the OSD/C3I Systems Committee in April 1988. As a result of continuing Technical problems and schedule slippage, the OSD/C3I Systems committee met again on 23 December 1988 to review an alternative acquisition approach of the WIS program. The committee agreed that DCA should prepare a plan to transfer Executive Agency from the Air Force to DCA.

/. **Program Highlights (Cont'd):**

On 10 February 1989 the Defense Acquisition Board (DAB) reviewed the OSD proposal on the WIS restructuring and accepted the proposal to transfer the Executive Agency from the Air Force to the Defense Communications Agency (DCA). On March 6 the Deputy Secretary of Defense approved the change. Also, approved was a new strategy for the modernization of the WWMCCS ADP that involves testing and validation of commercial-off-the-shelf products planned for integration into the WWMCCS ADP environment. DCA was directed to report back to the DAB for a program status assessment. Depending on the next DAB decision, this may be the last WIS Selected Acquisition Report.

Block A

LAN equipment installations have been completed at the Operational Test Site at the TAC.

Ninety five percent of the site designs are complete.

IBM continues development of the AMHS. The critical design review was completed in June 1988.

A program review was completed in April 1988 and an ADM issued in August 1988 at which time the test and acquisition strategy was approved contingent upon an approval of the TEMP.

As a result of the IBM announcement in September 1988 of an additional slip in the AMHS development and its consequent impact on major program milestones, OSD C3I initiated a reevaluation of program management.

Source Selection of the WIS workstation commenced.

DT&E of the LAN was completed in October 1988 and the Integrated System Test (IST) with DCA began in November 1988.

Block B

The program met two of the major contractual milestones for Block B, Release 1. The Systems Software Review was successfully completed in August 1988. The preliminary Design Review of the joint development team was completed in December 1988.

The WAM program is expected to meet mission requirements.

b. Significant Developments Since Last Report -- The Decision Coordinating Paper (DCP), Integrated Logistics Support Plan (ILSP), Test and Evaluation Master Plan (TEMP) and Cost Analysis Improvement Group (CAIG) Cost Estimate were developed, coordinated and submitted to OSD.

- **Program Highlights (Cont'd):**

The Joint Staff validated and prioritized requirement and approved overall program objectives, definitions, schedule and funding. The JOPES version 1 demonstrated at selected WWMCCS sites during Exercise Proud Eagle 90 and was subsequently fielded at all WWMCCS sites. Presented Program Assessment to OSD C3I System Committee, which endorsed the assessment for presentation to the DAB and recommended DAB approval of the program definition, schedule, testing plan and funding. The review was scheduled for presentation to the DAB on 18 December 1989, but was postponed to allow for additional Major Automated Information Systems Review Committee (MAISARC) review mandated by Congress.

c. Changes Since As Of Date -- Presented Program Assessment to Joint MAISARC/C3I Systems Committee which endorsed the assessment for presentation to the DAB and recommended DAB approval of program definition, schedule, testing plan and funding. The Joint Committee also recommended the DAB delegate future program oversite to the Joint Committee.

On 31 January 1990, the Comptroller General issued a decision upholding in part a protest by Martin Marietta Corp. against the award of the WWMCCS Workstation Contract by the USAF. Since this workstation is the platform on which WAM application software is being developed, OSD delayed the Program Assessment for the DAB, which had been scheduled for 21 February 1990, until the protest situation and its impact on the WAM program can be clarified. JOPES Version 2, which is not impacted by the workstation situation is in final testing and will be shipped to WWMCCS sites in April 1990.

8. **Threshold Breaches:** No DAE Baseline (dated June 30,1989) breaches.

9. **Schedule:**

a. Milestones --

	Development Estimate	Approved Program	Current Estimate
WIS Milestones			
A:Integration Contract Award	OCT 83	N/A	OCT 83
A:Common User Contract Award	OCT 84	N/A	OCT 84
A:System Support Contract Award	JUL 85	N/A	JUL 85
A:DSARC I/II	JUL 85	JUL 85	JUL 85
A:Start DT&E (Phase I) LAN	MAY 87	N/A	JUN 88(Ch-1)
A:Start DT&E (Phase I/II) System	MAY 87	N/A	N/A(Ch-1)
A:Start System IOT&E	NOV 87	N/A	N/A(Ch-1)
A:Start Low-rate Deployment A:(up to site #15)	NOV 87	N/A	N/A(Ch-1)
A:Start LAN Deployment	NOV 87	N/A	N/A(Ch-1)

a. Milestones -- Continued

	Development Estimate	Approved Program	Current Estimate
A:Initial Oper Capability System	NOV 87	May 89	N/A(Ch-1)
A:Deployment Approval LAN (sites 16 and on)	NOV 87	N/A	N/A (Ch-1)
A:Obligation Approval AMHS	NOV 87	N/A	N/A (Ch-1)
A:Common User Contract Award			
WIS Workstation	N/A	N/A	AUG 89 (Ch-1)
AMHS follow-on	N/A	N/A	N/A (Ch-1)
A:Transition Component (TC) Deployment Decision	N/A	N/A	N/A (Ch-1)
A:Finish DT&E (Phase I/II System)	N/A	N/A	N/A (Ch-1)
A:Completion of Block A IOT&E			
BC:DAB I/II (Block B)*	N/A	N/A	N/A (Ch-1)
BC:JMPE** Contract Award	JUN 86	N/A	N/A (Ch-1)
BC:Start OT&E	N/A	N/A	N/A (Ch-1)
BC:Start Deployment	N/A	N/A	N/A (Ch-1)
BC:Initial Operational Capability	N/A	N/A	N/A (Ch-1)
BC:DAB I/II (Block C)***	N/A	N/A	N/A (Ch-1)
WAM Milestones			
DAB (Program Assessment)	N/A	N/A	FEB 90 (Ch-2)
JOPES Version 2	N/A	N/A	MAY 90 (Ch-2)
JOPES Version 4 (JOPES IOC)	N/A	N/A	MAY 91 (Ch-2)
OT&E 1	N/A	N/A	AUG 91 (Ch-2)
JOPES Version 7	N/A	N/A	NOV 92 (Ch-2)
OT&E 2	N/A	N/A	JAN 93 (Ch-2)
Program Follow On Decision	N/A	N/A	MAY 93 (Ch-2)
JOPES Version 11	N/A	N/A	NOV 94 (Ch-2)
OT&E 3	N/A	N/A	JAN 95 (Ch-2)

* In December 1988 the Office of the Assistant Secretary of Defense for C3I (ASD/C3I) was reviewing the management structure for potential transfer of executive agent responsibilities from the Air Force. Results of this effort, including a new Block B DAB date, was to be the reporting responsibility of the successor executive agent for WIS.

** Joint Mission Processing Environment (JMPE)

*** Current Estimates for these milestones was to be established 180 days prior to their respective DAB review. There is no longer a WIS Block A,B & C program but the WAM program of incremental fielding of new software.

9. **Schedule (Cont'd):**

b. Previous Change Explanations --

Block A

DSARC I/II slipped from May to July 1985.

Start of System Development Test and Evaluation (DT&E) slipped from May to October 1987 due to the delay in the GTE Increment IV contract negotiations and subsequent contract award and the delay in the start of Common User Contract DT&E caused by the implementation of the WIS network authenticated security (WISNAS). Start of LAN Phase I DT&E slipped from October 1987 to February 1988 as a result of a software development slip and a restructuring of the DT&E effort to accommodate OSD requirements for increased Transition Component (TC) testing and sequencing with the GCOS-8 software development effort.

Start of System Phase I/II DT&E slipped from October 1987 to December 1988 due to the AMHS human factor/user interface redesign efforts.

The start of Operational Test and Evaluation slipped from October 1987 to October 1988 due to the delay in awarding the Increment IV contract, additional test requirements for DT&E/OT&E, and the requirement for interoperability test between WIS and GCOS 8 Operating System with DoD protocols. Full system Initial Operational Test and Evaluation (IOT&E) slipped from October 1988 to June 1989 to recouple the LAN and AMHS portions of the program after AMHS DT&E.

Initial Operational Capability is delayed from November 1987 to January 1989 as a result of the slippage in the DT&E and OT&E schedules. Initial Operating Capability (IOC) slipped from January 1989 to March 1989 to accommodate restructured testing and software development.

The Block A Deployment Decision slipped from December 1988 to February 1989 to allow for sufficient time for test report generation and review.

The start date for LAN Phase I DT&E has slipped from February to June 1988 because of various technical problems encountered in the LAN software as well as the GCOS-8 development.

The start date for System Phase I/II DT&E was slipped from December 1988 to November 1989 to allow for corrections in the

9. **Schedule (Cont'd):**

user interface and the AMPE interfaces. These required corrections have been documented in several ECPs.

The AMHS obligation approval by OSD will not be made until after the completion of IOT&E.

The WIS development program has been restructured. The main change is to retain the current WWMCCS communications network, with WIN protocols, as the primary avenue for intersite communications instead of the original plan for "flash cutover" to DoD protocols. This change eliminated the need for the Transition Component.

AMHS software development problems have been exacerbated by incorporation of user interface changes; integration and test activities have been slowed by an immature Ada environment on the IBM system.

Operational testing of the LAN is dependent upon the current WWMCCS environment transitioning from GCOS-3 to GCOS-8. The transition was delayed to March 1989 thereby delaying our operational test to May 1989.

The source selection for the WIS workstation was delayed from November 1988 to March 1989 because of specification reviews and approvals, and a Small Business Association request for "set-aside" action which required a lengthy review and adjudication.

Blocks B and C

Approval by the Service Operations Deputies in September 1987 of the WIS JPM proposed Block B initiative for initial Block B capability prototyping, permits delaying the required date for the JMPE. The ongoing sizing and prototyping efforts in preparation for the Block B DAB will determine the actual need date.

The Block B DAB I/II has slipped from March 1988 to September 1989 due to major cut (73%) in the FY88 RDT&E funding from $82.1M to $21.4M.

In December 1988 the Office of the Assistant Secretary of Defense for C3I (ASD/C3I) was reviewing the management structure for potential transfer of responsibility from the Air Force. Results of that effort, including a new Block B DAB date, was to be shown in a future SAR. That effort is now the WAM program and there are no Blocks A,B,

. **Schedule (Cont'd):**

and C.

c. Current Change Explanations --

Block A

(Ch-1) Due to the restructed program, WIS to WAM, there is no longer a Block A, B or C schedule.

WAM

(Ch-2) Current estimate titles and dates are the most current program schedule for which DAB approval was being requested at the scheduled February 1990 DAB meeting.

d. References --

Development Estimate: Block A: SDDM, dated September 11, 1985, subject "Decision Memorandum on the World-Wide Military Command and Control System (WWMCCS) Information System (WIS), Block A." Block B and C: Decision Coordinating Paper (DCP) for Block A of the WIS, dated September 20, 1985.

Approved Program: DAE Baseline dated June 30, 1989.

10. **Technical/Operational Characteristics:**

a. Technical --	Dev Est	Approved Program Goal/Threshold		Demon-strated Perf	Current Estimate
A:Availability Routine Oper. Availability	98%	98%	98%	N/A	98%
A:Crisis Operl. Avail.	99.8%	99.8%	99.8%	N/A	99.8%
A:MTBF(Worksta./Printr) (in hours)	2000	2000	2000	N/A	2000
MTBF (WIS System (Hrs))	160	160	160	N/A	160
Diagnostics Auto Msg Handling (AMH) Process	N/A	N/A	N/A	N/A	95%
A:Response Time					
Smple (Priorty) (Sec)	2-5	2-5	2-5	N/A	2-5
Cmplx (Priorty) (Min)	1-3	1-3	1-3	N/A	1-3
WAM:Availabilty					
Routine Oper. Avail.	98%	N/A	N/A	N/A	98%
Crisis Operl. Avail.	99.8%	N/A	N/A	N/A	99.8%

10. **Technical/Operational Characteristics (Cont'd):**

a. Technical --	Dev Est	Approved Program Goal/Threshold		Demon-strated Perf	Current Estimate
Response Time					
Smple (Priorty) (Sec)	90	N/A	N/A	N/A	90
Cmplx (Priorty) (Min)	3.9	N/A	N/A	N/A	3.9
b. Operational --					
WIS					
Security 1/ Usability 2/	8	8	8	N/A	8
Automated Msg Handling (AMH) Peak MSG Rec/Day 3/	3500	3500	3500	N/A	3500
Automated Msg Handling (AMH) Peak MSG Rec/Hour	500	500	500	N/A	500
Automated Msg Handling (AMH) Peak MSG Trans/Hour	150	150	150	N/A	150
WAM					
Security 1/ Usability 2/	8	N/A	N/A	N/A	8
Automated Msg Handling (AMH) Peak MSG Rec/Day 3/	3500	N/A	N/A	N/A	3500
Automated Msg Handling (AMH) Peak MSG Rec/Hour	500	N/A	N/A	N/A	500
Automated Msg Handling (AMH) Peak MSG Trans/Hour	150	N/A	N/A	N/A	150

c. Previous Change Explanations --

Blocks A, B and C None.

d. Current Change Explanations --

Blocks A, B, and C None.

WAM none.

10. **Technical/Operational Characteristics (Cont'd):**

Technical Footnotes for WIS.

1/ Availability is defined as the percentage of time WIS is ready for use. WIS reliability and redundancy requirements will be incorporated into its design so that critical command and control activities will be available as specified in JCS Pub 6-03.17 and the JOPES ROC.

2/ The fault detection rate is the probability of correctly determining the replacement unit on the first attempt. This rate is 95% for the AMH processor.

Technical Footnotes for WAM.

1/ Availability is defined as the percentage of time WAM is ready for use. WAM reliability and redundancy requirements will be incorporated into its design so that critical command and control activities will be available as specified in JCS Pub 6-03.17 and the JOPES ROC.

2/ The fault detection rate is the probability of correctly determining the replacement unit on the first attempt. This rate is 95% for the AMH processor.

Operational Footnotes for WIS.

1/ WIS will be secure from unauthorized access, data manipulation, or retrieval. The system hardware will be TEMPEST certified as required.

2/ Usability is defined as the time it will take to learn how to log-on through a WIS workstation to the system and access available WIS applications. The usability goal is 8 hours workstation on-the-job-training (OJT), with the availability of a full help command function.

3/ This goal is a measure of AMH Capability in a priority operation; it is defined as the maximum number of messages processed for the time period. All AMH goals assume an average message length of 1500 characters and a maximum length of 30,000 characters.

NOTE: The goals and thresholds are identical in the Approved Program.

10. **Technical/Operational Characteristics (Cont'd):**

Operational Footnotes for WAM.

1/ WAM will be secure from unauthorized access, data manipulation, or retrieval. The system hardware will be TEMPEST certified as required.

2/ Usability is defined as the time it will take to learn how to log-on through a WIS workstation to the system and access available WAM applications. The usability goal will be 8 hours workstation OJT with the availability of a full help command function.

3/ This goal is a measure of AMH capability in a priority operation; it is defined as the maximum number of messages processed for the time period. All AMH goals assume an average message length of 1500 characters and a maximum length of 30,000 characters.

NOTE: The WAM Approved Program goals and thresholds will be established at the February 1990 DAB.

e. References --

Development Estimate: Block A: SDDM, dated September 11, 1985, subject "Decision Memorandum on the World-Wide Military Command and Control System (WWMCCS) Information System (WIS), Block A." Block B and C: Decision Coordinating Paper (DCP) for Block A of the WIS, dated September 20, 1985.

Approved Program: DAE Baseline dated June 30, 1989.

11. **Program Acquisition Cost** (Current Estimate in Millions of Dollars)

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	545.3	1226.3	743.4
Procurement	642.3	305.6	253.9
PROCUREMENT	(642.3)	(305.6)	(253.9)
Total Flyaway	(642.3)	(305.6)	(253.9)
Other Wpn Sys Cost	(0.0)	(0.0)	(0.0)
Peculiar Support	(0.0)	(0.0)	(0.0)
Initial Spares	(0.0)	(0.0)	(0.0)
Construction	1.9	0.0	0.0
Ops. and Maint. (O&M)	237.5	107.0	113.0
Total FY 82 Base-Year $	1427.0	1638.9	1110.3

WAM, December 31, 1989

a. Cost -- (Cont'd)	Development Estimate	Approved Program	Current Estimate
Escalation	430.0	623.8	380.3
Development (RDT&E)	(132.3)	(466.0)	(221.5)
Procurement	(223.8)	(121.6)	(115.9)
Construction (MILCON)	(0.5)	(0.0)	(0.0)
Ops. and Maint. (O&M)	(73.4)	(36.2)	(42.9)
Total Then-Year $	1857.0	2262.7	1490.6
b. Quantities --			
Development (RDT&E)	0	0	0
Procurement	0	0	0
Construction (MILCON)	0	0	0
Ops. and Maint. (O&M)	0	0	0
Total	0	0	0

Paragraph 11 Comments:
FUNDING: This is total funding for both WIS and WAM programs. Funds will be required beyond FY94 but the requirements are unidentified at this time.

QUANTITIES: WAM will not develop or procure any equipment for the services per February 1989 DAB and March 1989 ADM. The WAM approach is one of frequent, incremental fielding of new software. This approach minimizes new development by relying on testing of available commercial and government products and integrating qualified products into the existing system.

c. Foreign Military Sales -- A letter of Offer & Acceptance was signed with SHAPE for $837K for common user equipment. Since the common user equipment contract is fixed price, this sale did not affect the price of equipment to U.S. Government users.

d. Nuclear Costs -- None.

e. References --

Development Estimate: SDDM, dated 11 September 1985 subject "Decision Memorandum on the Worldwide Military Command and Control System (WWMCCS) Information System (WIS), Block A."

Approved Program: DAE Baseline June 30, 1989.

2. **Program Acquisition/Current Procurement Unit Cost Summary:**
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1) Cost	1490.6	2262.7	1490.6
(2) Quantity	0.0	35.0	0.0
(3) Unit Cost	-	64.649	-
b. Current Procurement --	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	0.0	0.0	0.0
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	0.0	0.0	0.0
(2) Quantity	0.0	0.0	0.0
(3) Unit Cost	-	-	-

Paragraph 12 Comments:
For the discontinued WIS program identification of Level I host sites, as a unit of measure for Unit Cost Reporting carried with it the recognition that the total program costs divided by these sites will not yield a stable baseline since this program does not lend itself to the establishment of a true unit cost. Additionally, the number and the configuration of sites will vary with each Service and Agency acquisition strategy/funding policy.

The WIS unit was to be incrementally fielded over several years (consistent with Block schedule/capability approved through the DAB process); however, the ultimate operational performance expected by the thirty-four Level I host sites will be the results of the aggregate capabilities achieved during development of all Blocks -- it is for this reason that quantity data was reported in total rather than incrementally phased by fiscal year. A Current Procurement Unit Cost (CPUC) is therefore determined not appropriate.

The WAM program will not develop or procure equipment as approved by the February 1989 DAB and March 1989 ADM. Therefore, a WAM unit is undefinable.

13. **Cost Variance Analysis:**

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	O&M	TOTAL
Development Estimate	677.6	866.1	2.4	310.9	1857.0
Previous Changes:					
Economic	-154.4	-38.9	-	-12.6	-205.9
Quantity	-	-	-	-	-
Schedule	+23.2	-	-	-	+23.2
Engineering	+30.9	-	-	-	+30.9
Estimating	+377.3	-363.0	-	-158.0	-143.7
Other	-	-	-	-	-
Support	-	-	-2.4	-	-2.4
Subtotal	+277.0	-401.9	-2.4	-170.6	-297.9
Current Changes:					
Economic	+19.0	+19.5	-	+3.4	+41.9
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	-	-	-	-	-
Estimating	-8.7	-113.9	-	+12.2	-110.4
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	+10.3	-94.4	-	+15.6	-68.5
Total Changes	+287.3	-496.3	-2.4	-155.0	-366.4
Current Estimate	964.9	369.8	-	155.9	1490.6

3. **Cost Variance Analysis (Cont'd):**

(FY 1982 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	O&M	TOTAL
Development Estimate	545.3	642.3	1.9	237.5	1427.0
Previous Changes:					
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	+25.7	-	-	-	+25.7
Estimating	+174.8	-312.3	-	-132.7	-270.2
Other	-	-	-	-	-
Support	-	-	-1.9	-	-1.9
Subtotal	+200.5	-312.3	-1.9	-132.7	-246.4
Current Changes:					
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	-	-	-	-	-
Estimating	-2.4	-76.1	-	+8.2	-70.3
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	-2.4	-76.1	-	+8.2	-70.3
Total Changes	+198.1	-388.4	-1.9	-124.5	-316.7
Current Estimate	743.4	253.9	-	113.0	1110.3

b. Previous Change Explanations --

RDT&E

Economic:	Revised OSD inflation indices .
Schedule:	Deputy Secretary of Defense decision to delay deployment and acquisition by a one year slip in the schedule due to current funding constraints.
Engineering:	Support for Ada foundation effort, and product improvement of applications software.
Estimating:	Reclassification/Transfer of funds from Operation and Maintenance, and Other Procurement; additional year of cost added to the 5-year FYDP period; increased programmed dollars for Joint Operations Planning and Execution System (JOPES), Automated Message Handling (AMH); Required Operational Capabilities (ROCs) due to finalization of requirements; reprogramming of additional dollars to support planning start up of AFWIS program office; initial identification of "Balance to Complete" funding requirement; adjustment for difference between FY86 President's Budget and required funding; prorata shared Tri-Service RDT&E Funding directed by September 1985 SDDM; additional funding in support of command unique requirements; reductions in Gramm-Rudman and other miscellaneous across-the-board cuts required funding to be added to outyears to meet funding cap. Adjustment for current and prior years escalation change. Impact due to congressional reductions in FY88 appropriation and outyear funding adjustments. Service/Agency adjustment due to program restructuring. Rough Order Magnitude (ROM) estimate for completion of Blocks B & C. Service/Agency adjustment due to program transfer.

b. Previous Change Explanations -- (Cont'd)

PROCUREMENT

Economic:	Revised OSD inflation indices.
Estimating:	Appropriation transfer of funds to RDT&E; additional year of cost added to the 5-year FYDP period; initial identification of "Balance to Complete" fund prior years escalation change. Deletion requirement adjustment for difference between FY86 President's Budget and required funding; and reduction due to a smaller complement of equipment at WIS Sites in order to meet affordability constraints. Deletion of Worldwide Technology Communications Improvement Program costs inadvertently included in WIS reporting; reductions in Gramm-Rudman and other miscellaneous across-the-board cuts required funding to be added to outyears to meet requirements. Adjustment for current and prior years escalation change. Deletion of unique funds inappropriately charged to the WIS program. Impact due to congressional reductions in FY88 appropriation and outyear funding adjustments. Service/Agency adjustment due to program restructuring. Service/Agency adjustment due to program transfer.

MILCON

Support:	Funding deleted due to reduced support requirements. Increase funding to meet additional procurement acquisition.

O & M

Economic:	Revised OSD inflation indices.
Estimating:	Appropriation transfer of funds to RDT&E; additional year of cost added to the FYDP period; adjustment for difference between FY86 President's Budget and required funding; and refinement and rephasing of estimate to align program with FY87 President's Budget. Deletion of maintenance costs contained in PE 33151F and deletion of Air Force Command Unique software modernization costs (separate from WIS). Adjustment for current and prior years escalation change. Deletion of unique funds inappropriately charged to the WIS Program.Impact due to procurement funding reductions in DNA. Service/Agency adjustment due to program restructuring and program transfer.

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised OSD Inflation Indices (Economic)	N/A	+19.0
Service/Agency adjustment due to current and prior years escalation changes. (Estimating)	-2.4	+10.3
(2) PROCUREMENT		
Revised OSD Inflation Indices (Economic)	N/A	+19.5
Service/Agency Adjustment due to Program restructuring (Estimating)	-94.4	-76.1
(3) MILCON		
(4) O & M		
Revised OSD Inflation Indices (Economic)	N/A	+3.4
Service/Agency Adjustment due to program transfer (Estimating)	+15.6	+8.2

14. **Program Acquisition Unit Cost (PAUC) History:** (Then-Year Dollars in Millions)

a. Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
53.06	--	--	--	--	--	--	--	--	53.06

b. Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
53.06	0.000	-53.06	+0.000	+0.000	0.000	--	0.000	-53.06	0.000

14. **Program Acquisition Unit Cost (PAUC) History (Cont'd):**

Paragraph 14 Comments:
* The appropriateness of defining a WIS unit was undetermined as of December 30, 1983 SAR submission. The Program Acquistion Unit Cost (PAUC) baseline was established by the September 30, 1985 SAR submission.

The WAM program will not develop or procure equipment as approved by the February 1989 DAB and March 1989 ADM. Therefore, a WAM unit is undefinable.

15. **Contract Information:** (Then-Year Dollars in Millions)

a. **RDT&E**

System Integration:	Initial Contract Price Target	Ceiling	Qty
IBM Gaithersburg, MD F19628-84-C-0159, FPIF Award: October 5, 1984 Definitized: October 5, 1984	$13.0	$15.0	0.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$30.7	$35.2	0.0	$91.2	$91.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-1.7	$-2.1
Cumulative Variances To Date (12/31/89)	$-2.6	$-1.0
Net Change	$-0.9	$1.1

Explanation of Change: Significant schedule, cost, and completion variances were driven by slippage of program milestones for Part I Authentication Delay, Part I Specification rework and system redesign caused by User Interface changes. IBM has submitted a claim for the cost overrun and the claim is being reviewed by the Air Force. The decreased contract amount was due to a credit adjustment associated with ECP33.

15. **Contract Information (Cont'd):** (Then-Year Dollars in Millions)

System Integration:	Initial Contract Price Target	Ceiling	Qty
GTE Billerica, MA F19628-86-C-0053, FPIF Award: July 30, 1986 Definitized: N/A	$104.4	$118.6	0.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$133.8	$143.4	0.0	$133.8	$133.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-1.2	$0.0
Cumulative Variances To Date (12/31/89)	$0.0	$0.0
Net Change	$1.2	$0.0

Explanation of Change: This contract was terminated 26 May 1989.

15. **Contract Information (Cont'd):** (Then-Year Dollars in Millions)

b. Procurement System Integration:	Initial Contract Price Target	Ceiling	Qty
IBM Gaithersburg, MD F19628-84-C-0159, FFP Award: October 5, 1984 Definitized: October 5, 1984	$39.0	$39.0	0.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$52.9	$52.9	0.0	$0.0	$0.0

	Cost Variance	Schedule Variance
Previous Cumulativ Variances	$0.0	$0.0
Cumulative Variances To Date	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: This is a firm-fixed price contract with provisions for indefinite quantity and schedule - no cost/schedules performance reporting required.

16. **Program Funding Summary:**

a. Program Status --

(1) Percent Program Completed: 69.2% (9 yrs/13 yrs)

(2) Percent Program Cost Appropriated: 57.0% ($849.7 / $1490.6)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-94)	Total
RDT&E	553.2	81.8	83.3	246.6	964.9
Procurement	100.6	45.4	29.6	194.2	369.8
MILCON	-	-	-	-	-
O&M	52.1	16.6	18.6	68.6	155.9
Total	705.9	143.8	131.5	509.4	1490.6

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 0400 RDT&E, Defense Agencies								
1982				13.7	14.0	14.0	14.0	9.2
1983				12.0	12.8	12.8	12.8	4.9
1984								
1985								
1986								
1987								
1988								
1989								
1990				34.8	47.5	3.0		4.0
1991				38.8	55.1			4.2
1992				29.4	43.3			4.0
1993				26.8	40.8			3.7
1994				29.0	45.7			3.4
Subtot	0			184.5	259.2	29.8	26.8	
Appropriation: 1319 Research, Development, Test & Eval, Navy								
1984				7.4	8.3	8.3	8.3	3.8
1985				12.3	14.0	14.0	14.0	3.4
1986				12.8	15.1	15.1	14.8	2.8

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 1319 Research, Development, Test & Eval, Navy (Cont'd)								
1987				10.1	12.3	12.3	8.8	2.7
1988				4.4	5.5	5.5	5.1	3.1
1989				3.5	4.6	4.6	3.0	4.2
1990				4.4	6.0	3.4	0.3	4.0
1991				2.8	4.0			4.2
1992				3.5	5.2			4.0
1993				0.9	1.3			3.7
1994				1.6	2.4			3.1
Subtot	0			63.7	78.7	63.2	54.3	
Appropriation: 2040 Research, Development, Test & Eval, Army								
1984				11.9	13.2	13.2	13.2	3.8
1985				23.5	27.0	27.0	27.0	3.4
1986				24.4	28.7	28.7	28.7	2.8
1987				22.6	27.4	27.4	24.8	2.7
1988				23.7	29.7	29.7	25.2	3.1
1989				17.6	23.1	23.1	3.8	4.2
1990				18.2	24.8	5.2		4.0
1991				15.9	22.6			4.2
1992				32.1	47.3			4.0

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2040 Research, Development, Test & Eval, Army (Cont'd)								
1993			[illegible]	23.9	36.5			3.7
1994			[illegible]	13.6	21.4			3.4
Subtot	0			227.4	301.7	154.3	122.7	
Appropriation: 3600 Research, Development, T & E, Air Force								
1983				4.6	5.0	5.0	5.0	4.9
1984				22.5	25.0	25.0	25.0	3.8
1985				30.5	35.0	35.0	35.0	3.4
1986				51.6	60.7	60.4	60.4	2.8
1987				81.4	98.7	88.8	88.4	2.7
1988				19.4	24.4	22.7	21.8	3.1
1989			[illegible]	52.4	68.7	41.6	25.2	4.2
1990			[illegible]	2.6	3.5			4.0
1991			[illegible]	1.1	1.6			4.2
1992			[illegible]	0.5	0.8			4.0
1993			[illegible]	0.6	0.9			3.7
1994			[illegible]	0.6	1.0			3.4
Subtot	0			267.8	325.3	278.5	260.8	

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 0300 Procurement, Defense Agencies								
1985				1.2	1.4	1.4	1.4	3.4
1986				6.3	7.7	7.7	4.3	5.6
1987				1.0	1.3	1.3	1.2	5.4
1988				0.2	0.3	0.3	0.3	6.2
1989				0.4	0.6			4.2
1990								4.0
1991				1.4	2.0			4.2
1992				1.0	1.5			4.0
1993				0.5	0.8			3.7
1994				0.5	0.8			3.4
Subtot	0			12.5	16.4	10.7	7.2	
Appropriation: 1109 Procurement, Marine Corps								
1985				0.3	0.3	0.3	0.3	3.4
1986				0.5	0.6	0.6	0.6	2.8
1987				0.6	0.7	0.7	0.7	2.7
1988				0.2	0.3	0.3	0.3	3.1
1989				0.1	0.2	0.2	0.2	4.2
1990				0.1	0.2			4.0

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 1109 Procurement, Marine Corps (Cont'd)								
1991				0.1	0.1			4.2
1992				0.1	0.2			4.0
1993				0.1	0.2			3.7
1994				0.1	0.2			3.4
Subtot	0			2.2	3.0	2.1	2.1	
Appropriation: 1810 Other Procurement, Navy								
1987				2.1	2.7	2.7	2.7	5.4
1988								6.2
1989				0.2	0.3	0.3	0.3	4.2
1990				2.0	2.9	1.7		4.0
1991								4.2
1992								4.0
1993								3.7
1994								3.4
Subtot	0			4.3	5.9	4.7	3.0	
Appropriation: 2035 Other Procurement, Army								
1983				0.4	0.5	0.5	0.5	4.9
1984				0.1	0.1	0.1	0.1	3.8

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2035 Other Procurement, Army (Cont'd)								
1985				11.8	13.9	13.9	13.9	3.4
1986				7.6	9.2	9.2	8.3	2.8
1987				10.5	13.2	13.2	10.7	2.7
1988				4.9	6.4	6.4	5.7	3.1
1989				11.1	15.2	15.1	3.7	4.2
1990				19.2	27.4			4.0
1991				14.1	20.9			4.2
1992				26.1	40.0			4.0
1993				21.8	34.5			3.7
1994				19.6	32.1			3.4
Subtot	0			147.2	213.4	58.4	42.9	
Appropriation: 3080 Other Procurement, Air Force								
1985				1.9	2.2	2.2	2.2	3.4
1986				3.6	4.4	4.4	4.4	2.8
1987				6.4	8.1	8.1	8.1	2.7
1988								3.1
1989				8.0	11.0	10.2	10.2	4.2
1990				10.4	14.9			4.0
1991				4.4	6.6			4.2

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 3080 Other Procurement, Air Force (Cont'd)								
1992				15.5	23.7			4.0
1993				17.3	27.4			3.7
1994				20.1	32.8			3.4
Subtot	0			87.6	131.1	24.9	24.9	
Appropriation: 0100 Operation & Maintenance, Defense Agency								
1987				0.3	0.3	0.3	0.3	2.7
1988				0.1	0.1	0.1	0.1	3.1
1989								4.2
1990				3.5	4.8			4.0
1991				1.5	2.1			4.2
1992				3.1	4.5			4.0
1993				3.4	5.2			3.7
1994				3.3	5.2			3.4
Subtot	0			15.2	22.2	0.4	0.4	
Appropriation: 3400 Operation & Maintenance, Air Force								
1986				8.4	9.8	0.4	0.4	2.8
1987				10.6	12.8	7.5	7.5	2.7
1988				13.5	16.8	3.5	3.5	3.1

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 3400 Operation & Maintenance, Air Force (Cont'd)								
1989				9.4	12.3	10.7	10.7	4.2
1990				8.7	11.8	0.7	0.6	4.0
1991				11.7	16.5			4.2
1992				13.5	19.7			4.0
1993				10.7	16.3			3.7
1994				11.3	17.7			3.4
Subtot	0			97.8	133.7	22.8	22.7	
Total	0			1110.2	1490.6	649.8	567.8	

Paragraph 16 Comments:
The Defense Nuclear Agency funds of FY87 & FY88 were not in direct support of the WAM program.

17. **Production Rate Data**: None.

a. Annualized Production Rates -- None.

b. Cost Variance -- None.

c. Schedule Variance -- None.

d. Deliveries (Plan/Actual) -- None.

e. Approved Design-to-Cost Goal -- None.

18. **Operating and Support Costs**: None.

18. **Operating and Support Costs** (Cont'd)

a. Assumptions and Ground Rules -- None.

b. Costs -- None.

c. Contractor Support Costs -- None.

N-31 PHALANX CIWS ~~CONFIDENTIAL~~ SAR-89-036

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: MK-15 PHALANX CIWS

AS OF DATE: December 31, 1989

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1. ~~(U)~~ **Designation and Nomenclature (Popular Name):** MK 15/Close-In Weapon System (PHALANX CIWS)

2. ~~(U)~~ **DoD Component:** NAVY

~~(U)~~ **Responsible Office and Telephone Number:**

PHALANX Close-In Weapon System Program Office (PMS 413)
Naval Sea Systems Command
Washington, DC 20362-5101

CAPT Jere G. Mackin
Assigned: April 1,1987
AV 332-7142 COMM 703-602-7142

4. ~~(U)~~ **Program Elements/Procurement Line Items:**

RDT&E:
PE 0604358N
PROCUREMENT:
APPN 1507 ICN 4110 (Navy)
APPN 1611 ICN 0204220N (Navy)
APPN 1611 ICN 0204411N (Navy)
APPN 1611 ICN 0204224N (Navy)
APPN 1611 ICN 0204292N (Navy)
APPN 1611 ICN 0204112N (Navy)
APPN 1611 ICN 0204441N (Navy)



AS AMENDED

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. (U) **Program Highlights (Cont'd):**

evaluate CIWS performance against (b)(1) (b)(1) (b)(1) The final report of this phase of testing was issued in August 1988. Primary findings were that (b)(1) (b)(1) (b)(1) (b)(1) Two year (FY 1988 and FY 1989) approval for limited rate initial production was granted by SECNAV.

Additional production is to be considered after Follow-on OT&E (OT-III)* which includes testing against (b)(1) (b)(1) The CIWS program meets its current mission requirements.

*discussed in August 1989 approved TEMP

b. (U) Significant Developments Since Last Report -- None.

c. (U) Changes Since As Of Date -- None.

. (U) **Threshold Breaches:** There have been no breaches to the approved DAE baseline dated 31 Dec 1988.

9. (U) **Schedule:**

a. (U) Milestones --

	Production Estimate	Approved Program	Current Estimate
Start Engineering Dev	DEC 70	DEC 70	DEC 70
Complete At-Sea Test #1 Prototype	MAR 74	MAR 74	MAR 74
Complete at-Sea Operational Test and Evaluation	JUL 77	JUL 77	JUL 77
DSARC III	SEP 77	SEP 77	SEP 77
Production Contract Award	DEC 77	DEC 77	DEC 77
Initial Operational Capability on CV-66 First Prod. Run	FEB 80	FEB 80	FEB 80
Block I Testing Began	JUN 80	JUN 80	JUN 80
Block I Approval for Limited Production	JAN 84	DEC 85	DEC 85
Commence OPEVAL (BLK I)	MAY 87	DEC 87	APR 88
Block I Approval for Limited Production	N/A	N/A	AUG 88
Block I Approval for Full Production	N/A	MAY 88	MAY 90 (Ch-1)

5. **Related Programs**: FFG-7, CG 47, LSD-41, LHD, DDG 51, AOE 6 and, [redacted]N-68 Classes are SAR reportable related programs. CV-62, AE, [redacted]B-61 and DD-989 are related programs not included in other SARS.

6. **Mission and Description**: Close-In Weapon System (CIWS) is designed as a fast reaction terminal defense against low and high flying high speed maneuvering anti-ship missiles penetrating outer Fleet defenses. CIWS is an automatic self-contained unit consisting of search and track radars, digitalized fire control system and a 20 mm M61A1 gun mounted in a single above deck structure requiring minimum interface with other ship system. CIWS automatically detects, evaluates, tracks, and engages threats and then returns to search mode ready to detect another target. Its operations sequence is as follows: the search radar detects and evaluates a potential target by comparing measured target parameters (speed and angle of approach) with data stored in the fire control computer. After the target is declared a threat, it is handed over to the track radar. The system begins firing a stream of projectiles timed so that the projectiles arrive in the vicinity of the target when the target reaches an optimum engagement range. Thereafter, the fire control radar compares the incoming target position with the centroid of the stream of projectiles and makes any corrections required to bring it onto the target. This system does not replace an existing major weapon system, but provides a close range self defense capability that is otherwise unavailable to the fleet.

7. **Program Highlights**:

a. Significant Historical Developments -- Seven Expanded PHALANX Introduction Commitment (EPIC) flag level review panels have convened to improve introduction of PHALANX to the fleet. SECNAV directed acceleration of PHALANX installation in deploying ships was successfully conducted and continues. Spares support was smoothly transitioned to SPCC and Availability Centered Inventory Model (ACIM) sparing is being implemented. Comprehensive successful testing against real world Antiship Missile (ASM) threats was conducted and results incorporated into the design. The Block 0 configuration was not designed to meet high speed diving threats, and introduction of Block I configuration was necessary to meet these threats. Contractor Test and Evaluation (CTE) of PHALANX Block I was conducted during the final quarter of 1984. Navy Test and Evaluation (NTE) and comprehensive Demonstration Test/Operational Test (DT/OT) were accomplished in the spring and summer of 1985. There was a two month contract suspension of General Dynamics from 3 December 1985 to 2 February 1986. Approval for Limited Production (ALP) for Block I production under the FY 1986 and FY 1987 production contracts was approved on 12 March 1986. Block I land based DT was conducted to demonstrate improved radar sensitivity, fire control algorithm and increased firing rate. At-sea DT commenced in September 1987 as directed in the July 1987 approved TEMP. General Electric, Pittsfield has been established as a second source producer and the initial production contract was placed 18 February 1987.

[redacted] DT/OT and OPEVAL were conducted January - May 1988, utilizing Baseline 1 mounts on EX-USS STODDARD and USS JOSEPHUS DANIELS (CG-27) to

9. (U) **Schedule (Cont'd):**

b. (U) Previous Change Explanations --

ALP Schedule slipped from Jan 84 to Dec 85 due to problem development including excessive Target Motion Indicators (TMI) and Transmitter Mode Control Unit (TMCU) loss of "Standby go" indication. Corrective action confirmed and tested. OPEVAL (BLK I) slipped from Dec 87 to Apr 88 due to late delivery of Production Suitablility Model, establishment of system sensitivity performance in at-sea environment, and lost range availability. Block I Approval for Full/Limited Produciton slipped from May 88 to Aug 88 due to rescheduling of OPEVAL. BLK I Approval for Limited Production for two years (FY 1988 and FY 1989) vice Full Production was granted by NPDM in Aug 88. BLK I Approval for Full Production was rescheduled from Aug 88 to Jan 90 to accommodate Follow-on OT&E (OT-III).

c. (U) Current Change Explanations --

(Ch-1) - Blk I Approval for Full Production was again rescheduled from Jan 90 to May 90 to accommodate Follow-on OT&E (OT-III).

d. (U) References --

Production Estimate: DCP #88, Rev 1, dated 17 Nov 1977.

Approved Program: DAE Baseline, 31 Dec 1988.

10. (U) **Technical/Operational Characteristics:**

a. (U) Technical --	Prod Est	Approved Program Goal/Threshold		Demon-strated Perf	Current Estimate
PHALANX CIWS BLOCK 0					
Weight (lbs)	12000	12000	12600	10750	12600
Deck Space (Including space required for operation) in sq.ft	224	224	224	224	224
PHALANX CIWS BLOCK I					
Weight (lbs)	13600	13600	13600	13600	13600
Deck Space (Including space required for operation) in sq.ft	224	224	224	224	224

b. (U) Operational --

PHALANX CIWS BLOCK 0

10. (U) **Technical/Operational Characteristics (Cont'd):**

b. (U) Operational --	Prod Est	Approved Program Goal/Threshold		Demon-strated Perf	Current Estimate
Probability of Detection	(b)(1)				
Reaction Time (in sec)					
Probabilty of Kill					
Reliability (MTBF)(hrs)					
High stress profile	60	60	40	71	60
Low stress profile	120	120	120	N/A	120
Maintainability (MTTR)	2.2	2.2	3.0	2.73	2.2
Availability (inherent)					
High stress profile	.96	.96	.93	.96	.96
Low stress profile	.98	.98	.98	N/A	.98
Acquisition Range for Nominal Target(yds)	(b)(1)				
Fire Rate (in spm)					
PHALANX CIWS BLOCK 1					
Probability of Detection 1/	(b)(1)				
Reaction Time (in sec)					
First Target 2/					
3/					
Second Target 2/					
3/					
Probability of Kill					
Reliability (MTBF)(hrs)				(b)(1)	
High stress profile	70	70	70		132
Low stress profile	120	120	120		120
Maintainability (MTTR)	2.2	2.2	2.2		2.2
Availability (inherent)					
High stress profile4/	.97	.97	.97		.93
Low stress profile	.98	.98	.98	N/A	.98
Acquisition Range for Nominal Target (yds)	(b)(1)				
Fire Rate (in spm)					

c. (U) Previous Change Explanations --

PHALANX CIWS BLOCK 0:

An MTBF of 71 hours was achieved and includes all system software "drop outs". If the non-tactical system software "drop-outs" were excluded, potential system MTBF would be 188 hours.

An Inherent Availability (AI) = 0.96 was achieved using the

10. ~~(U)~~ Technical/Operational Characteristics (Cont'd):

observed MTBF of 71 hours; however, using the potential MTBF of 188 hours, the system has potential AI = 0.99.

Prototype system weighed 12,000 pounds. The contractor reduced the weight of the Operational Suitability Model (OSM) to 10,750 pounds. Engineering upgrades since initial delivery have increased the weight to 12,100 pounds.

PHALANX weight specifications increased as a result of manufacturing changes, engineering change proposals, and increase in weight of Outside Purchased Parts (OSP).

PHALANX CIWS BLOCK 1:

PHALANX weight specification reflects Block I vice Block 0 system. Block I operational changes occur in reaction time, high stress profile reliability, inherent reliability, acquisition range and fire rate. Reaction times are reported for low and high pulse repetition frequencies (LPRF/HPRF) and vary with elevation angle (above and below 10 degrees). Block I Baseline 1 System has dual fire rate capacity. Also a nominal increase in system reliability is realized. Demonstrated Performance values reflect Block I Baseline 1 testing. Block I improvements in system reliability has improved mean time between failure from 70 hours to 132 hours. Block I availability has been decreased from an estimate of .97 to an operationally demonstrated value of (b)(1)

NOTES:

1/ Against 0.52 RCS in clear environment. LPRF Pd = 1.0, HPRF Pd = .97.
2/ Mean Target Reaction Time (up to 10 degrees E1).
3/ Mean Traget Reaction Time (above 10 degrees E1).
4/ Demonstrated Availability (Operational) was (b)(1)

d. (U) Current Change Explanations -- None.

e. (U) References --

Production Estimate: DCP #88, Rev 1, dated 17 Nov 1977.

Approved Program: DAE Baseline, 31 Dec 1988.

4. (U) **Program Acquisition Cost** **(Current Estimate in Millions of Dollars)**

a. (U) Cost --	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	154.8	260.9	263.3
Procurement	2021.4	2759.1	2651.6
M61A1 GUN/BARREL	(22.5)	(25.0)	(23.9)
WEAPONS GROUP	(1518.0)	(1756.5)	(1672.8)
OTHER	(212.8)	(634.7)	(630.5)
Total Sailaway	(1753.3)	(2416.2)	(2327.2)
Other Wpn Sys Cost	(0.0)	(0.0)	(0.0)
Peculiar Support	(45.3)	(51.4)	(47.8)
Initial Spares	(222.8)	(291.5)	(276.6)
Construction	0.0	0.0	0.0
Ops. and Maint. (O&M)	0.0	0.0	0.0
Total FY 84 Base-Year $	2176.2	3020.0	2914.9
Escalation	305.5	45.9	49.1
Development (RDT&E)	(3.2)	(-47.6)	(-45.1)
Procurement	(302.3)	(93.5)	(94.2)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Ops. and Maint. (O&M)	(0.0)	(0.0)	(0.0)
Total Then-Year $	2481.7	3065.9	2964.0
b. (U) Quantities --			
Development (RDT&E)	3	3	3
Procurement	617	734	710
Construction (MILCON)	0	0	0
Ops. and Maint. (O&M)	0	0	0
Total	620	737	713

c. (U) Foreign Military Sales -- Sales to date are as follows:
Australia: Qty 6, Cost $30.4M; Greece: Qty 12, Cost $69.7M; Israel: Qty 14, Cost $67.8M; Japan: Qty 69, Cost $419.2M; Pakistan; Qty 7, Cost $26.9M; Portugal: Qty 3, cost $29.3M; Saudi Arabia: Qty 15, Cost $113.1M; Taiwan: Qty 11, Cost $78.1M; United Kingdom: Qty 30, Cost $150.8M; and Special Defense Acquisition Fund: Qty 4, Cost $16.7M. Total sales are 177 units with total dollar sales of approximately $1,002M.

d. (U) Nuclear Costs -- None.

e. (U) References --

Production Estimate: DCP 88, Rev 1. dtd 17 November 1977.

Approved Program: DAE baseline dated 31 Dec 1988.

2. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 88 SAR)
(1) Cost	2964.0	3065.9	3065.9
(2) Quantity	713.0	737.0	737.0
(3) Unit Cost	4.157	4.160	4.160
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	139.7	139.7	142.5
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	139.7	139.7	142.5
(2) Quantity	33.0	33.0	33.0
(3) Unit Cost	4.233	4.233	4.318

. (U) **Cost Variance Analysis:**

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	158.0	2323.7	0.0	2481.7
Previous Changes:				
Economic	-43.9	-312.6	-	-356.5
Quantity	-	+477.0	-	+477.0
Schedule	-	-1.4	-	-1.4
Engineering	-	+186.4	-	+186.4
Estimating	+99.2	+76.6	-	+175.8
Other	-	-	-	-
Support	-	+102.9	-	+102.9
Subtotal	+55.3	+528.9	-	+584.2
Current Changes:				
Economic	+2.1	+45.8	-	+47.9
Quantity	-	-126.9	-	-126.9
Schedule	-	-21.1	-	-21.1
Engineering	-	-	-	-
Estimating	+2.8	+20.7	-	+23.5
Other	-	-	-	-
Support	-	-25.3	-	-25.3
Subtotal	+4.9	-106.8	-	-101.9
Total Changes	+60.2	+422.1	-	+482.3
Current Estimate	218.2	2745.8	-	2964.0

4. Cost Variance Analysis (Cont'd):

(FY 1984 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	154.8	2021.4	0.0	2176.2
Previous Changes:				
Quantity	-	+359.1	-	+359.1
Schedule	-	-0.3	-	-0.3
Engineering	-	+147.3	-	+147.3
Estimating	+106.1	+157.3	-	+263.4
Other	-	-	-	-
Support	-	+74.3	-	+74.3
Subtotal	+106.1	+737.7	-	+843.8
Current Changes:				
Quantity	-	-89.5	-	-89.5
Schedule	-	-17.2	-	-17.2
Engineering	-	-	-	-
Estimating	+2.4	+17.0	-	+19.4
Other	-	-	-	-
Support	-	-17.8	-	-17.8
Subtotal	+2.4	-107.5	-	-105.1
Total Changes	+108.5	+630.2	-	+738.7
Current Estimate	263.3	2651.6	-	2914.9

b. Previous Change Explanations --

RDT&E

Economic: Revised escalation indices.

Estimating: Net increase due to additional requirements and the addition of program years as a continuing program.

b. (U) Previous Change Explanations -- (Cont'd)

PROCUREMENT

Economic:	Revised escalation indices.
Quantity:	Net quantity increase due to addition of 93 units to the program and the addition of program years as a continuing program.
Schedule:	Net decrease due to schedule shifts to meet the requirements of the Fleet Modernization Program Overhaul Schedule.
Engineering:	Application of Block I upgrade consisting primarily of high search elevation angle radar and increased magazine capacity to fiscal year 1986 procurement.
Estimating:	Net increase to estimating due to additional requirements and contracts allowing revised out year hardware estimates.
Support:	Net increase to support due to increased quantities and the addition of program years as a continuing program.

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised economic escalation indices. (Economic)	N/A	+2.1
Revised cost estimates due to increased DT/OT testing. (Estimating)	+2.4	+2.8
(2) PROCUREMENT		
Revised SCN and WPN economic escalation indices. (Economic)	N/A	+45.8
Reduced overall program costs due to the decrease of 14 SCN units and 10 WPN units in FY 87 and FY 89 - FY 94. (Quantity)	-89.5	-126.9
Reduced costs due to procurements occurring earlier than previously reported. (Schedule)	-17.2	-21.1
Estimating changes due to decrease in total quantity of units resulting in higher average unit costs to the program. (Estimating)	+17.0	+20.7
Decrease in support equipment costs due to decrease in overall quantity of units in the program. (Support)	-17.9	-25.3

. (U) **Program Acquisition Unit Cost (PAUC) History:** (Then-Year Dollars in Millions)

MK-15 PHALANX CIWS

(U) Initial Baseline Estimate to Current Estimate - -

PAUC (Initial Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
4.003	-0.433	-0.031	-0.032	+0.261	+0.280	--	+0.109	+0.154	4.157

15. (U) **Contract Information:** (Then-Year Dollars in Millions)

a. (U) **Procurement**

FY 86 Production:	Initial Contract Price Target	Ceiling	Qty
General Dynamics Pomona, CA N00024-86-C-5412, FPI Award: August 7, 1986 Definitized: July 8, 1987	$188.5	$200.5	57.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$220.8	$238.7	58.0	$222.0	$222.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-9.3	$-4.7
Cumulative Variances To Date (11/01/89)	$-18.5	$-4.8
Net Change	$-9.2	$-0.1

Explanation of Change: General Dynamics reflects an unfavorable $4.8M schedule variance and an unfavorable $18.5M cost variance. Schedule variance is attributable to delays in completion of system test procedure certification. Cost variance is attributable to a change in calculation of controlled material. This contract is approximately 94.6% complete. Estimate of cost at completion is estimated to overrun the contract by $20.5M.

5. [redacted] Contract Information (Cont'd): (Then-Year Dollars in Millions)

FY 87 Production:	Initial Contract Price Target	Ceiling	Qty
General Dynamics Pomona, CA N00024-87-C-5456, FPI Award: July 31, 1987 Definitized: July 31, 1987	$154.1	$170.0	65.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$180.5	$191.3	66.0	$171.1	$174.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.1	$-17.1
Cumulative Variances To Date (11/01/89)	$-6.7	$-13.6
Net Change	$-6.8	$3.5

Explanation of Change: Quantity should be 66 vice 65. One FMS unit was contractually added after initial award of contract. General Dynamics reflects an unfavorable schedule variance of $13.6M and an unfavorable cost variance of $6.7M. The current prediction for overrunning the contract is $11.1M. Schedule variance due to internal yearly overhead expense projections, material shortages, and departments overrunning monthly plan in an effort to regain internal schedule position. The unfavorable cost variance is attributed to newly negotiated forward pricing rates (includes changes in direct labor, overhead and general and administrative rates).

FY 88 Production:	Initial Contract Price Target	Ceiling	Qty
General Dynamics Pomona, CA N00024-88-C-5443, FFP Award: August 31, 1988 Definitized: August 31, 1988	$119.6	$0.0	36.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$121.5	$0.0	36.0	$121.5	$121.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: New production contract. Cost variances are not required as this is a fixed price contract. Schedule variances will be reported at a later date but will be based on slippage of units not costs.

. [redacted] **Contract Information (Cont'd):** (Then-Year Dollars in Millions)

FY 89 Production:	Initial Contract Price Target	Ceiling	Qty
General Electric Pittsfield, MA N00024-89-C-5412, FFP Award: November 29, 1988 Definitized: N/A	$62.4	$0.0	12.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$64.1	$0.0	12.0	$64.1	$64.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: New production contract. There will be no cost and schedule variances as this is a firm fixed price contract. Schedule variances will be based on slippage of units vice costs.

16. [redacted] **Program Funding Summary:**

a. [redacted] Program Status --

(1) Percent Program Completed: 69.2% (14 yrs/20 yrs)

(2) Percent Program Cost Appropriated: 76.2% ($2257.9 / $2964.0)

b. [redacted] Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY77-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-94)	Total
RDT&E	164.6	5.9	6.4	41.3	218.2
Procurement	2093.3	139.7	142.5	370.3	2745.8
MILCON	-	-	-	-	-
O&M	-	-	-	-	-
Total	2257.9	145.6	148.9	411.6	2964.0

c. (U) Annual Summary --

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 1319 Research, Development, Test & Eval, Navy								
1978				183.9	123.4	121.0	121.0	6.8
1979				5.3	3.9	3.9	3.9	8.4
1980				2.6	2.1	2.1	2.1	10.6
1981				2.3	2.1	2.1	2.1	10.6
1982				1.5	1.4	1.4	1.4	7.6
1983				1.3	1.3	1.3	1.3	4.9
1984				1.2	1.2	1.2	1.2	3.8
1985				3.5	3.7	3.7	3.6	3.4
1986				4.1	4.4	4.4	4.0	2.8
1987				5.7	6.3	5.6	5.5	2.7
1988				6.4	7.4	7.4	6.1	3.0
1989				6.2	7.4	7.2	5.1	4.2
1990				4.7	5.9	2.3	0.2	4.0
1991				5.0	6.4			4.2
1992				8.3	11.2			4.0
1993				13.8	19.3			3.7
1994				7.5	10.8			3.4
Subtot	3			263.3	218.2	163.6	157.5	

c. (U) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 1507 Weapons Procurement, Navy								
197T			48.9	48.9	26.8	26.8	26.8	3.6
1977			43.0	43.0	25.0	25.0	25.0	3.8
1978	21		106.1	119.2	77.4	77.4	75.9	6.8
1979	19		70.6	88.6	63.4	63.4	61.2	8.7
1980	51		146.4	165.8	130.7	130.7	118.8	11.8
1981	52		155.0	177.1	155.8	155.8	152.5	11.6
1982	49		142.6	174.0	166.2	166.2	161.3	14.3
1983	37		105.3	122.5	123.7	123.9	122.8	9.0
1984	40		116.4	123.9	130.2	132.0	123.1	8.0
1985	36		140.5	145.3	157.2	155.6	150.4	3.4
1986	32		115.2	117.2	131.1	131.6	129.3	2.8
1987	24		77.2	79.4	92.0	93.4	80.3	2.7
1988	5		23.3	24.8	29.9	29.5	16.3	3.0
1989	2		15.0	15.8	19.8	19.3	8.2	4.2
1990	18		46.1	46.7	60.6	1.3	0.5	4.0
1991	17		45.8	46.1	62.5			4.2
1992	3		15.6	17.0	24.0			4.0
1993	15		36.1	36.5	52.8			3.7
1994	15		39.0	39.0	58.2			3.4

[redacted]

c. (U) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 1507 Weapons Procurement, Navy (Cont'd)								
Subtot	436		1488.1	1630.8	1587.3	1331.9	1252.4	
Appropriation: 1611 Shipbuilding and Conversion, Navy								
1978	16		62.2	76.2	65.5	65.5	65.5	8.2
1979	25		72.4	88.1	77.3	77.3	77.3	9.6
1980	11		28.4	34.5	32.9	32.9	32.9	9.9
1981	16		40.3	49.1	48.3	48.3	48.3	9.6
1982	11		26.5	32.4	32.9	32.9	32.9	7.5
1983	23		57.2	69.0	71.0	71.0	71.0	3.8
1984	19		48.7	59.0	61.8	58.2	56.6	3.6
1985	15		43.9	53.5	57.4	56.6	53.3	2.1
1986	17		52.4	63.5	70.0	64.0	53.3	1.0
1987	12		38.6	47.2	53.7	46.6	28.7	1.5
1988	24		78.5	94.8	113.0	78.7	18.9	2.5
1989	15		53.3	64.9	80.3	55.1	2.6	2.8
1990	15		50.6	61.7	79.1			4.0
1991	16		49.4	60.3	80.0			4.2
1992	12		42.7	52.1	71.5			4.0
1993	17		60.8	74.0	104.7			3.7
1994	10		33.2	40.5	59.1			3.4

c. (U) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 1611 Shipbuilding and Conversion, Navy (Cont'd)								
Subtot	274		839.1	1020.8	1158.5	687.1	541.3	
Total	713		2327.2	2914.9	2964.0	2182.6	1951.2	

17. (U) **Production Rate Data:**
a. (U) Annualized Production Rates --

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1978	0	22	37	0
1979	0	64	44	0
1980	0	72	62	84
1981	0	73	68	84
1982	0	90	60	84
1983	0	112	60	84
1984	0	0	59	84
1985	0	0	51	84
1986	0	0	49	84
1987	0	0	36	84
1988	0	0	29	132
1989	0	0	17	132

17. (U) **Production Rate Data (Cont'd):**

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1990	0	0	33	132
1991	0	0	33	132
1992	0	0	15	0
1993	0	0	32	0
1994	0	0	25	0

b. (U) Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Acq. Cost (BY $)	2176.2	+738.7	2914.9	0.0	2914.9
(TY $)	2481.7	+482.3	2964.0	0.0	2964.0
PAUC Cost (BY $)	3.052	+ 1.036	4.088	0.000	4.088
(TY $)	3.481	+ 0.676	4.157	0.000	4.157

c. (U) Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	DEC 77	0	DEC 77	N/A	DEC 77
Duration (in mon)	93	+132	225	+54	171
End Date (Mo/Yr)	SEP 85	+132	SEP 96	N/A	MAR 92

d.([redacted])Deliveries (Plan/Actual) --

	To Date
RDT&E	3/3
Procurement	513/501
MILCON	0/0
O & M	0/0

e.([redacted])Approved Design-to-Cost Goal --

	Production Estimate	Current Estimate	Latest Approved Threshold
	(Average Unit Flyaway Cost)		
@ Qty 0 - @ Peak Rate: 0/mo			
FY Base-Year $	0.0	0.0	0.0
Then Year $	0.0	0.0	0.0
@ Qty 0 (1st three years) - @ Peak Rate: 0/mo			
FY Base-Year $	0.0	0.0	0.0
Then Year $	0.0	0.0	0.0

Paragraph 17 Comments:

NOTE: (for paragraph 17a) The attainment of the maximum production rate may be limited by expected participation of FMS customers.

Regarding the Current Estimate for paragraph 17a; delivery period is 12 months from 1st delivery to last. Quantity shown is annualized. Actual FMS quantities are shown but no projected FMS quantities are included.

No Design-to-cost goals apply to the CIWS program, as this program was initiated in 1966, prior to design-to-cost implementation.

18. **Operating and Support Costs**: None.

a.([redacted])Assumptions and Ground Rules -- None.

b.([redacted])Costs -- None.

c. (U) Contractor Support Costs -- (Current (Then-Year) Dollars in Millions)

Funding	FY1989 & Prior	FY1990	FY1991	Balance To Complete	Total
O&M	5.9	1.5	1.5	2.6	11.5
Industrial Fund	---	---	---	---	---
Total	5.9	1.5	1.5	2.6	11.5

N-29 P-3C SAR-89-035

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: P-3C ORION

AS OF DATE: DECEMBER 31, 1989

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1. Designation/Nomenclature (Popular Name): P-3C Patrol Aircraft ASW (ORION)

2. DoD Component: U.S. Navy

3. Responsible Office and Telephone Number:
   P-3 PROGRAM OFFICE — CAPT. D.C. BENNETT
   Naval Air Systems Command — Assigned: February 26, 1988
   Washington, D.C. 20361 — AUTOVON 222-3354

4. Program Elements/Procurement Line Items:
   RDT&E: 25605N, 63254N, 0604221N, 0604201N
   PROCUREMENT: 0204251N, 0204262N ICN 0185,0188 appn: 1506
   MILCON: 0204613N

5. Related Programs: Harpoon, Update IV, P-7A

90-C-0637

(b)(1)



THIS IS THE FINAL SAR

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5. Mission and Description: The P-3C is a patrol type ASW land-based aircraft with equipment to permit detection, identification, tracking accurate location and destruction of all type of enemy submarines. P-3C's were being procured in time-phased versions which incorporate advances in capability, maintainability and reliability resulting from an ongoing Product Improvement Program. UPDATE I aircraft included increased data processing capacity, OMEGA, and additional tactical display and improved DIFAR. UPDATE II aircraft incorporated Infrared Detection System (IRDS), a Sonobuoy Reference System (SRS), HARPOON missile capability and an improved wide band acoustic tape recorder. UPDATE III production includes the Proteus Advance Signal Processor (ASP), the Advanced Sonobuoy Communications Link (ASCL), the Integrated Acoustic Communications System (IACS), and a new software program to fully exploit the increased acoustic sensor capability.

7. Program Highlights:

a. Significant Historical Developments -- The P-3C aircraft is a direct follow-on of the P-3A and P-3B aircraft. The P-3C has been continuously produced since 1969. The last P-3C production contract was FY87 with the last delivery scheduled in March 1990. The fleet has reported a P-3C Mission Capability of 86.69% for operational squadrons for the period extending from Oct 88 thru Sep 89. This value exceeds the latest CNO standards. The six FY88 National Guard and Reserve P-3C aircraft which were appropriated but not authorized by Congress were cancelled. The P-3C aircraft has a demonstrated performance of successfully completing its current assigned missions.

Excluded from this Selected Acquisition Report are the 237 P-3C aircraft procured in FY83 & prior & the $4,301.9M - FY83 & prior funding.

b. Significant Developments Since Last Report -- None.

c. Changes Since "As Of" Date -- This is the final SAR. The total program funding is 92% expended.

8. Threshold Breaches: There are currently no DAE baseline (dated 31 December 1988) breaches.

9. Schedule

a. Milestones

Milestones	Production Estimate	Approved Program	Current Estimate
Program Initiated	Sep 65	Sep 65	Sep 65
First Prod Contract	Sep 67	Sep 67	Sep 67
Navy Prelim. Eval.	NA	NA	NA
First Prod Flight	Mar 69	Mar 69	Mar 69
Accept First Prod A/C	Feb 69	Feb 69	Feb 69
Begin BIS	Oct 69	Oct 69	Oct 69
End BIS	Jul 70	Jul 70	Jul 70
Fleet Introduction	Sep 69	Sep 69	Sep 69
Navy Support Date	Apr 70	Apr 70	Apr 70
Fleet operational	Jul 70	Jul 70	Jul 70
Update III-IOT&E	Jan 82	Jan 82	Jan 82
Update III Prov. ASU	Mar 82	Mar 82	Mar 82
Update III Fleet Oper.	May 84	May 84	May 84

b. Previous Change Explanations: Update IV Fleet Operational Milestone was deleted in Dec 87 SAR since Update IV avionics will not be incorporated into P-3C production aircraft. The UIV avionics suite will be incorporated into P-3 aircraft through the P-3 retrofit program only.

c. Current Change Explanations: None.

d. References--

Production Estimate: Master Milestones List dated 23 April 1978
Approved Program: DAE Baseline Approved 31 December 1988.

10. Technical/Operational Characteristics:

a. Technical	Prod. Est.	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
Weight (lbs)				
(1) Empty	66,726	66,726/ 66,726	66,726	66,726
(2) Normal T.O.	135,000	135,000/135,000	135,000	135,000
(3) Max. T.O.	139,700	139,760/139,760	139,760	139,760
w/Ext. Stores	142,000	142,000/142,000	142,000	142,000
Dimensions				
(1)L/Wing Span	116'10"/99'8"	116'10"/99'8"/ 116'10"/99'8"	116'10"/99.8"	116'10/99.8"
(2)Ht/Ht fold	33'9"/No Fold	33'9"/No Fold/ 33'9"/No Fold	33'9"/No Fold	33'9"/No Fold
b. Operational				
Speed-Combat Wt.				
(1)Cruise(Max.Rnge)	324Kn TAS	324Kn TAS/324Kn TAS	324Kn TAS	324Kn
(2)Maximum(Mil.Pwr)	392	392/392	392	392
Radius(NM)Full Fuel ASW loading				
(1)Max(no loiter)	2003NM/25000	2003NM/25000 2003NM/25000	2003NM/25000	2003nm/25000
(2)Norm(loiter 1/2 flt time 6hr loiter)	875	875/875	875	875
Ceil/Alt.				
(1)Serv.Ceil(Cmbt Wt)	30,000	30,000/30,000	30,000	30,000
(2)Cruise Alt.(low)	1,500	1,500/ 1,500	1,500	1,500
(high)	25,000	25,000/25,000	25,000	25,000
(3)loit Alt(low/high)	1,500	1,500/ 1,500	1,500	1,500
Reliability(probab. no fail 12hr mission that will reduce system effectiveness >90% of full effectiveness.)	90%	90% /90%	95.59%	90%
Maintainability				
(1)SDLM Cycle	60/50/40 mo	60/50/40 mo/ 60/50/40 mo	60/50/40 mo	60/50/40 mo
(2)MMH flt hr	16.0 hrs	16.0 hrs/16.0 hrs	14.3 hrs	16.0 hrs

c. Previous Change Explanations: None

d. Current Change Explanations: None

e. References--

Production Estimate: No DCP document available
Approved Program - DAE Baseline Approved 31 December 1988

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost	(1) Production Estimate (FY83-FY89)	(2) Approved Program	(3) Current Estimate (FY83-FY90)
Development	280.1	57.6	57.6
Procurement	3453.2	1252.6	1252.3
Flyaway:			
Airframe & Changes	(1477.7)	(547.7)	(547.7)
Engine & Accessories	(253.6)	(85.7)	(85.7)
Electronics & Comm	(881.6)	(284.3)	(284.3)
Armament & Other GFE	(20.9)	(6.7)	(6.7)
TOTAL FLYAWAY	(2633.8)	(924.4)	(924.4)
Ground Support Equip.	(185.7)	(73.6)	(73.6)
Training Equip. & Other	(570.1)	(233.8)	(233.5)
TOTAL SUPPORT	(755.8)	(307.4)	(307.1)
Initial Spares	(63.6)	(20.8)	(20.8)
MILCON	2.6	9.0	9.0
TOTAL FY84 Base-Year $	3735.9	1319.2	1318.9
Escalation	1287.7	123.7	122.6
Development	(51.5)	(4.3)	(4.3)
Procurement	(1236.0)	(118.1)	(117.0)
MILCON	(.2)	(1.3)	(1.3)
TOTAL THEN-YEAR $	5023.6	1442.9	1441.5
b. Quantities --			
Development	0	0	0
Production	80	32	32
TOTAL	80	32	32

c. Foreign Military Sales: Sales to date total $1003.4M. $195.3M for 10 P-3C,s for Australia; $366.2M for 13 P-3C's for Netherlands; $70.6M for 2 P-3C's for Norway, and $139.9M for 3 P-3C's and 5 knock-down P-3C's for Japan. 3 P-3C's for Pakistan for total of $231.4M.

d. Nuclear Costs: None

e. References --

Production Estimate: FY85 Congressional Data Sheet dtd Jan '84
Approved Programs: DAE Baseline Approved 31 December 1988.

12. Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then Year) Dollars in Millions)

		Current Estimate (DEC 89 SAR)	Current Year UCR Baseline (DEC 88 SAR)	Budget Year UCR Baseline (DEC 89 SAR)
a.	Program Acquisition			
(1)	Cost	1,441.5	1,442.9	1,441.5
(2)	Quantity	32	32	32
(3)	Unit Cost	45.047	45.091	45.047
b.	Current Procurement--	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1)	Cost	N/A	N/A	N/A
	Less CY Adv Proc	N/A	N/A	N/A
	Plus PY Adv Proc	N/A	N/A	N/A
	Net Total	N/A	N/A	N/A
(2)	Quantity	N/A	N/A	N/A
(3)	Unit Cost	N/A	N/A	N/A

13. Cost Variance Analysis:

A. Summary -- (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Estimate	331.6	4,689.2	2.8	5,023.6
Previous Changes				
Economic	- 21.3	- 422.2		- 443.5
Schedule	+ 104.3	+ 212.0		+ 316.3
Quantity	-	-1,897.2		-1,897.2
Estimating	- 352.7	- 733.4		-1,086.1
Support	-	- 477.7	+ 7.5	- 470.2
Subtotal	- 269.7	-3,318.5	+ 7.5	-3,580.7
Current Changes:				
Economic				
Quantity				
Estimating				
Support		- 1.4		- 1.4
Subtotal		- 1.4		- 1.4
TOTAL CHANGES	- 269.7	-3,319.9	+ 7.5	-3,582.1
Current Estimate	61.9	1,369.3	10.3	1,441.5

13. Cost Variance Analysis (Cont'd):
(FY 1984 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Estimate	280.1	3,453.2	2.6	3,735.9
Previous Changes				
Schedule	+ 81.1	+ 161.2		+ 242.3
Quantity		-1,505.7		-1,505.7
Estimating	- 303.6	- 538.2		- 841.8
Support		- 317.9	+ 6.4	- 311.5
Subtotal	- 222.5	-2,200.6	+ 6.4	-2,416.7
Current Changes:				
Quantity				
Estimating				
Support		- .3		- .3
Subtotal	-0-	- .3	-0-	- .3
Total Changes	- 222.5	-2,200.9	+ 6.4	-2,417.0
Current Estimate	57.6	1,252.3	9.0	1,318.9

b. Previous Change Explanation

RDT&E

ECONOMIC -- Revised economic esc. rates
SCHEDULE -- Inclusion of FY92 funding
ESTIMATING - Development costs for out-of-production a/c excluded from SAR reporting; Deletion of P-3G & UIV programs from the P-3C SAR; Cancellation of Avionics Improvement Program

PROCUREMENT

ECONOMIC -- Revised economic esc. rates
Reflected a correction of Prior SAR in Then Year $ (-22.3)
QUANTITY -- Cancellation of 6 NGR&E FY88 A/C; Shutdown of P-3C after
Reflected a correction of Prior SAR in Then Year $ (+22.3)
FY87 reduced program by 48 a/c; Inclusion of 6 NGR&E FY88 P-3C a/c.
ESTIMATING - Reprice of FY87-FY90 as Multi-year Program, cancellation of Multi-year Program, straight lining airframe/cfe costs, and Congressional Recissions & Reductions.
SUPPORT -- Cancellation of Reprogramming Action for FY87 Support Requirements & Reduction in Support Requirements and Spares; Stretch-out and increase in support/spares requirements; Reduction in support/spares requirements due to shutdown of P-3C program after FY87 procurement.

3. Cost Variance Analysis (Cont'd):

b. Previous Cange Escplanation (Cont'd):

MILCON -- Construction of A/C Parking Apron-NAS Jacksonville (2.9M); Construction of A/C Engine Maint. Shop-NAS Jax (4.6M); Cancellation of Construction of Operational Training Bldg a - NAS Moffett (2.7M)

c. Current Change Explanations --

	(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E	-0-	-0-
(2) PROCUREMENT		
Reduction in Support Requirements	- .3	- 1.4
(3) MILCON	-0-	-0-

14. Program Acquisition Unit Cost (PAUC) History:

A. Initial SAR Estimate

B.

PAUC (Initial PDE Est)			Changes (Then Year Dollars in Millions)						PAUC Current Estimate
	ECON	QTY	SCH	ENG	EST	SPT	Other	Total	
62.795	-13.858	+34.905	+9.884	-	-33.941	-14.738	-	-17.748	45.047

15. Contract Information: (Then Year Dollars in Millions)

		Initial Contract Price		
		Target	Ceiling	Qty
A.	RDT&E:			
B.	PROCUREMENT			
	AIRFRAME			
	Lockheed Aeronautical Systems Co. N0001986-C-0086 FFP AWARD: DEC 86 DEFINITIZATION: JUL 1988	170.4	N/A	9

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 100.0% (6/6 yrs)

(2) Percent Program Cost Appropriated: 100.0% (1445.1/1445.1)

b. Appropriation Summary --

Appropriation	Prior Years (FY83-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-94)	Total
RDT&E	61.9				61.9
PROCUREMENT	1,369.3				1,369.3
MILCON	10.3				10.3
TOTAL	1,441.5				1,441.5

16. Program Funding Summary (Cont'd): (Current Estimate in Millions)

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year $	Total Then-Year $			Escl Rate %
		Non-Rec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E,N								
1984				8.8	8.9	8.8	8.8	3.8
1985				23.7	24.9	24.9	24.9	3.4
1986				12.0	13.0	13.0	12.2	2.8
1987				5.2	5.8	5.8	5.4	2.7
1988				3.8	4.4	4.4	4.0	3.0
1989				4.1	4.9	4.9	4.0	4.2
Sub-total				57.6	61.9	61.8	59.3	

6. Program Funding Summary (Cont'd): (Current Estimate in Millions)

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year $	Total Then-Year $			Escl Rate %
		Non-Rec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: Procurement								
1983				48.2	48.6	48.6	48.6	4.9
1984	5		170.8	276.4	290.1	290.1	277.0	3.8
1985	9		261.6	361.2	390.1	390.1	352.4	3.4
1986	9		254.9	319.2	355.4	355.3	350.4	2.8
1987	9	5.5	183.4	244.4	281.6	281.6	237.5	2.7
1988				2.4	2.9	2.9	1.2	3.0
1989				.5	.6	.1	-	4.2
Sub-total	32	5.5	870.7	1,252.3	1,369.3	1,368.7	1,267.1	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions)

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year $	Total Then-Year $			Escl Rate %
		Non-Rec	Rec		Program	Obli-gated	Ex-pended	
				Appropriation: MILCON				
1984				1.3	1.4	1.4	1.4	3.8
1985				1.4	1.4	1.4	1.4	3.4
1986				-	-	-	-	
1987				2.5	2.9	2.9	2.0	2.7
1988				3.8	4.6	3.5	2.0	3.0
Sub-total				9.0	10.3	9.2	6.8	
Total	32	5.5	870.7	1,318.9	1,441.5	1,439.7	1,333.2	

17. Production Rate Data:

a. Annualized Production Rates

FISCAL YEAR	DEVELOPMENT ESTIMATE	PRODUCTION ESTIMATE	CURRENT ESTIMATE	MAXIMUM ECONOMIC
1984	N/A	5	5	24
1985	N/A	9	9	24
1986	N/A	9	9	24
1987	N/A	9	9	24
1988	N/A			
1989	N/A			
1990	N/A			

B. Cost Variance -- Dollars in Millions

ITEM		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max.)	Maximum
Prog. Acq. Cost	(BY)	3,735.9	-2,417.0	1,318.9	N/A	N/A
	(TY)	5,023.6	-3,582.1	1,441.5	N/A	N/A
PAUC	(BY)	46.699	- 5.483	41.216	N/A	N/A
	(TY)	62.795	-17.748	45.047	N/A	N/A

c. Schedule Variance --

	PdE	Variance (CE less PdE)	Current Estimate	Variance (CE less Max.)	Maximum
Start Date (Mo/Yr)	10/82	-	10/82	N/A	N/A
Duration (in Months)	144	- 54	90	N/A	N/A
End Date (Mo/Yr)	9/94	-	3/90	N/A	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
PROCUREMENT	30/29

e. Approved Design to Cost Goal -- Not Applicable

(Average Unit Flyaway Cost)		
Development Estimate	Current Estimate	Latest Approved Threshold
N/A	N /A	N/A

18. Operating and Support Costs: N/A

a. Assumptions and Support Costs -- N/A

b. Costs -- N/A

c. Contractor Support Costs --

	FY1989 & Prior	FY1990 Year	FY1991 Year	Balance To Complete	Total
O & M (A,N,AF)	24.9	10.0	10.3	N/A	45.2
Industrial Fund	2.5	2.0	2.1	N/A	6.6
Total	27.4	12.0	12.4	N/A	51.8

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N-12 E-2C

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: E-2C

AS OF DATE: December 31, 1989

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(b)(1)

TO C0643

1. (U) Designation/Nomenclature (Popular Name): E-2C/Carrier Based All Weather Airborne Early Warning Command and Control System (Hawkeye)

2. (U) DOD Component: Department of the Navy.

3. (U) Responsible Office and Telephone Number:

E-2/C-2 and ATDS Program Office
Naval Air Systems Command
Washington, DC 20361-1231

PM: CAPT J. W. Sprague
Assigned: May 6, 1988
AV 222-3251; COMM (202)692-3251

4. (U) Program Elements/Procurement Line Items:

RDT&E: PE 0204152N
PROCUREMENT: APPN 1506 ICN 0195 PE 0204152N, 0204156N
MILCON: PE 24611N

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5. (U) Related Programs: C-2A Greyhound; Improved Engine (PE 0604252N)

6. (U) Mission and Description: The Grumman built E-2C "Hawkeye" is a twin engine, carrier based Combat Information Center aircraft which extends task force defense perimeters by providing early warning of approaching enemy air and surface units and vectoring interceptors and strike aircraft to the attack. Carrying a crew of five the E-2C also provides area surveillance, intercept control, search and rescue, communication relay, and strike and traffic control. Principal subsystems include APS-125/138/139 radar and ALR-73 Passive Detection Systems which allow E-2C to detect emitters/targets even during periods of radar silence.

7. (U) Program Highlights:

a. Significant Historical Development -- The E-2C was introduced to the fleet in 1973. The automatic overland radar target tracking and Electronic Counter Counter-Measure (ECCM) features were introduced to the fleet in 1977 with the new AN/APS-125 Advanced Radar Processing System (ARPS). The designation of the AN/APS-125 radar was changed to the AN/APS-138 in 1983 with the production incorporation and delivery of the Total Radiation Aperture Control Antenna (TRAC-A) and other radar changes. The AN/APS-139, delivered to the fleet in December 1988, improved radar ECCM performance and increased system track capacity. The E-2C satisfies the mission needs.

UDP Group I APS-139 commenced TECHEVAL in 19 October 1988 and completed in Jun 1989. OPEVAL has been delayed due to difficulties encountered with the T56-A-427 engine which will undergo concurrent OPEVAL. Anticipate beginning OPEVAL in May 90.

b. Changes Since "As Of" Date -- None

8. (U) Threshold Breaches: There are currently no DAE baseline breaches dated 31 December 1988..

9. (U) Schedule:

a. Milestone --	Production Estimate	Approved Program	Current Estimate
Project Initiated (Letter Contract)	Jun 1968	Jun 1968	Jun 1968
Definitized Contract Executed (R&D)	May 1969	Sep 1970	Sep 1970
Production Contract Award	Oct 1970	Sep 1971	Sep 1971
Navy Preliminary Evaluation I (Commenced)	Jan 1972	Feb 1972	Feb 1972
First Flight of Production Airplane	May 1972	Sep 1972	Sep 1972

9. (U) Schedule (Cont'd):

Navy Preliminary Evaluation II (Commenced)	Oct 1972	Oct 1972	Oct 1972
First Production Airplane Accepted	Oct 1972	Jan 1973	Jan 1973
Board of Inspection and Survey (Commenced)	Feb 1973	Apr 1973	Apr 1973
Fleet Introduction	Apr 1973	May 1973	May 1973
Board of Inspection and Survey (Completed)	Mar 1973	Nov 1973	Nov 1973
Initial Operational Capability	Nov 1973	Feb 1974	Feb 1974
Navy Support Date	Nov 1974	Dec 1975	Dec 1975
First Production AN/APS-125 ARPS	Dec 1976	Nov 1976	Nov 1976
AN/APS-125 Fleet Operational	May 1978	May 1978	May 1978
APS-138 Radar/TRAC-A Antenna (Prod. Delivery)	Dec 1982	Jun 1983	Jun 1983
High Speed Processor (Prod. Delivery)	Apr 1987	Apr 1987	Apr 1987
APS-139 Radar (Prod. Delivery)	Feb 1988	Feb 1988	Apr 1988
APS-145 Radar (Prod. Delivery)	N/A	N/A	Dec 1990

b. Previous Change Explanations -- None
CH-1 NDCP W0463 dated 27 Apr 1988 (Approved development of an increased range APS-145 radar.)

c. Current Change Explanations -- None

d. (U) References --

Production Estimate: DCP No. 26 Rev 1 dated 24 June 1971, subject "Development Concept Paper Carrier Based, Airborne Early Warning/Command and Control System (E-2C)" NDCP W0463 dated 27 April 1988, subject "Navy Decision Coordinating Paper for Carrier Based Early Warning Command and Control System (E-2C)"

Approved Program: DAE Baseline dated 31 Dec 1988

10. (U) Technical/Operational Characteristics:

a. (U) Technical --	Pde Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
Take off weight	51,535	N/A /51,878	51,878	51,878
Length/Span	56'4"-80'7"	N/A /57'6"-80'7"	57'6"-80'7"	57'6"-80'7"
Engine Number/Type	2-T56-A-8A	N/A /2-T56-A-425	2-T56-A-425 2-T56-A-427	2-T56-A-425 2-T56-A-427
Crew	5	N/A / 5	5	5

10. (U) Technical/Operational Characteristics (Cont'd):

b. (U) Operational --

(U) Speed (KIAS)				
(1) Max Speed @ 13,500' (KIAS)	315	N/A /315	N.A.	315
(2) Cruise Speed @ 24,450'	270	N/A /270	N.A.	270
(U) Time on Station @ 200 NM (Hrs)	4.0	N/A /4.0	3.5	4.0
(U) Service Ceiling (Ft)	28,100	N/A /28,100	N.A.	28,100
(U) Radar Detection Range (AN/APS-120)				
(U) (1) Overland (A-6 target)	(b)(1)			
(U) (2) Overwater (A-6 target)				
(U) ARPS Radar Detection Range (AN/APS-125)				
(U) (1) Overland (A-6 target)				
(U) (2) Overwater (A-6 target)				
(U) Passive Detection System				
(U) (1) range				
(U) (2) azimuth	360 deg	N/A /360 deg	360 deg	360 deg
(U) Radar Detection Range (AN/APS-138/9 with TRAC-A antenna)				
(U) (1) Overland	(b)(1)			
(U) (2) Overwater				
(U) (3) Near Land				
(U) Radar Detection Range (APS-145)				
(U) (1) Overwater (C-141 target)	(b)(1)			
(U) Systems Accuracy (CEP to Target at 200 NM range) (NM)				

Note: All detection parameters based on 50% probability of detection point.

10. (U) Technical/Operational Characteristics (Cont'd):

c. Previous Changes Explanations -- DAE Baseline dated 31 Dec 88
ARB dated 16 Sep 1988 (Approved limited production procurement of the T56-A-427 engine for E-2C aircraft.)
ARB dated 1 Dec 1988 (Provided developmental and operational test results for APS-145 radar.)

d. Current Changes Explanations - None

e. (U) References --

Production Estimate: DCP No. 26 Rev 1 dated 24 June 1971, subject "Development Concept Paper Carrier Based, Airborne Early Warning/Command and Control System (E-2C)" NDCP W0463 dated 27 April 1988, subject "Navy Decision Coordinating Paper for Carrier Based Early Warning Command and Control System (E-2C)"

Approved Program: DAE Baseline dated 31 Dec 1988

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost --	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	$ 655.7	$ 537.2	$ 534.7
Procurement	4739.2	6153.8	7145.6
Airframe & Changes	(2967.3)	(4097.9)	(4830.4)
Engine & Accessories	(142.0)	(283.8)	(314.7)
Electronics	(110.0)	(159.0)	(188.5)
Armament & Other GFE	(13.7)	(40.8)	(19.6)
Total Flyaway	(3233.0)	(4581.5)	(5353.2)
Other Wpn Sys Cost	(1183.4)	(1233.1)	(1432.2)
Initial Spares	(322.8)	(339.2)	(360.2)
Construction (MILCON)	3.1	2.4	2.4
Total FY 85 Base-Year $	5398.0	6693.4	7682.7
Escalation	523.5	710.4	1428.2
Development (RDT&E)	(50.3)	(24.4)	(25.1)
Procurement	(473.1)	(686.0)	(1403.1)
Construction (MILCON)	(0.1)	(0.0)	0.0
Total Then-Year $	$ 5921.5	$ 7403.8	$ 9110.9
b. Quantities --			(b)(1)
Development (RDT&E)	2	2	
Procurement	125	163	
Total	127	165	

1. [redacted] Program Acquisition Cost (Cont'd) (Current Estimated in Millions of Dollars)

c. Foreign Military Sales -- Sales to date are 4 for Israel for a total of $181.2M; 11 for Japan for a total of $725.2M; 5 for Egypt for a total of $780.9M; 4 for Singapore for a total of $364.8M; and 0 for Taiwan for a total of $53.3.

d. Nuclear Costs -- None

e. [redacted] References --

Production Estimate: DCP No. 26 Rev 1 dated 24 June 1971, subject "Development Concept Paper Carrier Based, Airborne Early Warning/Command and Control System (E-2C)" NDCP W0463 dated 27 April 1988, subject "Navy Decision Coordinating Paper for Carrier Based Early Warning Command and Control System (E-2C)"

Approved Program: DAE baseline dated 31 Dec 1988

17. [redacted] Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then Year) Dollars in Millions)

		Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a.	Program Acquisition --	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
	(1) Cost	9110.9	7403.8	9110.9
	(2) Quantity	(b)(1)	165	(b)(1)
	(3) Unit Cost		44.9	
b.	Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
	(1) Cost	341.4	341.4	411.0
	Less CY Adv Proc	30.5	30.5	38.1
	Plus PY Adv Proc	30.2	30.2	30.5
	Net Total	341.1	341.1	403.4
	(2) Quantity	4	4	6
	(3) Unit Cost	85.275	85.275	67.233

13. [redacted] Cost Variance Analysis:

a. Summary -- (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	706.0	5212.3	3.2	5921.5
Previous Changes:				
Economic	-5.7	-116.6		-122.3
Quantity	-	+1384.5	-	+1384.5
Schedule	-	+17.7	-	+17.7
Engineering	+24.6	+36.7	-	+61.3
Estimating	-163.3	+227.9	-	+64.6
Other	-	-	-	-
Support	-	+77.3	-.8	+76.5
Subtotal	-144.4	+1627.5	-.8	+1482.3
Current Changes:				
Economic	+.7	+128.4	-	+129.1
Quantity	-	+678.0	-	+678.0
Schedule	-	+224.4	-	+224.4
Engineering	-	+33.0	-	+33.0
Estimating	-2.5	+306.4	-	+303.9
Other	-	-	-	-
Support	-	+338.7	-	+338.7
Subtotal	-1.8	+1708.9	-	+1707.1
Total Changes	-146.2	+3336.4	-.8	+3189.4
Current Estimate	559.8	8548.7	2.4	9110.9

13. (U) Cost Variance Analysis(Cont'd):
(FY 1985 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	655.7	4739.2	3.1	5398.0
Previous Changes:				
Quantity	-	+1112.7	-	+1112.7
Schedule	-	+13.3	-	+13.3
Engineering	+49.8	+25.2	-	+75.0
Estimating	-168.3	+202.6	-	+34.3
Other	-	-	-	-
Support	-	+60.8	-0.7	+60.1
Subtotal	-118.5	+1414.6	-0.7	+1295.4
Current Changes:				
Quantity	-	+422.6	-	+422.6
Schedule	-	+116.7	-	+116.7
Engineering	-	+20.6	-	+20.6
Estimating	-2.5	+211.8	-	+209.3
Other	-	-	-	-
Support	-	+220.1	-	+220.1
Subtotal	-2.5	+991.8	-	+989.3
Total Changes	-121.0	+2406.4	-0.7	+2284.7
Current Estimate	534.7	7145.6	2.4	7682.7

b. Previous Change Explanations --

(1) RDT&E
Economic: Revised indices
Engineering: Update of the Radar
Estimating: Revised production cost

(2) Procurement
Economic: Revised indices
Quantity: Addition of 38 aircraft
Schedule: Changed to meet inventory objective
Engineering: Engineering changes due to ECPs
Estimating: Repricing of A/C and GFE
Support: Revised estimate of support

(3) MILCON
Support: Repair of training facility at Norfolk

13. (U) Cost Variance Analysis (Cont'd):

c. Current Change Explanations --

	(Dollars in Millions) Base Year	Then Year
(1) RDT&E		
Economics: Current Revised escalation indices.	N/A	+.7
Estimating	-2.5	-2.5

(FY 1985 Constant Dollars (Base Year) in Millions)

	(Dollars in Millions) Base Year	Then Year
(2) Procurement		
Revised escalation indices (Economic)		+128.4
Increase is due to an additional 12 A/C procurement through 1998- (Quantity)	+422.6	+678.0
Reduction to annual procurement quantities over FY-91-94. (Schedule)	+116.7	+224.4
Engineering changes due to increased quantity. (Engineering)	+20.6	+33.0
Repricing of A/C and GFE requirements including change from multiyear procurement to annual procurement. (Estimating)	+211.8	+306.4
Revised estimate of support costs through FY 94 and cost to cover inventory requirements FY 95 to FY 98 (Support)	+220.1	+338.7
(3) MILCON		
None		

14. (U) Program Acquisition Unit Cost (PAUC) History: (Millions of then-year dollars)

a. Current Baseline Estimate to Current Estimate

(b)(1) [redacted]

[redacted]

15. [redacted] Contract Information: (Then-Year Dollars in Millions)

a. RDT&E --

Radar	Initial Contract Price Target	Ceiling	Qty
Grumman Aerospace Corporation N00019-86-C-0356 FPIS Award: January 9, 1987 Definitized: June 1986	$ 54.5	N/A	--

Current Contract Price Target	Ceiling	Qty	Estimate Price At Completion Contractor	Program Manager
$ 54.5	N/A	--	$ 54.5	$ 54.5
			Cost Variance	Schedule Variance
Previous Cumulative Variances			-0-	-0-
Cumulative Variances to Date			3.1	-0.4
Net Change			3.1	-0.4

b. Procurement --

Airframe	Initial Contract Price Target	Ceiling	Qty
Grumman Aerospace Corporation N00019-88-C-0331 AAC Award: April 28, 1989 Definitized:	$252.9	N/A	4

Current Contract Price Target	Ceiling	Qty	Estimate Price At Completion Contractor	Program Manager
$252.9	N/A	4	$252.9	$252.9

15. [redacted] Contract Information (Cont'd):

Airframe	Initial Contract Price Target	Ceiling	Qty
Grumman Aerospace Corporation N00019-88-C-0007 FFP Award: April 29, 1988 Definitized: October 1989	$339.7	N/A	6

Current Contract Price Target	Ceiling	Qty	Estimate Price At Completion Contractor	Program Manager
$339.7	N/A	6	$339.7	$339.7

* CPR not required on FFP

Grumman Aerospace Corporation N00019-87-C-0001 FFP Award: July 23, 1987 Definitized: July 31, 1988	$345.0	N/A	10

Current Contract Price Target	Ceiling	Qty	Estimate Price At Completion Contractor	Program Manager
$345.0	N/A	10	$345.0	$345.0

* CPR not required on FFP

Grumman Aerospace Corporation N00019-86-C-0096 FFP Award: June 12, 1986 Definitized: July 31, 1987	$242.2	N/A	6

Current Contract Price Target	Ceiling	Qty	Estimate Price At Completion Contractor	Program Manager
$219.4	N/A	6	$274.4	$274.4

* CPR not required on FFP

16. [redacted] Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 71.4% (20 yrs/28 yrs)

(2) Percent Program Cost Appropriated: 60.9% ($5545.6/$9110.9)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY70-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-98)	Total
RDT&E	476.0	37.8	37.4	8.6	559.8
Procurement	4688.0	341.4	411.0	3108.3	8548.7
MILCON	2.4	-	-	-	2.4
Total	5166.4	379.2	448.4	3116.9	9110.9

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY 85 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1970	2			161.0	161.0	161.0	161.0	5.5
1972				30.8	30.8	30.8	30.8	4.6
1973				15.9	15.9	15.9	15.9	4.4
1974				0.1	0.1	0.1	0.1	8.0
1975				0.0	0.0	0.0	0.0	10.9
1976				0.0	0.0	0.0	0.0	6.6
1977T				0.0	0.0	0.0	0.0	2.9
1977				0.0	0.0	0.0	0.0	2.6
1978				0.0	0.0	0.0	0.0	6.8
1979				5.5	5.5	5.5	5.5	8.4
1980				11.1	11.1	11.1	11.1	10.6
1981				19.0	19.0	19.0	19.0	10.6
1982				17.7	17.7	17.7	17.7	7.6
1983				40.5	40.5	40.5	40.5	4.9
1984				40.6	40.6	40.5	40.5	3.8
1985				33.9	34.4	33.4	33.4	3.4
1986				21.1	22.1	21.9	21.2	2.8
1987				30.7	33.0	32.9	22.2	2.7
1988				19.5	21.7	21.7	19.1	3.0
1989				19.5	22.6	22.6	15.4	4.2
1990				31.4	37.8	35.0	0.1	4.0
1991				29.8	37.4	0.0	0.0	4.2
1992				5.4	7.0	0.0	0.0	4.0
1993				1.2	1.6	0.0	0.0	3.7
1994				0.0	0.0	0.0	0.0	3.4
Sub-total	2			534.7	559.8	509.6	453.5	

16. Program Funding Summary (Cont'd): (Current Estimated in Millions of Dollars)

c. Annual Summary -- [redacted]

Fiscal Year	Qty	Flyaway FY 85 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
				Appropriation: Procurement				
1970	11	0.0	0.0	43.7	43.7	43.7	43.7	3.9
1972	9	0.0	190.7	274.8	274.8	274.8	274.8	3.8
1973	0	0.0	104.7	157.5	157.5	157.5	157.5	4.2
1974	8	0.0	127.3	161.3	161.3	161.3	161.3	5.8
1975	6	0.0	102.5	129.0	129.0	129.0	129.0	8.8
1976	6	1.0	100.1	160.7	160.7	160.7	160.7	6.6
197T	1	0.0	16.8	23.2	23.2	23.2	23.2	3.6
1977	6	0.0	107.9	156.4	156.4	156.4	156.4	3.8
1978	6	0.0	132.4	192.5	192.5	192.5	192.5	6.8
1979	6	9.4	140.6	207.6	207.6	207.6	207.6	8.7
1980	6	0.0	158.9	198.4	198.4	198.4	198.4	11.8
1981	6	21.6	151.7	235.1	235.1	235.1	235.1	11.6
1982	6	1.2	192.9	254.0	254.0	254.0	254.0	14.3
1983	6	0.0	187.3	288.6	288.6	288.6	288.6	9.0
1984	6	0.0	195.4	317.2	317.2	317.2	286.1	8.0
1985	6	30.3	187.4	303.7	318.4	318.4	294.4	3.4
1986	6	26.9	183.9	311.6	336.3	336.3	318.9	2.8
1987	10	7.2	341.9	412.5	460.6	460.6	429.0	2.7
1988	6	27.4	223.2	340.5	397.1	397.1	242.6	3.0
1989	6	0.0	242.3	309.1	375.6	358.7	68.6	4.2
1990	4	17.7	172.5	270.2	341.4	20.0	3.2	4.0
1991	5	0.0	234.0	313.3	411.0	0.0	0.0	4.2
1992	(b)(1)	0.0	237.6	325.3	441.4	0.0	0.0	4.0
1993		0.0	244.7	291.1	408.3	0.0	0.0	3.7
1994		0.0	243.0	277.1	401.0	0.0	0.0	3.4
1995		0.0	242.0	321.2	478.8	0.0	0.0	3.1
1996		0.0	240.4	293.6	451.2	0.0	0.0	3.1
1997		0.0	239.8	289.2	458.3	0.0	0.0	3.1
1998		29.5	239.1	287.2	469.3	0.0	0.0	3.1
Sub-total		172.2	5181.0	7145.6	8548.7	4691.1	4125.6	
				Appropriation: MILCON				
85 & Prior				2.4	2.4	2.4	2.4	
Sub-Total				2.4	2.4	2.4	2.4	
Total	(b)(1)	172.2	5181.0	7682.7	9110.9	5203.1	4581.5	

[redacted]

17. (U) Production Rate Data:

a. Annual Production Rates -- Note: Since the E-2C has been in production for several years, the development estimate was not a factor considered for production rates in this SAR.

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1987	10	N/A	10	18
1988	6	N/A	6	18
1989	6	N/A	6	18
1990	6	N/A	4	18
1991	6	N/A	6	18
1992	6	N/A	(b)(1)	18
1993		N/A		18
1994		N/A		18
1995		N/A		18
1996		N/A		18
1997		N/A		18
1998		N/A		18

b. Cost Variance -- Dollars in Millions (Note: Subject to limitations on production rates above.)

Item		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY $)	5398.0	+2284.7	7682.7	+427.2	7255.5
	(TY $)	5921.5	+3189.4	9110.9	+860.3	8250.6
PAUC	(BY $)	(b)(1)	(b)(1)	(b)(1)	(b)(1)	(b)(1)
	(TY $)					

c. Schedule Variance -- (Note: Subject to the limitations on production rates above.)

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	7/70	N/A	7/70	N/A	7/70
Duration (in Months)	276	+98	374	+60	314
End Date (Mo/Yr)	9/92	N/A	9/00	N/A	9/95

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	2/2
Procurement	112/112

e. Approved Design to Cost Goal -- N/A

3. (U) Operating and Support Costs:

a. Assumptions and Ground Rules -- N/A

b. Costs -- (FY 1985 Constant (Base-Year) Dollars in Millions) -- N/A

C. Contractor Support Costs --

	(Then-Year Dollars in Millions)				
	FY1989 & Prior	FY1990 .Year	FY1991 Year	Balance To Complete	Total
O&M,N	63.6	4.1	4.1		71.8
Industrial Fund					
Total	63.6	4.1	4.1		71.8

NO. N-30 P-7A SAR-89-027

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: P-7A

AS OF DATE: DECEMBER 31, 1989

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1. Designation/Nomenclature (Popular Name): P-7A (Long Range Air ASW Capability Aircraft (LRAACA))

2. DoD Component: U.S. Navy

3. Responsible Office and Telephone Number:
   P-3 PROGRAM OFFICE — CAPT. D.C. BENNETT
   Naval Air Systems Command — Assigned: February 26, 1988
   Washington, D.C. 20361 — AUTOVON 222-3354

4. Program Elements/Procurement Line Items:
   RDT&E: 0604221N (W1926)
   PROCUREMENT: 0204251N, 0204262N ICN 0185,0188; appn: 1506
   MILCON: 0204613N

5. Related Programs: Harpoon, Update IV

~~CLASSIFIED BY: OPNAVINST S5513B/18~~
~~DECLASSIFIED ON: OADR~~

(b)(1) [redacted] TIED

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6. Mission and Description: P-7A mission areas and roles encompass projected sea control tasks in a contested environment in support of the maritime strategy well into the next century. In addition to its Antisubmarine Warfare (ASW) mission, P-7A's other missions include Antisurface Warfare (ASUW), mining, surveillance and reconnaissance. P-7A replaces the aging P-3 Maritime Patrol Aircraft (MPA) fleet and will incorporate Update IV Avionics Suites and associated sensor systems. In the conduct of its ASW mission, P-7A will be capable of a high speed transit to distant submarine datum areas with long on-station endurance. It will have long range, large load carrying capacity, carriage of weapons including the AGM-84 Harpoon and MK-50 Torpedo, and improved self protection systems. P-7A with UIV Avionics will be required to operate with the Antisubmarine Warfare Operations Control Center (ASWOC)

7. Program Highlights:

a. Significant Historical Developments -- The P-7A program was approved as a FY88 major system new start via Deputy Secretary of Defense Memorandum dated 22 August 1986 (JMSNS). Upon receipt of SECNAV guidance on 7 January 1987, the Navy released a draft Request for Proposal of a competitive procurement of a P-3 derivative aircraft. Lacking sufficient industry interest, the scope of competition was expanded in March 1987 to include commercial aircraft derivatives. OSD directed the Navy to conduct a P-7A mission requirements determination study in May 1987 and a draft Reques for Proposal was released to industry soliciting comments on operational potential of commercial derivative aircraft to perform the P-7A mission. A P-7A Request for Proposal incorporating the findings of the OSD directed study and the responses from industry was issued on 23 September 1987. Proposal evaluations commenced on 17 February 1988 and a source selection wa announced on 18 October, 1988. The P-7A Navy Program Decision Meeting (NPDM was held on 17 November 1988 and was approved and forwarded for OSD Conventional Systems Committee review on December 14, 1988. The Defense Acquisition Board convened on 4 January 1989 resulting in the award of an FSED contract to Lockheed Aeronautical System Company on 5 January 1989.

The P-7A Program is expected to meet its assigned missions.

b. Significant Developments Since Last Report -- On November 1989, Lockheed Aeronautical Systems Company (LASC), the prime aircraft developer, notified the Navy of design, schedule and cost problems in the P-7A development program. The Navy and Lockheed have not had sufficient time to review these problems in detail. A DAB review is anticipated in the Spring of 1990 to assess these problems and to determine an appropriate course of action.

c. Changes Since "As of" Date: -- None.

8. Threshold Breaches: -- There are currently no DAE baseline, dated 1 March 1989, breaches.

9. Schedule

a. Milestones

	Development Estimate	Approved Program	Current Estimate
Program Initiated	Sep 87	Sep 87	Sep 87
Navy Prelim. Eval	Mar 88	Mar 88	Mar 88
Milestones I/II	Dec 88	Dec 88	Dec 88
FSED Award	Jan 89	Jan 89	Jan 89
Milestone IIIA (ALP)	Sep 92	Sep 92	TBD
OPEVAL Complete	Aug 94	Aug 94	TBD
Milestone IIIB (AFP)	Sep 94	Sep 94	TBD
IOC-LRAACA	[redacted] (b)(1)		

b. Previous Change Explanations: N/A

c. Current Change Explanations: N/A

d. References --

Development Estimate: Decision Coordinating Paper (DCP) dated November 23, 1988; FY90 Congressional Budget Submit - Jan 1989 DAB dated 4 January 1989
Approved Program: DAE Baseline Approved 1 MAR 1989.

10. Technical/Operational Characteristics:

a. Technical	Dev. Est.	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
Speed	0.55Mach	0.55Mach/0.55Mach	N/A	0.55Mach
Max Range(4hrs)	1600nmi	1600nmi/1600nmi	N/A	1600nmi
Turn Rate	2.52dps	2.52dps/2.52dps	N/A	2.52dps
Critical Field Length	8000ft	8000ft/8000ft	N/A	8000ft
Crosswind Component	30kts	30kts/30kts	N/A	30kts

10. Technical/Operational Characteristics (con't)

b. Operational	Dev. Est.	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
ASW Acoustic Perfromance				
Probability of Detection given: SPA size 5625 sqnm;operating against 1995 threat.				
Probability of Detection given: SPA size 2916 sqnm;operating against 1995 threat.				
Probability of correct auto classification(sub or non sub)given detection				
Probability of loclizing target given classification				
Probability of proper weapon placement,given target				
ASUW Targeting Perform				
Targeting of a single medium surface combatant at 84 nmi				
Targeting of a specific unit in a multiple unit formation, at 84 nmi				

(b)(1)

10. Technical/Operational Characteristics (con't)

	Dev. Est.	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
b. Operational (con't)				
Reliability & Maintainability				
MTBF (hours)				
Airframe-per WRA	1.67	1.67/1.67	N/A	1.67
ASW Avionics	46.0	46.0/46.0	N/A	46.0
Maintainability				
MTTR (hours)				
Airframe	1.5	1.5/1.5	N/A	1.5
Avionics	.50	.50/.50	N/A	.50
MMMFH (O-lvl)				
Airframe	10.0	10.0/10.0	N/A	10.0
Availability (full mission capable)				
ASW Mission	(b)(1)			
ASUW Mission				
Mining Mission				
Manning				
Air Crew	equal P3C	15% less P3C/equal P3C	N/A	15% less P3C
Squadron Level	equal P3C	15% less P3C/equal P3C	N/A	17% less P3C
Survivability				
Probability of successful missile detection/countermeasure employment (360 degrees)	(b)(1)			
Probability of explosion suppression from single 23mm HEI impact				
Weapons/Stores				
4 MK50 torpedoes, 150 "A size" sonobuoys, 2 extended range Harpoons	4 hrs at 1600 nmi	4 hrs at/4 hrs at 1600 nmi/1600 nmi	N/A N/A	4 hrs at 1600 nmi

c. Previous Change Explanations: N/A

d. Current Change Explanations: N/A

e. References --

Development Estimate: Decision Coordinating Paper dated Nov 23, 1988; FY 1990 Congressional Budget Submission Jan 1989

Approved Program: DAE Baseline Approved 1 MAR 1989.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost	(1) Development Estimate	(2) Approved Program	(3) Current Estimate
Development	848.9	848.9	826.7
Procurement	5,709.0	5,709.0	5,564.6
Flyaway:			
Airframe & Changes	(2,774.2)	(2,774.2)	(2,737.5)
Engine & Accessories	(555.4)	(555.4)	(548.7)
Electronics & Comm	(1,220.6)	(1,220.6)	(1,120.1)
Armament & Other GFE	(10.8)	(10.8)	(10.6)
TOTAL FLYAWAY	(4,561.0)	(4,561.0)	(4,416.9)
Ground Support Equip.	(160.4)	(160.4)	(164.0)
Training Equip. & Other	(418.7)	(418.7)	(419.1)
TOTAL SUPPORT	(579.1)	(579.1)	(583.1)
Initial Spares	(568.9)	(568.9)	(564.6)
MILCON	4.8	4.8	4.4
TOTAL FY89 Base-Year $	6,562.7	6,562.7	6,395.7
Escalation	1,327.1	1,327.1	2,077.2
Development	(65.6)	(65.6)	(101.2)
Procurement	(1,260.9)	(1,260.9)	(1,975.0)
MILCON	(.6)	(.6)	(1.0)
TOTAL THEN-YEAR $	7,889.8	7,889.8	8,472.9
b. Quantities --			
Development	2	2	2
Production	123	123	123
TOTAL	125	125	125

c. Foreign Military Sales: None

d. Nuclear Costs: None

e. References --

Development Estimate: Decision Coordinating Paper dated Nov 23, 1988 FY 1990/91 President's Budget

Approved Program: DAE Baseline approved 1 Mar 89.

2. Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then Year) Dollars in Millions)

		Current Estimate DEC 89 SAR	Current Year UCR Baseline DEC 88 SAR	Budget Year UCR Baseline DEC 89 SAR
a.	Program Acquisition			
(1)	Cost	8,472.9	7,889.8	8,472.9
(2)	Quantity	(b)(1) [redacted]	125	(b)(1) [redacted]
(3)	Unit Cost		63.118	
b.	Current Procurement--	(FY 1990)	(FY 1990)	(FY 1991)
(1)	Cost	N/A	N/A	N/A
	Less CY Adv Proc	N/A	N/A	N/A
	Plus PY Adv Proc	N/A	N/A	20.5
	Net Total	N/A	N/A	20.5
(2)	Quantity	N/A	N/A	N/A
(3)	Unit Cost	N/A	N/A	N/A

3. Cost Variance Analysis:

A. Summary -- (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	914.5	6,969.9	5.4	7,889.8
Previous Changes Economic Quantity Schedule Engineering Estimating Support	-0-	-0-	-0-	-0-
Subtotal	-0-	-0-	-0-	-0-
Current Changes: Economic Quantity Schedule Engineering Estimating Support	+ 37.5 - 24.1	+ 733.1 - 178.1 + 14.7	+ .6 - .6	+ 771.2 - 202.8 + 14.7
Subtotal	+ 13.4	+ 569.7	-0-	+ 583.1
TOTAL CHANGES	+ 13.4	+ 569.7	-0-	+ 583.1
Current Estimate	927.9	7,539.6	5.4	8,472.9

3. Cost Variance Analysis (Cont'd):
(FY 1989 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	848.9	5,709.0	4.8	6,562.7
Previous Changes Quantity Schedule Engineering Estimating Support	-0-	-0-	-0-	-0-
Subtotal	-0-	-0-	-0-	-0-
Current Changes: Quantity Schedule Engineering Estimating Support	- 22.2	- 144.1 - .3	- .4	- 166.7 - .3
Subtotal	- 22.2	- 144.4	- .4	- 167.0
TOTAL CHANGES	- 22.2	- 144.4	- .4	- 167.0
Current Estimate	826.7	5,564.6	4.4	6,395.7

b. Previous Change Explanation - None.

21. Cost Variance Analysis (Cont'd):

c. Current Change Explanations -

		(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E			
Revised economic esc. rates	(ECON)	N/A	+ 37.5
Reduced estimate to absorb increases resulting from revised economic escalation.	(EST)	- 22.2	- 24.1
(2) PROCUREMENT			
Revised economic esc. rates	(ECON)	N/A	+ 733.1
Refinement of estimates.	(EST)	- 144.1	- 178.1
Realignment of support requirements.	(SUP)	- .3	+ 14.7
(3) MILCON			
Revised economic esc. rates	(ECON)	N/A	+ .6
Reduced estimate to absorb increases resulting from revised economic escalation.	(EST)	- .4	- .6

4. Program Acquisition Unit Cost (PAUC) History:

A. Initial SAR Estimate

PAUC (Dev Est)			Changes (Then Year Dollars in Millions)						PAUC Current Estimate
	ECON	QTY	SCH	ENG	EST	SPT	Other	Total	
(b)(1)									

15. Contract Information: (Then Year Dollars in Millions)

a. RDT&E -
Lockheed Aero. Sys. Co., Burbank, Ca.
N00019-89-C-0097, FPI
Award: Jan 1989
Definitized: Jan 5, 1989

Initial Contract Price		
Target	Ceiling	Qty
662.4	750.3	2

Target	Ceiling	Qty
662.4	750.3	2

Estimated Price At Completion	
Contractor	Program Manager
645.7	TBD

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (10/89)	$-25.0	$-11.5
Net Change	N/A	N/A
Cumulative Variance Change Percent	N/A	N/A

b. PROCUREMENT - None.

c. MILCON - None.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 25.0% (3/12 yrs)

(2) Percent Program Cost Appropriated: 3.12% (264.7M/8472.9M)

b. Appropriation Summary --

Appropriation	Prior Years (FY88-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-99)	Total
RDT&E	65.7	199.0	234.9	428.3	927.9
PROCUREMENT	0.0	0.0	20.5	7,519.1	7,539.6
MILCON	0.0	0.0	0.0	5.4	5.4
Total	65.7	199.0	255.4	7,952.8	8,472.9

[redacted]

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

Fiscal Year	Qty	Flyaway FY89 Dollars		Total Base Year $	Total Then-Year $			Escl Rate %
		Non-Rec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E,N								
1988				1.3	1.3	1.3	1.0	3.0
1989	2			63.0	64.4	63.7	57.4	4.2
1990				187.1	199.0	160.2	19.1	4.0
1991				212.2	234.9			4.2
1992				166.2	191.1			4.0
1993				123.2	146.6			3.7
1994				73.7	90.6			3.4
Sub-total	2			826.7	927.9	225.2	77.5	

[redacted]

[redacted] P-7A DECEMBER 31, 1989

16. Program Funding Summary (Cont'd): (Current Estimate in Millions)

Fiscal Year	Qty	Flyaway FY89 Dollars		Total Base Year $	Total Then-Year $			Escl Rate %
		Non-Rec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: Procurement								
1991				18.1	20.5			4.2
1992	(b)(1)	6.2	175.9	319.7	381.9			4.0
1993		5.7	376.7	559.3	690.5			3.7
1994		1.4	585.2	687.9	878.7			3.4
1995		1.1	678.2	900.5	1,194.4			3.1
1996		1.0	646.7	804.4	1,093.2			3.1
1997		1.1	630.1	791.7	1,109.4			3.1
1998		.9	654.2	779.9	1,125.0			3.1
1999		.8	651.6	703.1	1,046.0			3.1
Sub-total		18.2	4,398.6	5,564.6	7,539.6			

[redacted]

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16. Program Funding Summary (Cont'd): (Current Estimate in Millions)

Fiscal Year	Qty	Flyaway FY89 Dollars		Total Base Year $	Total Then-Year $			Escl Rate %
		Non-Rec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: MILCON								
1993				2.0	2.4			3.7
1994				2.4	3.0			3.4
Sub-total				4.4	5.4			
Total	(b)(1)	18.2	4,398.6	6,395.7	8,472.8	225.2	77.5	

7. Production Rate Data:

a. Annualized Production Rates

FISCAL YEAR	DEVELOPMENT ESTIMATE	PRODUCTION ESTIMATE	CURRENT ESTIMATE	MAXIMUM ECONOMIC
1989		N/A		N/A
1990		N/A		N/A
1991		N/A		N/A
1992		N/A		N/A
1993		N/A		N/A
1994		N/A		N/A
1995		N/A		N/A
1996		N/A		N/A
1997		N/A		N/A

B. Cost Variance -- Dollars in Millions

ITEM	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max.)	Maximum
Prog. Acq. Cost (BY) (TY)	Not applicable since P-7A is currently a development program only.				
PAUC (BY) (TY)					

c. Schedule Variance --

Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max.)	Maximum
Start Date (Mo/Yr) Duration (in Months) End Date (Mo/Yr)	Not applicable since P-7A is currently a development program only.			

[redacted]

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
PROCUREMENT	0/0

e. Approved Design to Cost Goal--

	(Average Unit Flyaway Cost)		
	Development Estimate	Current Estimate	Latest Approved Threshold

18. Operating and Support Costs: N/A

a. Assumptions and Support Costs -- N/A

b. Costs -- (FY 1989 Constant (Base-Year) Dollars in Millions)

Cost Elements	Avg Annual Cost Per LRAACA Squadron	Avg Annual Cost Per P-3C Squadron
Personnel	10.35	13.96
O&S Consumables	6.32	6.88
Direct Depot Maintenance	3.58	4.00
Sustaining Investment	1.78	1.04
Other Direct Costs		
Indirect Costs		
Total	22.03	25.88

c. Contractor Support Costs -- None.

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N-44 UHF FOLLOW-ON

SAR-89-062

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)

Program: UHF FOLLOW-ON

AS OF DATE: December 31, 1989

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1. **Designation and Nomenclature (Popular Name):** UHF Follow-on Communications Satellite System

2. **DoD Component:** U.S. Navy

3. **Responsible Office and Telephone Number:**
   Space and Naval Warfare Systems Command
   Communication and Satellite Systems Office
   (PMW-146)
   Washington, DC 20363
   Mr. W.R. Coffman
   Assigned:
   February 1, 1988
   AV 332-4781;
   COMM (703) 602-4781

4. **Program Elements/Procurement Line Items:**
   Procurement: APPN 1507N ICN 30243000 (Shared Funding)

5. **Related Programs:** None.

(b)(1)

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MAR 21 1990

UNCLASSIFIED

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N-44 UHF FOLLOW-ON

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)

Program: UHF FOLLOW-ON

AS OF DATE: December 31, 1989

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1. Designation and Nomenclature (Popular Name): UHF Follow-on Communications Satellite System

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Mr. W.R. Coffman
Assigned:
February 1, 1988
AV 332-4781;
COMM (703) 602-4781

4. Program Elements/Procurement Line Items:
Procurement: APPN 1507N ICN 30243000 (Shared Funding)

5. Related Programs: None.

(b)(1)

MAR 21 1990

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6. **Mission and Description:** The existing constellation of Ultra High Frequency (UHF) communication satellites provides key command and control links for mobile forces of the DoD and other Government Agencies. As Executive Agent, the Navy is charged with maintaining the continuity of the space segment. The UHF Follow-On program will provide for a new generation of communication satellites to replenish the existing constellation commencing in the early 1990's.

7. **Program Highlights:**

(a). Significant Historical Developments --

Due to the urgent need to satisfy DoD communication requirements, the Secretary of Defense designated the UHF Follow-on program a major acquisition program.

A DAB Milestone IIIA decision was made on 22 July 1988 authorizing the program to enter production. After a full and open competition, a Firm Fixed Priced contract was awarded to Hughes Aircraft Company on 29 July 1988. The Congress approved a multiyear procurement of this system in the FY89 Defense Authorization Act.

(b) Significant Developments Since Last Report --

The Defense Acquisition Executive (DAE) approved the acquisition baseline March 24, 1989. The DAB IIIB milestone was delayed due to administrative delays in scheduling various reviews associated with the DAB IIIB review process.

The Navy's Operational Testing and Evaluation Force conducted an early operational assessment concluding that the UHF Follow-On satellite system is potentially operationally effective and suitable.

The UHF Follow-On satellite system is expected to satisfy the mission requirement.

(c) Changes since "As of " Date -- None.

8. **Threshold Breaches:** The DAB IIIB milestone slipped in excess of 6 months on 1 March 1990 due to administative delays.

9. **Schedule:**

a. Milestones --

	Production Estimate	Approved Program	Current Estimate
Designation as Major Defense Acquisition Program	MAY 88	N/A	MAY 88
DAB - Milestone IIIA Decision	JUL 88	JUL 88	JUL 88
Contract Award	JUL 88	JUL 88	JUL 88
Systems Requirements Review	OCT 88	OCT 88	OCT 88
Start Production, Acceptance, Test & Evaluation (Ground Testing)	NOV 88	NOV 88	NOV 88
Preliminary Design Review	MAR 89	MAR 89	MAR 89
DAB - Milestone IIIB Decision	AUG 89	AUG 89	APR 90 (CH-1)
Critical Design Review	JAN 90	JAN 90	MAR 90 (CH-2)
Start Production, Acceptance, Test & Evaluation (In-orbit Testing)	SEP 92	SEP 92	SEP 92
IOC (First spacecraft fully operational)	NOV 92	DEC 92	NOV 92
OT-IV	N/A	SEP 92	SEP 92 (CH-3)

b. Previous Change Explanations -- None.

c. Current Change Explanations --

(CH-1) DAB IIIB milestone delayed from August 1989 to April 1990 due to administative delays.

(CH-2) The start of CDR delayed two months to avoid conflicts with the aquisition review process leading to Milestone IIIB.

(CH-3) OT-IV is contained in DAE baseline but not in the SAR baseline.

d. References --

Production Estimate: ADM dated 29 July 1988, subject "UHF Follow-on Milestone IIIA Decision Memorandum."

Approved Program: DAE Baseline approved March 24, 1989.

10. Technical/Operational Characteristics:

a. Technical --	Prod. Est.	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
Dual Launch Compatible Spacecraft Design: (STS & ELV)	YES	N/A	N/A	YES
Dual Launch Capability:	N/A	dual launch/ELV only	N/A	dual launch (CH-1)
Mean mission duration: (years) (Based on 14 yr design life)	10	10/10	N/A	10
Hardening: (Comply with SM-416-84)	YES	YES/YES	N/A	YES
Anti-jam broadcast capacity (# channels per satellite):	3	3/1	N/A	3
Effective Isotropic Radiated Power (EIRP) and capacity: - (number of 25 KHz channels with 28 dBW (decibels relative to one watt)):	3	3/2	N/A	3
- (number of 25 KHz channels with 26 dBW):	15	15/14	N/A	15
- (number of 5 KHz channels with 20 dBW):	21	21/20	N/A	21
Interoperability (Compatible with all existing UHF terminals except frequency hoppers):	YES	YES/YES	N/A	YES

10. Technical/Operational Characteristics (Cont'd):

b. Operational --	Prod. Est.	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
System Availability (Percent):	95	95/90	N/A	95
Fuel Quantity (yrs of station keeping and one 15 degree/day move):	14	14/14	N/A	14
Successful Cryptographically secure command execution and telemetry reception using NSA approved devices:	YES	YES/YES	N/A	YES
DIA validated anti-jam broadcast and command (NISC threat level, which is classified):	YES	YES/YES	N/A	YES
Autonomy (probability of reacquisition up to one month):	95%	95%/90%	N/A	95%
Frequency plans required by MJCS 48-87:	YES	YES/YES	N/A	YES
Constellation size * (# of satellites including 1 in-orbit spare):	9	9/9	N/A	9

c. Previous Change Explanations -- None

d. Current Change Explanations --

(CH-1) DAE baseline approved March 24, 1989 included the characteristic "Dual launch capability" vice "Dual Launch Compatible Spacecraft Design" as stated in previous SAR.

* Contract and budget provides for an optional tenth spacecraft to be procured as a contingency in the event of a launch failure.

10. Technical/Operational Characteristics (Cont'd):

e. References --

Production Estimate: ADM dated 29 July 1988, subject "UHF Follow-on Milestone IIIA Decision Memorandum."

Approved Program: DAE baseline approved March 24, 1989.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost --	Production Estimate	Approved Program	Current Estimate
Procurement			
Total Flyaway	$1,322.0	$1,404.5	$1,276.7
Other Weapon Cost	0.0	0.0	0.0
Initial Spares	0.0	0.0	0.0
Total FY88 Base-Year $	1,322.0	1,404.5	1,276.7
Escalation Procurement	209.1	222.7	258.6
Total Then-year $	$1,531.1	$1,627.2	$1,535.3
b. Quantities --			
Procurement	10	10	10
Total	10	10	10

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Production Estimate: ADM dated 29 July 1988, subject "UHF Follow-on Milestone IIIA Decision Memorandum."

Approved Program: DAE baseline approved March 24, 1989.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	$1,535.3	$1,531.1	$1,535.3
(2) Quantity	10	10	10
(3) Unit Cost	153.5	153.1	153.5

b. Current Procurement --	(FY90)	(FY90 APPN)	(FY91)
(1) Cost	287.7	287.8	152.6
Less CY Adv Proc	141.0	141.0	0.0
Plus PY Adv Proc	54.0	54.0	81.0
Net Total	200.7	200.8	233.6
(2) Quantity	2	2	3
(3) Unit Cost	100.35	100.40	77.87

Note: The Unit Cost Summary does not include funding for an Extremely High Frequency (EHF) capability that has been appropriated in FY90 and programmed through FY93. The additional total program funding of $310 million is not shown here as the funds are not currently contained in either the SAR nor DAE baseline. Both the SAR and the DAE baseline will be updated to reflect EHF funding following the DAB Milestone IIIB review.

13. Cost Variance Analysis:

(a) Summary -- (Current (Then-Year) Dollars in Millions)

	Procurement	Total
Production Estimate	$ 1,531.1	$ 1,531.1
Previous Changes:		
Economic		
Quantity		
Schedule		
Engineering		
Estimating		
Other		
Support		
Subtotal	0	0
Current Changes:		
Economic	64.1	64.1
Quantity	0.0	0.0
Schedule	0.0	0.0
Engineering	0.0	0.0
Estimating	(59.9)	(59.9)
Other	0.0	0.0
Support	0.0	0.0
Subtotal	4.2	4.2
Total Changes	4.2	4.2
Current Estimate	$ 1,535.3	$ 1,535.3

13. Cost Variance Analysis (Cont'd):

(FY88 Constant (Base-Year Dollars in Millions)

	Procurement	Total
Production Estimate	$ 1,322.0	$ 1,322.0
Previous Changes:		
Quantity		
Schedule		
Engineering		
Estimating		
Other		
Support		
Subtotal	0	0
Current Changes:		
Quantity	0.0	0.0
Schedule	2.9	2.9
Engineering	0.0	0.0
Estimating	(48.2)	(48.2)
Other	0.0	0.0
Support	0.0	0.0
Subtotal	(45.3)	(45.3)
Total Changes	(45.3)	(45.3)
Current Estimate	$ 1,276.7	$ 1,276.7

b. Previous Change Explanations -- None.

c. Current Change Explanations --

(1) Procurement	(Dollars in Millions) Base-Year	Then-Year
Revised Jan 90 economic escalation rates (Economic)	N/A	64.1
Procure spacecraft #10 one year earlier than planned (Schedule)	+ 2.9	0.0
Recategorization of current and prior year as inflation (Estimating)	- 48.2	- 59.9

14. **Program Acquisition Unit Cost (PAUC) History:**
(Millions of Then-Year Dollars)

a. Initial SAR Estimate to Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Curr Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
153.1	+ 6.4	-	-	-	- 6.0	-	-	-	153.5

15. **Contract Information:** (Then-Year Dollars in Millions)

a. RDT&E -- None

b. Procurement --

Satellites:	Initial Contract Price* Target	Ceiling	Qty
Hughes Aircraft Company Los Angeles, CA N00039-88-C-0300, FFP Award: July 29, 1988 Definitized: July 29, 1988	$1,374.7	N/A	10

Current Contract Price: Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$1,373.1	N/A	10	$1,373.1	$1,373.1

*Represents a Firm Fixed Priced contract including options.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 40.0% (4 yrs/10 yrs)

(2) Percent Program Cost Appropriated: 39.5% ($607.0/$1,535.3)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY87-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-96)	Total
Procurement	319.3	287.7	152.6	775.7	1,535.3

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY88 $		Total Base Year $	Total Then-Year $			Escal Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: Weapons Procurement, Navy								
1987				21.1	21.8	21.8	11.4	2.7
1988	1	88.3	177.7	115.5	123.9	123.9	40.4	3.0
1989				155.6	173.6	150.0	25.0	4.2
1990	2	0.0	263.7	247.9	287.7	21.0		4.0
1991	3	0.0	337.6	126.7	152.6			4.2
1992	4	0.0	409.4	254.1	316.9			4.0
1993				344.7	443.7			3.7
1994				5.4	7.1			3.4
1995				3.6	5.0			3.1
1996				2.1	3.0			3.1
Sub-Total								
Total	10	88.3	1188.4	1276.7	1535.3	316.7	76.8	-

Note: The Navy plans to incorporate an EHF capability on spacecraft number four and subsequent spacecraft. Additional funds are budgeted in the following years in the following amounts:

(in millions of then-year $)

FY90	FY91	FY92	FY93	Total
25.0	97.0	63.0	125.0	310.0

While this report does not include these budgeted amounts for EHF, the SAR baseline will be revised upon approval of Milestone IIIB and a baseline change by the Defense Acquisition Executive.

17. **Production Rate Data:** -- This section is not applicable as satellite production is funded at a rate less than six units per fiscal year.

18. **Operating and Support Costs:**

a. Assumptions and Ground Rules --
The support costs for FLTSAT consist of orbital support and anomaly analysis of the spacecraft. Costs are borne by Space and Naval Warfare Systems Command and the Naval Space Command. The annualized Operation & Support costs listed represent the average costs for eight FLTSAT satellites for FY 1986 to FY 1988.

b. Costs -- (FY 1988 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual cost for FLTSAT Support (Antecedent)
Orbital Support	$ 2.0
Anomaly Analysis	.6
GSE&I	.5
Total	$ 3.1

c. Contract Support Costs: Not applicable -- No Operation and Maintenance nor Industrial Fund appropriations are used for Contract Support Costs within the UHF Follow-on program.

N-34 SLAT

SAR-89-040

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MAR 21 1990

SELECTED ACQUISITION REPORT

PROGRAM: SUPERSONIC LOW ALTITUDE TARGET (AQM-127A)

AS OF DATE: December 31, 1989

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1. Designation and Nomenclature : AQM-127A Supersonic Low Altitude Target (SLAT).

2. DoD Component: U. S. Navy

3. Responsible Office and Telephone Number:

Naval Air Systems Command
Target Systems Program Office
Washington, D.C. 20361

CAPT J. C. Lewis
Assigned: 1 July 1988
A/V 222-4645; COMM (202) 692-4645.

4. Program Elements/Procurement Line Items:

RDT&E: PE 0604258N

PROCUREMENT: None

MILCON: None

5. Related Programs: None

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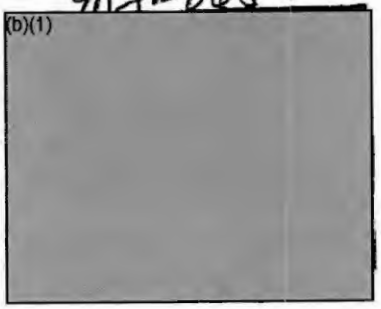

6. Mission Description: The AQM-127A supersonic low altitude target is a supersonic, remotely controlled, recoverable vehicle, which is air launchable from Navy aircraft, thus capable of performing representative threat flight profiles, and incorpora-ting target unique payload to satisfy projected antiship missile defense.

7. Program Highlights:

a. Significant Historical Developments -- On 7 April 1982, a NADEC briefing on aerial targets was held to address target deficiencies and concluded that current target vehicles could not stress the Aegis combat system to its performance boundaries. NAVMAT took the lead in developing a Navy Decision Coordinating Paper for a sea skimmer program. On 10 September 1984 a fixed-price incentive contract was awarded for the full scale engineer-ing development phase for 15 supersonic low altitude targets. The first flight was conducted at Pacific Missile Test Center in July 1988 with OPEVAL scheduled to conclude in June 1990.

b. Significant Developments Since Last Report -- In March 1989 flight tests were suspended as a result of technical Guidance and Control (G&C) interface deficiencies. On 13 September 1989 the Assistant Secretary of the Navy, Research, Engineering and Systems (ASN (RE&S)) approved a restructured program consisting of a guidance and control (G&C) system modification, procurement of 30 Test and Evaluation targets in FY1991 and the first production targets in FY1993. Flight testing was scheduled to resume in July 1990 with an eight flight Navy/contractor test program, an eight flight TECHEVAL program, a ten flight OPEVAL test program and the acceleration of the Atlantic Fleet Weapons Training Facility (AFTWF) site activation to support critical DDG-51 development and operational testing in FY1991. Subsequent Congressional reduction to the FY1990 SLAT RDT&E budget (from the $44.3M to $27.3M) and additional technical test requirements prior to resumption of flight testing resulted in revision of the restructure plan. The revisions are: delay new start operational improvement efforts from FY1990 to FY1991, reduced Navy field activity engineering and logistics support in FY1990, resumption of flight test in November vice July 1990, and deferring the procurement of the 30 SLAT T&E vehicles and technical data package from FY1991 to FY1992.

c. Changes Since As of Date -- None

8. Threshold Breaches: NONE

9. Schedule:

a. Milestones	Development Estimate	Approved Program	Current Estimate	
Milestone 0 (Program Init)	NADEC Apr 82	N/A	Apr 82	
Milestone I	N/A	N/A	N/A	
Milestone II (NDPM)	Jul 84	N/A	Jul 84	
FSD Contract Award	Sep 84	N/A	Sep 84	
Preliminary Design Review	Nov 85	N/A	Nov 85	
Critical Design Review	Mar 86	N/A	Mar 86	
First Flight (FSD Hardware)	Jul 88	N/A	Jul 88	
Milestone IIC	N/A	N/A	Oct 91	CH1
Milestone IIIA Low Rate Production	Nov 89	N/A	N/A	CH2
Milestone IIIB Full Production	Jan 90	N/A	N/A	CH3
Milestone III	N/A	N/A	Jan 93	CH4
IOC T&E	Jul 90	N/A	Jan 94	CH5
IOC Fleet Training	Feb 93	N/A	Nov 94	CH6

b. Previous Change Explanation - N/A

c. Current Change Explanations -

(CH-1) From N/A to Oct 91. Milestone IIC decision point added to the program. This new decision milestone was added, and approved, as part of the restructured program. This Milestone was added to more appropriately access the technical and programmatic risks as a result of FSD flight test experience prior to the procurement of the 30 Test and Evaluation targets.

(CH-2) From Nov 89 to N/A. Milestone IIIA was previously scheduled for November 1989. Also as part of the restructured program, low rate initial production and the associated Milestone IIIA decision point was eliminated. Initial production is not of a large enough quantity to require a low rate production lead-in procurements.

(CH-3) From Jan 91 to N/A. Milestone IIIB decision point was previously scheduled for January 1991. Milestone IIIB was appropriately renamed Milestone III concurrent with the elimination of Milestone IIIA. This program now has only one production Milestone III decision point. (see Change 4)

(CH-4) From N/A to Jan 93. Milestone III was previously identified as Milestone IIIB, scheduled for January 1991. This decision milestone was renamed as indicated in Change 3 and has been rescheduled to coincide with the restructured program plan as approved December 28, 1989. The production decision (Milestone III) is scheduled for January 1993 after TECHEVAL (DT-IID) and OPEVAL (OT-II).

(CH-5) From Jul 90 to Jan 94. IOC T&E was previously scheduled for July 1990. Initial Operating Capability for Test and Evaluation has been moved to January 1994 to coincide with delivery of the T&E assets to be procured upon approval at Milestone IIC.

(CH-6) From Feb 93 to Nov 94. IOC Fleet Training was previously scheduled for February 1993. Initial Operating Capability for Fleet Training has been moved to November 1994 to coincide with establishment of Fleet support and delivery of the first production lot to be procured upon approval at Milestone III.

d. References - - ASN (RE&S) Program Restructure Approval letter of 28 December 1989.

Development Estimate: 1990-91 President's budget.

Approved Program: No approved DAE Baseline.

10. Technical/Operation Characteristics:

a. Technical/Operational	Development Estimate	Approved Program Goal/Threshold	Current Estimate
Speed	Mach 2.5	N/A	Mach 2.5
Altitude/Minimum	30 Ft.	N/A	30 Ft.
Range/Minimum	55 nm	N/A	55 nm
Mission Reliability	.85	N/A	.85
Launch and Flight Rel	.90	N/A	.90
Flt Recovery Reliability	.95	N/A	.95
Flt Termination Reliability	.97	N/A	.97

b. Operational -- N/A

c. Previous Change Explanations -- NONE

d. Current Change Explanations -- NONE

e. References: Dev Est: FY90-91 President Budget
Approved Program: No approved baseline.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (See Note)	$372.4	N/A	$319.1
Procurement	0	N/A	0
Construction (MILCON)	0	N/A	0
Total FY 89 Base-Year $	0	N/A	0
	$372.4	N/A	$319.1
Escalation			
Development (RDT&E)	(4.6)	N/A	(3.9)
Procurement	0	N/A	0
Construction (MILCON)	0	N/A	0
Total Then-Year $	$367.8	N/A	$315.2

NOTE: Current Estimate Then-Year amount of $315.2M includes procurement of 15 FSED targets. Contract award for a thirty target RDT&E procurement for Weapon System T&E is planned for FY92.

b. Quantities --			
Development (RDT&E)	59	N/A	45
Procurement	0	N/A	0
Total	59	N/A	45

c. Foreign Military Sales -- N/A

d. Nuclear Costs -- N/A

e. References: Development Estimate: FY90-91 President's budget.
Approved Program: No approved DAE Baseline.

12. Program Acquisition/Current Procurement Unit Cost Summary:

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program			
Acquisition	(Dec 89 SAR)	(Dec 89 SAR)	(Dec 89 SAR)
(1) Cost	315.2	315.2	315.2
(2) Quantity	45	45	45
(3) Unit Cost	7.0	7.0	7.0
b. Current			
Procurement	(FY1990)	(FY1990)	(FY1991)
(1) Cost	N/A	N/A	N/A
Less CY Adv Proc	N/A	N/A	N/A
Plus PY Adv Proc	N/A	N/A	N/A
Net Total	N/A	N/A	N/A
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	$367.8	-	-	$367.8
Previous Changes:	-	-	-	-
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Development Estimate	$367.8	-	-	$367.8
Current Changes:				
Economic	- 1.9	-	-	-1.9
Quantity	-36.5	-	-	-36.5
Schedule	+43.8	-	-	+43.8
Engineering	+24.3	-	-	+24.3
Estimating	-82.3	-	-	-82.3
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-52.6	-	-	-$52.6
Total Changes	-52.6	-	-	-$52.6
Current Estimate	$315.2	-	-	$315.2

(FY 1989 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	$372.4	-	-	$372.4
Previous Changes:	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Development Estimate	$372.4	-	-	$372.4
Current Changes:				
Quantity	-33.2	-	-	-33.2
Schedule	+40.9	-	-	+40.9
Engineering	+23.2	-	-	+23.2
Estimating	-84.2	-	-	-84.2
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-53.3	-	-	-53.3
Total Changes	-53.3	-	-	-53.3
Current Estimate	$319.1	-	-	$319.1

b. Previous Change Explanation --

RDT&E: Initial SAR.

PROCUREMENT: R&D SAR

MILCON: R&D SAR

c. Current Change Explanations --

(1) RDT&E	Base-Year	Then Year
Revised Jan 89 economic rates. (Economic)		-1.9
Lot I 14 target buy canceled (Quantity)	-41.5	-36.5
Flight test suspended, LRIP slip as part of Program restructure (Schedule)	+40.9	+43.8
Guidance and Control design changes (Engineering)	+23.2	+24.3
Navy reprogramming and adjustments due to restructure. (Estimating)	-84.2	-82.3

PROCUREMENT: N/A

MILCON: N/A

14. Program Acquisition Unit cost (PAUC) History: (Millions of then-year dollars)

a. Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
6.2	-.04	1.16	.97	.54	-1.83	-	-	.8	7.0

b. Current Baseline Estimate to Current Estimate -- N/A

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E --

Air Vehicle	Initial Contract Price Target	Ceiling	Qty
Martin Marietta	$103.6	$120.0	15

N0001984-C-0288, FPI
Award: September 10, 1984
Definitized: N/A

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$165.7	$184.1	15	$213.9	$217.0

Variance	Cost Variance	Schedule
Previous Cumulative Variances	-56.8	-3.3
Cumulative Variances to Date	-68.2	-0.3
Net Change	-11.4	+3.0

Explanation of Change: The current variances are the result of contractor test and evaluation (CTE) flight anomalies at PMTC. The governments liability is the ceiling price which has increased due to out of scope changes.

b. Procurement -- N/A

c. MILCON -- N/A

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 80.0% (8 yrs/10 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 66.9% ($210.9/$315.2)
(Funds Appropriated To Date in Millions/Total Program Funding in Millions)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Prior Years (FY 83-89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance To Complete (FY 92-94)	Total
RDT&E	$183.9	$27.0	$40.5	$ 63.8	$315.2

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY89 Dollars		Total Base Year $	Total Then-Year $			Esc Rate (%)
		Nonrec	Rec		Progm	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1983				7.7	6.4	6.4	6.3	4.9
1984	15			5.7	4.8	4.8	4.8	3.8
1985				25.6	22.5	22.5	21.9	3.4
1986				48.1	43.4	43.4	43.2	2.8
1987				49.4	45.6	45.6	43.5	2.7
1988				40.5	38.9	38.8	38.4	3.0
1989				21.8	22.3	22.2	13.5	4.2
1990				25.9	27.0	19.6	.3	4.0
1991				37.5	40.5			4.2
1992	30			56.9	63.8			4.0
FY 93-94) Balance to complete				TBD	TBD			3.7
								3.4
Sub Total	45			$319.1	$315.2	$203.3	$171.9	

Appropriation: Procurement - N/A

Appropriation: Milcon - N/A

17. Production Rate Data:

a. Annualized Production Rates -- N/A

b. Cost Variance -- N/A

c. Schedule Variance -- N/A

d. Deliveries (Plan/Actual) -- N/A

e. Approved Design to Cost Goal -- N/A

18. Operating and Support Costs: -- N/A

a. Assumptions and Ground Rules -- N/A

b. Costs -- N/A

c. Contract Support Costs -- N/A

[redacted]

(1)

AF-7 CMU

SAR-89-066

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SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q & A) 823)
PROGRAM: CHEYENNE MOUNTAIN UPGRADE

AS OF DATE: December 31, 1989

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SAF/PAS
90-099 -T
#03

1. (U) **Description and Nomenclature:** Cheyenne Mountain Upgrade (CMU) Program

2. (U) **DoD Component:** U. S. Air Force

3. (U) **Responsible Office and Phone Number:**

Cheyenne Mountain Upgrade Program Office
Electronic Systems Division
Hanscom AFB MA 01731-5000

Col James E. Jacoby
Assigned: 1 August 1988
AV 478-5980, MITRE ext 5020, COMM
(617) 271-5020

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DEPARTMENT OF DEFENSE

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4. (U) **Program Elements/Procurement Line Items:**

RDT&E: PE 0102310F
PROCUREMENT: APPN 3080

5. (U) **Related Programs:** ITW/AA, BMEWS, PAVE PAWS, GEODSS, ASAT, SPADCCS, DSP, NWS, OTH-B, SDI, AFAMPE, ATWC, JRSC, GWEN, MILSTAR, JSS ROCC/SOCC, ASPADOC, IDHS, COBRA DANE, DSSR, NADS, SEEK IGLOO, FARR, ROTHR

6. (U) **Mission and Description:** The baseline CMU programs will develop system capabilities which must ensure fully capable, timely and reliable day-to-day processing of all tactical warning mission sensor data for atmospheric, ballistic missile and space threats. These capabilities must endure natural or man-made disturbances, jamming, sabotage and other effects to ensure the availability of Integrated Tactical Warning and Attack Assessment (ITW/AA) information in peacetime and through a conflict until physically destroyed. The capacity of the CMU systems and their interfaces must be sufficient to handle both single event, and small and large scale raids. They must also provide credible warning data to all U. S. forces and the National Command Authorities (NCA). Missile warning sensor message transmission to

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6. (U) Mission and Description (Continued):
the correlation centers, Cheyenne Mountain AFB (CMAFB) and the Offutt Processing and Correlation Center (OPCC), and forward fixed users is managed by the Survivable Communications Integration System (SCIS) equipment. Warning messages from space, air and intelligence sources are transmitted to the correlation centers directly. Messages are processed by the Communications System Segment Replacement (CSSR) and passed to the appropriate systems. The Space Defense Operation Center (SPADOC), Command Center Processing and Display System Replacement (CCPDS-R) and Granite Sentry then process the data and generate the information displays necessary for decision making. Full funding of the ITW/AA System Engineering program (formerly PE 12313F, as of FY 90 PE 12310F) is a mandatory prerequisite for the successful execution of the CMU programs.

7. (U) Program Highlights:

a. (U) Significant Historical Development - - The CMU programs consolidate six ongoing development programs in support of the Integrated ITW/AA system. They encompass communications, processing and display systems being acquired for CMAFB, CO and the OPCC which is an early/trans-attack correlation center at Offutt AFB, NE. All six programs are being acquired to correct deficiencies of the 427M system and to comply with the Commander-in-Chief North American Aerospace Defense/U. S. Commander-in-Chief Space Command (CINCNORAD /USCINCSPACE) overall Integrated ITW/AA system architecture. The consolidation of these programs under the CMU is to satisfy direction contained in the Fiscal Year 1989 Appropriations Bill, as implemented by PBD 228, to consolidate the individual programs into a single integrated program and a single line item for each affected appropriation. Granite Sentry and Spadoc 4 system elements achieved IOC in 1989. The DAB was held in Sep 89.

b. (U) Changes since "as of" date -- The Acquisition Program Baseline C^3I was signed by the Defense Acquisition Executive on February 12, 1990.

8. (U) Threshold Breaches: There are currently no Acquisition Program Baseline (APB) baseline (dated 9 November 1989) breaches, or Decision Coordination Paper (DCP) (dated 1 August 1989) breaches.

9. (U) Schedule:

a. (U) Milestone - (IOC)	Development Estimate	Approved Program	Current Estimate
Granite Sentry Ph II	Mar 1990	Mar 1990	Mar 1990
Granite Sentry Ph III	Mar 1991	Mar 1991	Mar 1991
CSSR Tech Control and Message Processing	Apr 1991	Apr 1991	Apr 1991
SPADOC 4B	Apr 1991	Apr 1991	Apr 1991
SCIS Installation Complete	Mar 1992	Mar 1992	Mar 1992
Granite Sentry Ph IV A	Mar 1992	Mar 1992	Mar 1992
CCPDS-R Msl Warning	Sep 1993	Sep 1993	Sep 1993
Granite Sentry Ph IV B	Sep 1993	Sep 1993	Sep 1993
Granite Sentry Ph V	Mar 1994	Mar 1994	Mar 1994
CSSR P^3I	Sep 1994	Sep 1994	Sep 1994
SCIS New Media	Dec 1994	Dec 1994	Dec 1994
CCPDS-R SAC Force Mgmt IOC	Dec 1994	Dec 1994	Dec 1994
OPCC Msl Warning	Dec 1994	Dec 1994	Dec 1994
Granite Sentry Ph VI	Mar 1995	Mar 1995	Mar 1995
SPADOC 4C	Sep 1995	Sep 1995	Sep 1995
OPCC Air Warning/CCP	Dec 1995	Dec 1995	Dec 1995
System of Systems IOT&E Complete FOC	Dec 1995	Dec 1995	Dec 1995
PMRT	FY96	FY96	FY96

9. (U) Schedule (Continued):

b. (U) Previous Change Explanations - - None. This is an initial report.

c. (U) Current Change Explanations - - None. This is an initial report.

d. (U) References - -

(U) Development Estimate: DAE approved APB dated 12 Nov 89, subject Acquisition Program Baseline (APB), Cheyenne Mountain Upgrade Programs.

(U) Approved Program: DAE approved APB dated 12 Nov 89, subject Acquisition Program Baseline (APB), Cheyenne Mountain Upgrade Programs.

10. (U) Technical/Operational Characteristics:

(U) This list of parameters, and associated goals indicates the characteristics of the CMU Programs within the Integrated TW/AA system. The design criteria for the CMU Programs is provided in the Acquisition Program Baseline Agreement, Dated 1 August 1989. The operational performance parameters section lists characteristics which will be evaluated during System-of-Systems testing. The goals for performance parameters are tentative and may change, they will be finalized in conjunction with the publication of the CMU SORD in NOV 1989 as directed by the CMU PMD.

a. (U) Technical - - Not Applicable as only Operational Performance Parameters have been designated at the CMU level.

b. (S) Operational - -

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
(U) Message Accountability (1 Loss in)				(b)(1)
Missile	(b)(1)		N/A	
Air			N/A	
Space			N/A	
(U) System Restoration Time (98%)				
Missile (Min)	(b)(1)		N/A	
Air (Min)			N/A	
Space (Min)			N/A	
(U) Operational Availability				
Missile	(b)(1)		N/A	
Air			N/A	
Space			N/A	
(U) Message Delivery Time (99.8%)				
Missile (Sec)	(b)(1)		N/A	
Air (Sec)			N/A	
Space (Min)			N/A	
(U) Mode Change (Exercise - Real)				
Missile (Sec)	(b)(1)		N/A	

c. (U) Previous Change Explanations - - None. This is an initial report.

10. (U) Technical/Operational Characteristics (Cont'd):

d. (U) Current Change Explanations -- None. This is an initial report.

e. (U) References --

(U) Development Estimate: DAE approved APB, 12 Nov 89.

(U) Approved Program: DAE approved APB dated 12 November 1989, subject Acquisition Program Baseline (APB), Cheyenne Mountain Upgrade programs.

11. (U) Program Acquisition Cost: (Current Estimate* in Millions of Dollars)

a. (U) Cost --

Cost --	Development Estimate	Approved Program	Current Estimate*
Development (RDT&E)	$1,188.1	$1,168.9	$1,181.5
Procurement	321.2	316.1	316.5
Total FY89 Base-Year $	$1,509.3	$1,485.0	$1,498.0
Escalation	$ 71.7	$ 96.0	$ 70.7
Development (RDT&E)	(58.4)	(77.6)	(58.0)
Procurement	(13.3)	(18.4)	(12.7)
Total Then-Year $	$1,581.0	$1,581.0	$1,568.7

* Due to the FY90 congressional mark, the FY90 appropriation does not reflect the restructured program shown in the DAE Baseline approved February 12, 1990. The DAB also determined ITW/AA needed additional funding to ensue delivery of an integrated CMU. The Air Force is committed to providing the necessary funding.

b. (U) Quantities -- N/A. See footnote page 5.

c. (U) Foreign Military Sales -- None.

d. (U) Nuclear Costs -- None.

e. (U) References --

(U) Development Estimate: DAE approved APB dated 12 November 1989, subject Acquisition Program Baseline (APB), Cheyenne Mountain Upgrade programs.

(U) Approved Program: DAE approved APB dated 12 November 1989, subject Acquisition Program Baseline (APB), Cheyenne Mountain Upgrade Programs.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: [Current (Then-Year) Dollars in Millions]

a. (U) Program Acquisition*

b. (U) Current Procurement*

* Program Acquisition Unit Cost is not applicable to this program. The Cheyenne Mountain Upgrade Program is an RDT&E intensive effort that will upgrade the existing system.

13. (U) Cost Variance Analysis:

a. (U) Summary

[Current (Then-Year) Dollars in Millions]

	RDT & E	PROC	MILCON	TOTAL
Development Estimate	$ 1,246.5	$ 334.5	--	$ 1,581.0
Previous Change:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	--	--	--	--
Current Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating	-7.0	-5.3		-12.3
Other				
Support				
Subtotal	-7.0	-5.3	--	-12.3
Total Changes	-7.0	-5.3	--	-12.3
Current Estimate	$ 1,239.5	$ 329.2	--	$ 1,568.7

13. [redacted] Cost Variance Analysis (Continued):

a. [redacted] Summary (Continued)

FY 1989 [Constant Dollars (Base-Year) in Millions]

	RDT & E	PROC	MILCON	TOTAL
Development Estimate	$ 1,188.1	$ 321.2	--	$ 1,509.3
Previous Change: Economic Quantity Schedule Engineering Estimating Other Support				
Subtotal	--	--	--	--
Current Changes: Economic Quantity Schedule Engineering Estimating Other Support	-6.6	-4.7		-11.3
[redacted]ubtotal	-6.6	-4.7	--	-11.3
Total Changes	-6.6	-4.7	--	-11.3
Current Estimate	$ 1,181.5	$ 316.5	--	$ 1,498.0

b. ([redacted]) Previous Change Explanations

None -- First SAR

c. ([redacted]) Current Change Explanations --

		(Dollars in Millions) Base-Year	Then-Year
(1)	RDT & E Congressional cut of $7.0 in FY 90 Appropriation. (Est)	-6.6	-7.0
(2)	Procurement Congressional cut of $5.0 in FY 90 Appropriation and Gramm-Rudman reduction of $0.3. (Est)	-4.7	-5.3

14. (U) **Program Acquisition Unit Cost (PAUC) History**: (Millions of Then-Year Dollars)

NOTE: Program Acquisition Unit Cost data is not applicable to this program. The Cheyenne Mountain Upgrade program is an RDT & E intensive effort that will upgrade an existing system.

15. (U) **Contract Information**: (Then-Year Dollars in Millions)

NOTE: All contracts described in this section use a combination of both RDT & E and Procurement funding. This is due to the software intensive nature of the Cheyenne Mountain Upgrade effort.

SPADOC

Ford Aerospace & Communication Corp, Colorado Springs, CO
F19628-83-C-0019, FPIF
Award: April 7, 1983
Definitized: April 7, 1983

Initial Contract Price		
Target	Ceiling	Qty
$146.8	$163.2	0

Current Contract Price		
Target	Ceiling	Qty
$219.0	$234.8	0

Estimated Price at Completion	
Contractor	Program Manager
$234.8	$234.8

NOTE: Contract price data for SPADOC includes Blocks A and B. Variance data is for Block B only.

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (11/30/89)	$-7.5	$-0.5
Net Change	0.0	0.0

Explanation of Change: No program impact. Cost variance is due to additional effort needed to complete integration of S/W Maintenance and Version 1.1. The schedule variance is due to delays in software integration.

CSSR

GTE, Needham Heights, MA
F19628-84-C-0063, FPIF
Award: June 8, 1984
Definitized: June 8, 1984

Initial Contract Price		
Target	Ceiling	Qty
$149.8	$168.2	0

Current Contract Price		
Target	Ceiling	Qty
$159.9	$179.0	0

Estimated Price at Completion	
Contractor	Program Manager
$179.3	$183.3

NOTE: Contract price data for CSSR includes Blocks 1 and 2. Variance data is for Block 2 only.

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (11/30/89)	$-2.1	$-2.1
Net Change	0.0	0.0

Explanation of Change: No program impact. Cost variance is due to additional effort needed for High Level Design. The schedule variance is due to late start of computer program development.

15. Contract Information (Continued): (Then-Year Dollars in Millions)

SCIS
E-Systems, St Petersburg, FL
F19628-86-C-0131, FPIF
Award: August 21, 1986
Definitized: August 21, 1986

Initial Contract Price		
Target	Ceiling	Qty
$26.9	$30.3	0

Current Contract Price		
Target	Ceiling	Qty
$54.2	$61.0	0

Estimated Price at Completion	
Contractor	Program Manager
$58.0	$59.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (11/30/89)	$-2.7	$-1.4
Net Change	0.0	0.0

Explanation of Change: No program impact. Cost variance is due to additional effort applied to software development. The schedule variance is due to delays in software testing.

CCPDS-R
TRW Corporation, Redondo Beach, CA
F19628-87-C-0047, FPIF
Award: June 3, 1987
Definitized: June 3, 1987

Initial Contract Price		
Target	Ceiling	Qty
$58.9	$64.3	0

Current Contract Price		
Target	Ceiling	Qty
$99.6	$108.2	0

Estimated Price at Completion	
Contractor	Program Manager
$100.2	$98.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (11/30/89)	$ 0.2	$-1.0
Net Change	0.0	0.0

Explanation of Change: No program impact. Cost variance is insignificant. The schedule variance is due to delays in the area of Prime Mission Equipment (Software) formal testing.

16. [redacted] Program Funding Summary: (Current Estimate in Millions of Dollars)

a. [redacted] Program Status --

(1) ([redacted]) Percent Program Completed: 65.0% (13 yrs/20 yrs)

(2) ([redacted]) Percent Program Appropriated: 58.0% ($910.5/$1,568.7)

b. [redacted] Appropriation Summary -- (Then-Year Dollars in Millions)

Appropiation	Prior Years (FY78-89)	Budget Year* (FY90)	Budget Year (FY91)	Balance to Complete (FY92-97)	Total
RDT & E	564.3	110.8	100.8	463.6	$1,239.5
Procurement	205.0	30.3	6.9	87.0	329.2
Total	769.4	141.1	107.7	550.6	$1,568.7

16. (U) Program Funding Summary (Continued): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary --

		Flyaway FY 89 Dollars			Total Then-Year $			
Fiscal Year	Qty	Nonrec	Rec	Total Base Year $	Program	Obligated	Expended	Esc rate (%)
Appropriation: RDT & E								
1978				4.6	2.6	2.6	2.6	6.2%
1979				3.6	2.2	2.2	2.2	8.4%
1980				3.7	2.5	2.5	2.5	9.7%
1981				3.9	2.9	2.9	2.9	11.9%
1982				11.0	8.8	8.8	8.8	9.2%
1983				26.3	22.0	22.0	22.0	4.9%
1984				63.6	55.3	55.3	55.3	3.8%
1985				61.5	55.1	55.1	55.1	3.4%
1986				100.7	92.8	92.8	92.8	2.8%
1987				96.7	91.9	91.9	70.9	2.7%
1988				112.6	110.8	110.6	96.4	3.1%
1989				114.3	117.4	107.9	46.1	4.2%
1990				103.7	110.8	53.5	3.0	4.0%
1991				90.6	100.8			4.2%
1992				105.7	122.0			4.0%
1993				136.0	162.4			3.7%
1994				86.2	106.3			3.4%
1995				40.8	51.8			3.1%
1996				14.4	18.9			3.1%
1997				1.6	2.2			3.1%
Sub-total	0			1,181.5	1,239.5	608.1	460.6	

16. [redacted] Program Funding Summary (Continued): (Current Estimate in Millions of Dollars)

c. [redacted] Annual Summary (Continued) --

		Flyaway FY 89 Dollars			Total Then-Year $			
Fiscal Year	Qty	Nonrec	Rec	Total Base Year $	Program	Obligated	Expended	Esc rate (%)
Appropriation: Procurement								
1982				0.9	0.8	0.8	0.8	9.2%
1983				23.2	20.1	20.1	20.1	4.9%
1984				27.0	24.1	24.1	24.1	3.8%
1985				42.5	39.2	39.2	39.2	3.4%
1986				51.6	49.1	49.1	45.7	2.8%
1987				17.7	17.5	17.5	10.5	2.7%
1988				13.3	13.7	11.7	6.9	3.1%
1989				37.6	40.5	27.8	3.2	4.2%
1990				27.1	30.3	16.9	0.0	4.0%
1991				5.9	6.9			4.2%
1992				21.6	26.0			4.0%
1993				14.8	18.4			3.7%
1994				30.5	38.9			3.4%
1995				2.8	3.7			3.1%
Sub-total	0			316.5	329.2	207.2	150.5	
Total	0			1,498.0	1,568.7	815.3	611.1	

NOTE: Accounting data is as of 31 Dec 89.

17. [redacted] Production Rate Data:

NOTE: Production Rate Data is not applicable to this program. The Cheyenne Mountain Upgrade program is an RDT & E intensive effort that will upgrade an existing system.

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules - -

NOTE: This information has not been developed at this point in the program.

b. (U) Costs - -

NOTE: This information has not been developed at this point in the program.

c. (U) Contractor Support Costs: N/A

AF-11 E-3A RSIP

SAR-89-07#

(1) SAF/PAS

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90-099 -T

#11

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: Radar System Improvement Program (RSIP)

AS OF DATE: 31 December 1989

INDEX

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CLEARED FOR OPEN PUBLICATION
FEB 28 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

1. **Designation and Nomenclature (Popular Name):**

Radar System Improvement Program (RSIP)

2. **DOD Component:** U.S. Air Force

3. **Responsible Office and Telephone Number:**

AWACS RSIP Program Office (AWACS SPO) — Col. Patrick Craig
Electronic Systems Division — AV 478-5829
Hanscom AFB, MA 01731-5000 — 617-377-5829
Date Assigned: May 89

4. **Program Elements/Procurement Line Items:**

RDT&E: PE0207417F, BPAC 644111 (shared funding)
Procurement: APPN 3010 (11411L)

5. **Related Programs:** E-3 Airborne Warning and Control System

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When separated from the attached this page is ~~unclassified~~

6. **Mission and Description:**

The Radar System Improvement Program (RSIP) modifications to the E-3 aircraft will provide significant improvement in radar sensitivity/ECCM performance, radar performance monitoring and control, and reliability/maintainability (R&M) by the mid 1990's to maintain system effectiveness in the projected operational environment. These improvements require the following changes to the AWACS Surveillance Radar Functional Group (SRFG):

a. The Surveillance Radar Computer (SRC) will replace the existing Radar Data Correlator (RDC) and Digital Doppler Processor (DDP).

b. The Surveillance Radar Control and Maintenance Panel (SRCMP) will replace the existing Radar Control Maintenance Panel (RCMP); the Surveillance Radar Control and Maintenance Console (SRCMC) will be modified as required to accept the SRCMP and to include provisions for spectrum analyzer and keyboard mounting.

c. Minor modifications will be made to the following:

Analog receiver
Stable Local Oscillator (Stalo)
Synchronizer
Phase shifter control unit

7. **Program Highlights:**

a. Significant Historical Developments --

1) The AFSARC review and approval to start FSD occurred in December 1988.
2) FSD contracts with Boeing and Westinghouse were awarded on September 25, 1989.
3) Boeing and Westinghouse are both prime contractors, with Boeing having total system program responsibility.

b. Significant Developments Since the Last Report -- None; This is the Initial SAR.

This system is expected to satisfy its mission requirements and comply with all performance requirements.

c. Changes Since 'As Of' Date -- None.

8. **Threshold Breaches:** None.

9. Schedule:

a. Milestones --

	Development Estimate	Approved Program	Current Estimate
FSD			
Milestone II (AFSARC)	Dec 88	N/A	Dec 88
FSD Contract Award	Sep 89	N/A	Sep 89
Brassboard Flight Tests	Apr 91	N/A	Apr 91
System Design Review	Feb 90	N/A	Feb 90
Critical Design Review	Jan 91	N/A	Jan 91
Test System 3 (TS-3) I&CO	Sep 92	N/A	Sep 92
Flight Test DT&E	Sep 93	N/A	Sep 93
IOT&E	Dec 93	N/A	Dec 93
Physical Config Audit	Dec 93	N/A	Dec 93
Production			
Advance Procurement Authorization	Jun 93	N/A	Jun 93
Production Decision	Mar 94	N/A	Mar 94
Trial Installation	Sep 95	N/A	Sep 95
IOC (4 Aircraft)	Sep 96	N/A	Sep 96

b. Previous Change Explanations -- None; Initial SAR.

d. References --
Development Est: FY91 Amended President's Budget, 29 Jan 90
Approved Program: No DAE approved program has been established to date. The AWACS APB was signed by the SAE on 8 Dec 89

10. Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
a. Technical --				
(1) Improve System Sensitivity	10.6dB	N/A / N/A	N/A	10.6dB
(2) Detection Range Towed-Sphere (.1M^2)				
-low altitude	(b)(1)	N/A / N/A	N/A	(b)(1)
-high altitude		N/A / N/A	N/A	
(3) Reliability (Radar Set) MTBCF	486hrs	N/A / N/A	N/A	486hrs
(4) System MTBCF	1400hrs	N/A / N/A	N/A	1400hrs
(5) Series MTBCMA	100hrs	N/A / N/A	N/A	100hrs
b. Operational --				
(1) Detection Range				
-Fighter-size target	(b)(1)	N/A / N/A	N/A	(b)(1)
- low altitude		N/A / N/A	N/A	
- high altitude		N/A / N/A	N/A	
(2) ECCM				
-Accurate strobe on main-beam noise jammer at 100nm	(b)(1)	N/A / N/A	N/A	(b)(1)
-Detect fighter-size target	(b)(1) (b)(1)	N/A / N/A	N/A	(b)(1)
- 16 degrees off main beam jammer	(b)(1)	N/A / N/A	N/A	
-Inband frequency change	(b)(1)	N/A / N/A	N/A	
(3) Maintainability				
-Mean Repair Time	0.26hrs	N/A / N/A	N/A	0.26hrs
-Fraction of failures detected	98%	N/A / N/A	N/A	98%

c. Previous Change Explanations -- None; Initial SAR.

d. Current Change Explanations -- None

e. References --

Development Est: FY91 Amended President's Budget, 29 Jan 90

Approved Program: No DAE approved program has been established to date. The AWACS APB was signed by the SAE on 8 Dec 89

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development	349.7	N/A	349.7
Procurement	222.1	N/A	222.1
Flyaway Cost	(175.1)	N/A	(175.1)
Other Costs	(29.4)	N/A	(29.4)
Initial Spares	(17.6)	N/A	(17.6)
Construction	(0.0)	N/A	(0.0)
Total FY89 Dollars	571.8	N/A	571.8
Escalation	118.1	N/A	118.1
Development	(47.0)	N/A	(47.0)
Procurement	(71.1)	N/A	(71.1)
Construction	(0.0)	N/A	(0.0)
Total TY Dollars	689.9	N/A	689.9
b. Quantities --			
Development	5	N/A	5
Procurement	33	N/A	33
Total	38	N/A	38

c. Foreign Military Sales -- None.
d. Nuclear Costs -- None.

e. References --
Development Est: FY91 Amended President's Budget, 29 Jan 90
Approved Program: No DAE approved program has been established to date. The AWACS APB was signed by the SAE on 8 Dec 89

12. Program Acquisition/Current Procurement Unit Cost Summary:
Current (Then-Year) Dollars in Millions

a. Program Acquisition	Current Estimate (Dec 89 SAR)	Current Year UCR Baseline (Dec 89 SAR)	Budget Year UCR Baseline (Dec 89 SAR)
(1) Cost	689.9	689.9	689.9
(2) Quantity	36*	36*	36*
(3) Unit Cost	19.164	19.164	19.164

b. Current Procurement - None

*Two of the FSD units produced will not become inventory end items.

13. **Cost Variance Analysis:**

a. Summary --

1. (Current (Then-Year) Dollars in Millions

	RDT&E	PROC	MILCON	TOTAl
Development Estimate	396.7	293.2	0	689.9
Previous Changes:				
Economic	0	0	0	0
Quantity	0	0	0	0
Schedule	0	0	0	0
Engineering	0	0	0	0
Estimating	0	0	0	0
Other	0	0	0	0
Support	0	0	0	0
Subtotal	0	0	0	0
Current Changes:				
Economic	0	0	0	0
Quantity	0	0	0	0
Schedule	0	0	0	0
Engineering	0	0	0	0
Estimating	0	0	0	0
Other	0	0	0	0
Support	0	0	0	0
Subtotal	0	0	0	0
Total Changes	0	0	0	0
Current Estimate	396.7	293.2	0	689.9

2. FY89 Constant (Base Year) Dollars in Millions

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	349.7	222.1	0	571.8
Previous Changes:				
Quantity	0	0	0	0
Schedule	0	0	0	0
Engineering	0	0	0	0
Estimating	0	0	0	0
Other	0	0	0	0
Support	0	0	0	0
Subtotal	0	0	0	0
Current Changes:				
Quantity	0	0	0	0
Schedule	0	0	0	0
Engineering	0	0	0	0
Estimating	0	0	0	0
Other	0	0	0	0
Support	0	0	0	0
Subtotal	0	0	0	0
Total Changes	0	0	0	0
Current Estimate	349.7	222.1	0	571.8

b. Previous Change Explanations -- None; Initial SAR.

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year

(1) RDT&E

None.

(2) Procurement

None.

14. **Program Acquisition Unit Cost (PAUC) History:**
(Then-Year Dollars in Millions)

a. Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Current) Est)
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Tot	
19.164*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.164*

* Two of the FSD kits produced will not become inventory end-items.

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E

System/Subsystem: RSIP (Group b kits)	Initial Contract Price Target	Ceiling	Qty
	$223.6	$251.8	5

Westinghouse Electrice Corp
Baltimore, MD 21203-1693
F19628-89-C-0138, FPIF
Award: Sept 25, 1989
Definitized: Sep 25, 1989

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$223.6	$251.8	5	$223.6	$223.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	0.0	0.0
Cumulative Variances to Date (21 Dec 89)	$-4.8	$ 0.0
Net Change	-4.8	0.0
Cumulative Variance Change Percent	N/A	N/A

Explanation of Change - The 4.8 unfavorable cost variance is due to the fact that Westinghouse has not baselined the system yet.

15. Contract Information (Cont'd): (Then-Year Dollars in Millions)

	Initial Contract Price		
	Target	Ceiling	Qty
RSIP (Group A kits)	$ 59.0	$ 65.0	3

The Boeing Company
Seattle, WA 98124-3707
F19628-89-C-0139, FPIF
Award: Sept 25, 1989
Definitized: Sep 25, 1989

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 59.0	$ 65.0	3	$ 59.0	$ 59.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	0.0	0.0
Cumulative Variances to Date (21 Dec 89)	$+0.5	$ 0.0
Net Change	+0.5	0.0
Cumulative Variance Change percent	N/A	N/A

Explanation of Change - The favorable cost variance of $0.5 million is due to the delay in contract award which caused E-3 perssonnel to be assigned to short-term non-RSIP tasks. The underrun is primarily in level-of-effort coordination tasks. In addition, the Boeing Company Machinists strike resulted in a slightly behind schedule condition and additional underrun.

b. Procurement -- None

c. MILCON -- None

16. **Program Funding Summary:** (Current Estimate in Millions)

a. Program Status --
(1) Percent Program Completed: 22.2% (2 Yr/9 Yrs)
(2) Percent Program Cost Appropriated: 14.3% (99.0/689.9)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Prior Years (FY89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-97)	Total
RDT&E	39.2	59.8	92.6	205.1	396.7
Procurement	0.0	0.0	0.0	293.2	293.2
MILCON	0.0	0.0	0.0	0.0	0.0
TOTAL	39.2	59.8	92.6	498.3	689.9

c. Annual Summary --

Fiscal Year	QTY	Flyaway FY89 Dollars Nonrec	Flyaway FY89 Dollars Rec	Total Base Year$	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: RDT&E								
1989				38.2	39.2	37.5	11.1	4.2
1990				56.0	59.8	0.0	0.0	4.0
1991				83.3	92.6	0.0	0.0	4.2
1992				77.1	89.0	0.0	0.0	4.0
1993				50.3	60.1	0.0	0.0	3.7
1994				25.1	30.9	0.0	0.0	3.4
1995				19.7	25.1	0.0	0.0	3.1
Sub-total	5			349.7	396.7	37.5	11.1	
Appropriation: Procurement								
1993	2	5.8	12.9	39.9	49.8	0.0	0.0	3.7
1994	5	0.0	29.3	55.1	70.8	0.0	0.0	3.4
1995	11	0.0	56.5	56.5	74.9	0.0	0.0	3.1
1996	10	0.0	47.1	47.1	64.5	0.0	0.0	3.1
1997	5	0.0	23.5	23.5	33.2	0.0	0.0	3.1
Sub-total	33	5.8	169.3	222.1	293.2	0.0	0.0	
Total	38	5.8	169.3	571.8	689.9	37.5	11.1	

Note: Obligation/Expenditure accounting records as of 31 Dec 89.

17. **Production Rate Data:**

a. Annualized Production Rates --

Fiscal Year Buy	Production Rates (Quantity/Year) Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1993	2	N/A	2	N/A
1994	5	N/A	5	N/A
1995	11	N/A	11	N/A
1996	10	N/A	10	N/A
1997	5	N/A	5	N/A

b. Cost Variance -- (Dollars in Millions)

Item	Prod Est	Variance (CE less PdE	Current Estimate	Variance (CE less Max	Maximum Economic
Prog Acq Cost (BY $)	N/A	N/A	571.8	N/A	N/A
Prog Acq Cost (TY $)	N/A	N/A	689.9	N/A	N/A
PAUC (BY $)	N/A	N/A	15.884	N/A	N/A
PAUC (TY $)	N/A	N/A	19.164	N/A	N/A

c. Schedule Variance --

Item	Prod Est	Variance (CE less PdE	Current Estimate	Variance (CE less Max	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A
Duration (in Months)	N/A	N/A	N/A	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
Procurement	0/0

e. Approved Design-to-Cost Goal --

(Average Unit Flyaway Cost)

Development Estimate	Current Estimate	Latest Approved Threshold
N/A	N/A	N/A

Note: Production rate data is labeled not applicable since RSIP is primarily a modification program involving the integration of off-the-shelf hardware into mod kits in the production phase.

18. Operating and Support Costs:

a. Assumptions and Groundrules: Not available

b. Costs: Not available

c. Contractor Support Costs: Not applicable

A-25 STINGER RMP ~~SECRET~~

SAR-89-125

SELECTED ACQUISITION REPORT (RCS-DD-COMP (Q&A) 823)

PROGRAM: STINGER Weapon System FIM 92C (STINGER-RMP)

As of Date: December 31, 1989

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FOR OPEN PUBLICATION
MAR 22 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

21

1. (U) **Designation and Nomenclature (popular name):** FIM 92C Man-Portable Air Defense Guided Missile System (STINGER-Reprogrammable Microprocessor (RMP))

2. (U) **DOD Component:** Department of The Army

3. (U) **Responsible Office and Telephone Number:**

STINGER Project Office
Air Defense Program Executive Office
Redstone Arsenal, AL 35898-5630

Project Manager: George B. Reed, Jr
COL, AD
Assigned: November 15, 1988
AUTOVON: 746-6191
Commercial: 205-876-6191

4. (U) **Program Elements/Procurement Line Items:**

RDT&E: PE 64306 Project D646 (Shared Funding) (Sunk)
PE 64306 Project D524 (Sunk)

Procurement: APPN 2032 SSN C18500 (Shared Funding).

5. (U) **Related Programs:** AVENGER (Line of Sight Rear (LOS-R) Pedestal Mounted STINGER (PMS)).

(b)(1)

CLASSIFIED BY: STINGER SSG, JANUARY 3, 1990
DECLASSIFY ON: OADR

~~SECRET~~

OASD(PA) DFOISR 90-T-0703/11

6. (U) **Mission and Description**: The STINGER-RMP Weapon System is an advanced man-portable shoulder fired air defense system. It provides low altitude defense for ground forces against attack by low-flying aircraft and utilizes a passive infrared and ultraviolet homing guidance system which operates independently after aiming and launching by the operator. The system is comprised of the weapon (missile in launcher and reusable gripstock), an Identification Friend or Foe (IFF) unit, trainers, and ancillary equipment. The basic STINGER missile was an infrared seeking system fielded in 1981. The follow-on STINGER-POST system updated the guidance system capability through the use of a dual color (infrared/ultraviolet) seeker. In response to other countermeasure threat advances, the STINGER-POST design was adapted to STINGER-RMP (reprogrammable microprocessor). The guidance functions of the STINGER-RMP are under software control and are reprogrammable via a memory module located in the gripstock external to the missile. This will allow future threat changes to be countered by changing the software in the memory module rather than by changing missile hardware. The STINGER systems replaced the REDEYE Weapon System in order to counter the threat of the 1980's and 1990's. STINGER RMP will provide the active Army with a light air defense missile for defense of priority assets within the division against hostile aircraft using advanced infrared countermeasures.

7. (U) **Program Highlights**:

a. (U) Significant Historical Developments. The STINGER program began in 1972 and was completed in 1987. STINGER-POST initial hardware was available in February 1987. This program was completed with the final STINGER-POST missile delivered in September 1987.

(U) The STINGER-RMP program is an outgrowth of the STINGER-Passive Optical Seeker Technique (POST) Program. The program was initiated in June 1983 to improve performance in an infrared countermeasure environment and to allow change as the threat evolves. The first STINGER-RMP production contract was awarded in August 1985. The Fiscal Year 1987 letter order contract was definitized into a three year multiyear contract in March 1988. The second year portion of the three year multiyear contract was signed in April 1988. In September 1987, a second source contract was awarded. Competition will begin with missile contract awards in FY 90.

(U) The R&D program was extended from its intended conclusion date of July 1989 when sufficient performance to satisfy the contract had not been achieved. The R&D contract effort will continue until May 1990, and includes associated test requirements that will result in test milestone slippages. The OSD Conventional System Committee (CSC) met on May 24, 1989, to review STINGER-RMP status pursuant to a decision to release FY89 funding. The CSC released $225M in FY89 funds to continue missile procurements for Army and Marine Corps. The Army completed the approved test requirements in late October 1989. A program status update was held in November 1989 and the remaining FY89 funds were released. Program revisions are pending AAE approval. The previous STINGER SAR was separated into two reports: STINGER/STINGER POST and the STINGER-RMP. STINGER/STINGER POST terminated reporting during the September 1989 reporting cycle.

7. (U) **Program Highlights**: **(Continued)**

b. (U) Significant Developments Since Last Report. -- None

(U) STINGER-RMP is expected to meet mission requirements.

c. (U) Changes since as of date -- None

8. (U) **Threshold Breaches**: There are currently no breaches to the AAE Baseline approved February 26, 1990.

9. (U) **Schedule**:

a. (U) Milestones --

	Production Estimate	Approved Program	Current Estimate	
ASARC III	Jun 83	Jun 83	Jun 83	
R&D Contract Award	Sep 84	Sep 84	Sep 84	
Initial Production Contract Award	NA	Aug 85	Aug 85	
Development Test/Operational Test (DT/OT) Started	NA	May 86	May 86	
FY86 Production Contract Award	Nov 86	Sep 86	Sep 86	
2nd Source Selection Award	NA	Sep 87	Sep 87	
Initial Production Contract Deliveries Started	NA	Jul 89	Jul 89	
Production Verification Test (PVT) I/Pilot Lot Test Started	NA	Nov 87	Nov 87	
DT/OT Completed	NA	Dec 87	Dec 87	
FY 87-89 Multiyear Contract Award (36 mos.)	NA	Mar 88	Mar 88	
PVT I Completed	NA	Apr 88	Apr 88	
Special Test (SANDIA)	NA	May 88	May 88	
Engineering Development Test Extension Start	NA	Jun 88	Jun 88	
FY86 Production Deliveries Started	NA	Aug 89	Aug 89	
PVT II Started	NA	Apr 89	Apr 89	(CH-1)
Performance Assessment	NA	May 90	May 90	
Test and Evaluation Master Plan (TEMP) Approval (Army)	NA	Mar 89	Mar 89	
Follow-On Test & Eval Start	NA	Apr 90	Apr 90	
PVT II Complete	NA	Oct 89	Oct 89	
Eng Development Test (Extension) Complete	NA	May 90	May 90	
Follow-On Test & Evaluation Complete	NA	Jul 90	Jul 90	
FY89 2d Source Option Exercised	NA	May 89	May 89	(CH-2)
R & D Program Complete	Dec 87	May 90	May 90	
FY87-89 Multiyear Deliveries Start	NA	Apr 90	Apr 90	(CH-3)
First Unit Equipped (FUE) USAREUR	Nov 87	Nov 89	Nov 89	
FY89 Competitive Contract Award	NA	Feb 90	Feb 90	(CH-4)

9. (U) **Schedule:** **(Continued)**

	Production Estimate	Approved Program	Current Estimate	
(U) 2d Source Pilot Lot Flight Test Start	NA	Jan 90	Jan 90	
(U) FY87 2d Source Deliveries Start	NA	Feb 91	Feb 91	(CH-5)
(U) FY90 Competitive Contract Award	NA	Apr 90	Apr 90	
(U) 2d Source Pilot Lot Flight Test Complete	NA	Jul 90	Jul 90	
(U) FUE EUSA	NA	Jul 90	Jul 90	(CH-6)
(U) 2d Source Government Evaluation Flight Test Start	NA	Sep 90	Sep 90	
(U) FUE FORSCOM	NA	Oct 90	Oct 90	
(U) 2d Source Government Evaluation Flight Test Complete	NA	Jan 91	Jan 91	
(U) FY89 2d Source Deliveries Start	NA	May 91	May 91	
(U) FY90 Deliveries Start	NA	May 92	May 92	
(U) FUE WESTCOM	NA	Aug 93	Aug 93	(CH-6)
(U) FUE ARNG	NA	Jan 94	Jan 94	(CH-7)

b. (U) Previous Change Explanation --

Initial Production Contract Deliveries Started changed from October 1987 to July 1989 and FY 86 Production Deliveries Start changed from September 1988 to August 1989 both due to software related problems; Performance Assessment changed from March 1989 to May 1990 for tests to be performed with latest software developed during ED contract; PVT II Complete changed from May 1989 to December 1989 due to extension of ED contract and expanded test program and from December 1989 to October 1989 to comply with deviation report; Engineering Development Test (Extension) Complete changed from May 1989 to May 1990 due to R&D contract being extended; Follow-on Test & Evaluation Complete changed from May 1989 to December 1989 due to increase in test scope; R&D Program Complete was delayed from December 1987 to January 1989 to July 1989 to May 1990 and the FY 87-89 Multiyear Deliveries Start changed from June 1989 to November 1989 due to software related problems; First Unit Equipped (FUE) USAREUR changed from June 1988 to April 1989 to July 1989 due to delay in production acceptance pending validation of software correction; FY 89 Competitive Contract Award changed from July 1989 to November 1989 pending completion of testing; Follow-on Test & Eval (PVT III) Start and Complete changed from April 1989 and December 1989 to April 1990 and July 1990 due to extension of ED contract, testing, and software design; FY87-89 Multiyear Delivery Start changed from November 1989 to January 1990 for software testing; First Unit Equipped (FUE) USAREUR changed from July 1989 to November 1989, FUE EUSA changed from July 1990 to October 1990, and FUE WESTCOM changed from January 1993 to July 1993 due to slippage in acceptance of RMP missiles; FUE ARNG changed from June 1993 to N/A due to change in the Army Modernization Plan.

9. (U) **Schedule:** **(Continued)**

c. (U) Current Change Explanation --

(CH-1) PVT II Started changed from February 1989 to April 1989 to reflect actual start date.

(CH-2) FY89 2d Source Option Exercised (previous SAR titled "FY89 2d Source Contract Award") changed from June 1989 to May 1989 to reflect actual date.

(CH-3) FY87-89 Multiyear Deliveries Start changed from January 1990 to April 1990 due to delay in Army acceptance of missiles until further testing and software improvements were completed to meet Engineering Development contract performance requirements. Congress' enactment of specific legislation in the FY90 Authorization Bill prohibited acceptance of STINGER missiles that did not meet performance specifications unless the contractor agreed to make required changes in accepted hardware at no additional cost to the Government.

(CH-4) The FY89 Competitive Contract Award changed from November 1989 to February 1990 pending DA guidance on incorporation of language addressing the specific constraints to acceptance of hardware in the FY90 Authorization Bill.

(CH-5) The FY 87 2d Source Deliveries Start changed from March 1990 to February 1991 to agree with the contract delivery schedule rather than the vendors' accelerated internal schedules.

(CH-6) The FUE EUSA changed from October 1990 to July 1990 and the FUE WESTCOM changed from July 1993 to August 1993 due to the delays in missile acceptance until improvements in contract performance requirements were completed. These delays in missile acceptance have caused changes in fieldings.

(CH-7) FUE ARNG changed from NA to January 1994 to support the ARNG requirement reflected in the Army Acquisition Objective (AAO).

9. (U) **Schedule:** **(Continued)**

d. (U) References --

Production Estimate: Secretary of the Army Memo, July 1983, Subj: System Acquisition Decision Memo - STINGER-POST/RMP ASARC III Executive Council Session, June 6, 1983.

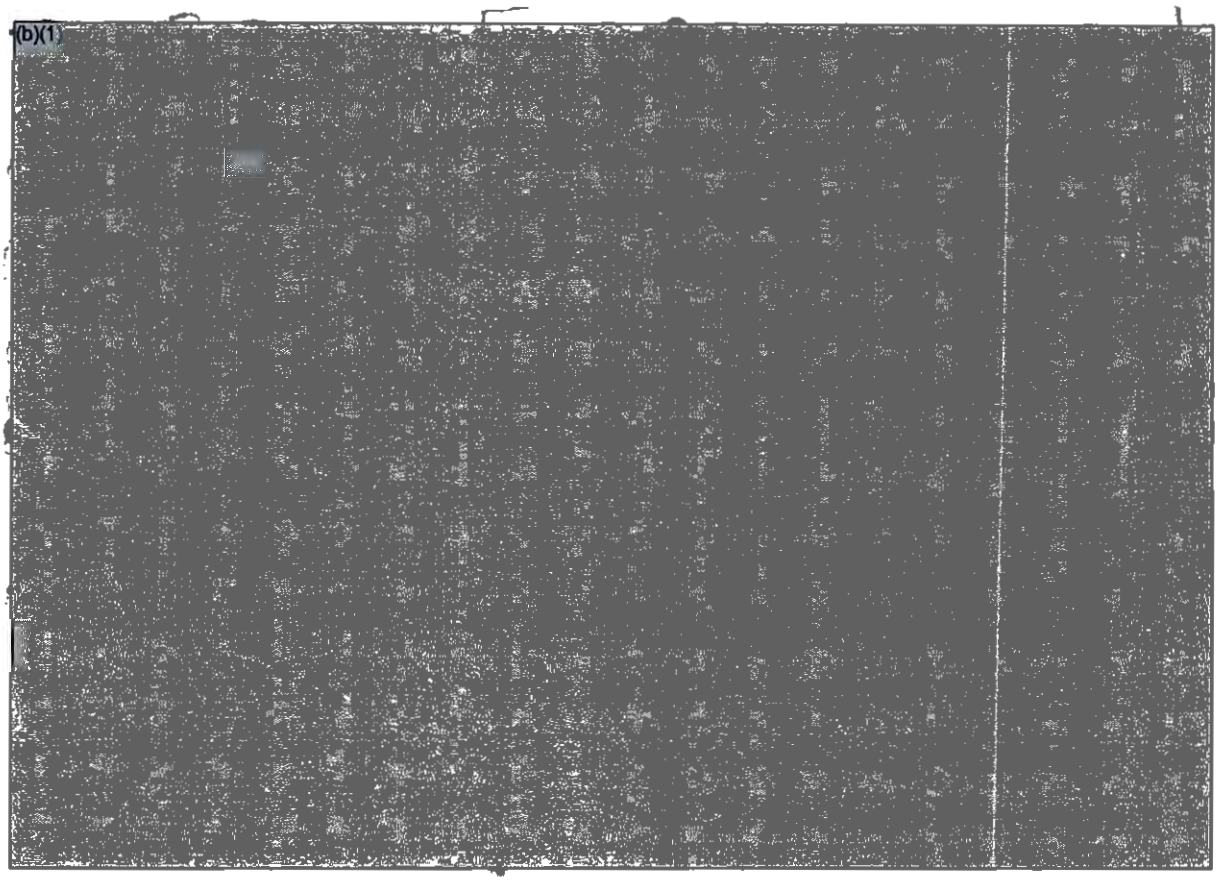
Approved Program: AAE Baseline approved February 26, 1990.

10. (U) **Technical/Operational Characteristics:**

	Prod Est	Approved Program Goal/Thres	Demon-strated Perf	Current Estimate
a. (U) Technical --				
Ready-to Fire Weapon Weight Including Onboard IFF Antenna (lbs)	35.5	NA	35	36

b. (U) Operational --

(b)(1)



10. (U) **Technical/Operational Characteristics: (Continued)**

	Prod Est	Approved Program Goal/Thres	Demon-strated Perf	Current Estimate
(b)(1)				
(U) 3/ Weapon Reliability	.82	.90/.82	.84	.89

1/ (S) Demonstrated through simulation.

2/ (S) Eso=Preuse reliability x prefire reliability x firing reliability x missile lethality for K kills x Pdet. The Eso value for RMP list above reflect performance of the current software. The current materiel need document allows for a 50% degradation of the benign value in a countermeasures environment

(b)(1)

1/ (U) Wpn Rel=Prefire reliability x fire reliability x warhead detonation reliability. STINGER-RMP is a one shot device. It has no mean time between failure (MTBF) or mean time to repair (MTTR) requirement.

c. (U) Previous Change Explanations --

System effectiveness changed based on reliability evolution and performance. Weight change based on improved gripstock. System Inherent Effectiveness (Esi) estimate changed from (b)(1) to N/A. Esi values in previous reports replaced by Eso values in December 1988 report. Current Estimate for Weapon Reliability reported in a previous SAR was in error, changed from .82 to .89. Previously demonstrated performance was not representative of current software. Missile performance based on MICOM Performance Estimate and current understanding of infrared countermeasures effects were incorporated in the Eso formula.

d. (U) Current Change Explanations -- None.

e. (U) References --

Production Estimate: Approved STINGER-RMP DCP dated June 6, 1983.

Approved Program: AAE Baseline approved February 26, 1990.

11. (U) **Program Acquisition Cost** (Current Estimate in Millions of Dollars)

	Production Estimate	Approved Program	Current Estimate
a. (U) Cost --			
Development (RDT&E)	52.3	46.1	46.1
Procurement	2215.3	1828.5	1828.5
Weapon (FLYAWAY)	(2095.7)	(1739.2)	(1739.2)
Other (GSE)	(119.6)	(89.3)	(89.3)
Initial Spares	(0.0)	(0.0)	(0.0)
Construction (MILCON)	0.0	0.0	0.0
Total Constant FY83$	2267.6	1874.6	1874.6
Escalation	693.6	813.7	813.7
Development (RDT&E)	(7.0)	(3.2)	(3.2)
Procurement	(686.6)	(810.5)	(810.5)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Total Then-Year $	2961.2	2688.3	2688.3
b. (U) Quantities* --			
Development (RDT&E)	6	9	9
Procurement	36,028	59,059	59,059
Total Weapons	36,034	59,068	59,068

*The Army will procure the maximum number of supportable systems consistent with the dollars appropriated.

c. (U) Foreign Military Sales -- Sales are $164.4 for STINGER-RMP (Less reprogrammable module) Missiles, Training/Training Support Equipment, TDP and/or services. A breakdown of approximate dollar value by country is as follows:

COUNTRY	TOTAL $
(U) Germany	66.5
(U) Japan	51.3
(U) Norway	.3
(U) Switzerland	3.8
(U) Greece	42.5
Total	164.4

11. (U) **Program Acquisition Cost:** **(Continued)**

d. (U) Nuclear Costs -- None

e. (U) References --

Production Estimate: Secretary of the Army Memo, July 1983, Subj: System Acquisition Decision Memo - STINGER-POST/RMP ASARC III Executive Council Session, June 6, 1983.

Approved Program: AAE Baseline approved February 26, 1990.

12. (U) **Program Acquisition/Current Procurement Unit Cost Summary:**
(Current [Then-Year] Dollars in Millions)

		Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a.	Program Acquisition --	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1)	Cost	$2,688.3	$2,449.4	$2,688.3
(2)	Quantity	59,068	53,783	59,068
(3)	Unit Cost	$0.046	$0.046	$0.046
b.	Current Procurement --	(FY 90)	(FY 90 APPN)	(FY 91)
(1)	Cost	$114.7	$114.7	$252.4
	Less CY Adv Proc	0.0	0.0	0.0
	Plus PY Adv Proc	0.0	0.0	0.0
	Net Total	114.7	114.7	252.4
(2)	Quantity	2375	2375	6922
(3)	Unit Cost	$0.0483	$0.0483	$0.0365

13. ~~(U)~~ **Cost Variance Analysis:**

a. Summary --(Current [Then-Year] $ in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	59.3	2901.9	0.0	2961.2
Previous Changes:				
Economic	-0.4	-109.1		-109.5
Quantity	+0.2	+852.7		+852.9
Schedule		+235.3		+235.3
Engineering	+3.7			+3.7
Estimating	-13.5	-1292.3		-1305.8
Other				
Support				
Subtotal	-10.0	-313.4	0.0	-323.4
Current Changes:				
Economic	-0.8	+115.8		+115.0
Quantity		+53.9		+53.9
Schedule		+6.4		+6.4
Engineering				
Estimating	+0.8	-116.3		-115.5
Other				
Support		-9.3		-9.3
Subtotal	0.0	+50.5	0.0	+50.5
Total Changes	-10.0	-262.9	0.0	-272.9
Current Estimate	49.3	2639.0	0.0	2688.3

(FY 83 Constant Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	52.3	2215.3	0.0	2267.6
Previous Changes:				
Quantity	+0.6	+444.6		+445.2
Schedule		+148.8		+148.8
Engineering	+3.7			+3.7
Estimating	-11.2	-934.3		-945.5
Other				
Support				
Subtotal	-6.9	-340.9	0.0	-347.8
Current Changes:				
Quantity		+17.3		+17.3
Schedule				
Engineering				
Estimating	+0.7	-58.4		-57.7
Other				
Support		-4.8		-4.8
Subtotal	+0.7	-45.9	+0.0	-45.2
Total Changes	-6.2	-386.8	+0.0	-393.0
Current Estimate	46.1	1828.5	0.0	1874.6

13. (U) **Cost Variance Analysis:** **(Continued)**

b. (U) Previous change Explanations --

RDT&E

Economic:	Revised escalation indices.
Quantity:	Additional 3 Missiles.
Engineering:	Addition and deletion of PMS; Safeguard Interlock System.
Estimating:	Revision of PMS estimate. Delete Stinger follow-on.

Procurement

Economic:	Revised escalation indices.
Quantity:	Additional 8080 missiles for Sgt York and 444 additional peace-time losses due to stretchout of program. Additional Army of Excellence quantities and deletion of Sgt York missiles. Added 5285 missiles in FY96 to reach the revised Army Acquisition Objective (AAO).
Schedule:	Moved 1750 missiles from FY93 to FY89. Moved 639 missiles from FY87 to FY93. Shift of 530 missiles to outyears. Added 270 missiles to FY91.
Estimating:	Adding additional tooling costs and changing cost estimating methodology and cost savings from actual contracts. Unit cost reduction and revised ECO estimate; addition of estimated warranty risk balance of cost of 8524 missiles added for Sgt York, additional peacetime losses, and the addition of Pedestal Mounted STINGER. Deletion of PMS; quantity change from 6000 per year to 5000 per year. MYP/2nd Source Savings.

c. (U) Current change Explanations --

		(Dollars in Millions) Base-Year	Then-Year
(1)	(U) RDT&E		
	Revised escalation indices.(Economic)	NA	-0.8
	Current/prior year inflation. (Estimating)	+0.7	+0.8
(2)	(U) Procurement		
	Revised Escalation Indices.(Economic)	NA	+115.8
	Correction for miscategorization in December 1987 SAR (added 270 missiles).		
	o Quantity	+17.3	+53.9
	o Estimating	-17.3	-60.3
	o Schedule (stretchout)	N/A	+6.4
	Budget revisions: (Estimating)	-41.1	-56.0 -43.2
	o Current/prior year inflation.	(-7.2)	(-2.8) - 3.0
	o Budget reduction.	(-33.9)	(-53.2)
	Decrease in support costs associated with move of 281 missiles from FY 91 to outyears. (Support)	-4.8	-9.3

14. (~~U~~) **Program Acquisition Unit Cost (PAUC) History**: (Then Year Dollars in Millions)

a. (~~U~~) Production Estimate to Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
.082	--	-.016	+.004	--	-.024	--	--	-.036	.046

15. (~~U~~) **Contract Information**: (Then-Year Dollars in Millions)

a. (U) RDT&E -- None

b. (U) Production --

General Dynamics Corp, Rancho Cucamonga, CA
DAAH01-86-C-0838 Fixed Price Incentive (FPI)
Award: September 1986
Definitized: September 1986

Initial Contract Price		
Target	Ceiling	Qty
$231.9	$263.1	4643

Current Contract Price		
Target	Ceiling	Qty
$237.9	$270.0	4643

Estimated Price at Completion	
Contractor	Program Manager
$241.0	$241.7

	Cost Variance	Schedule Variance
Previous Cumulative Variance (Jul 89)	$ -0.5	$ -13.9
Cum Variances to date (Oct 89)	$ -4.6	$ -12.9
Net Change:	$ -4.1	$ +1.0

Explanation of Change: Cost variance is due to contractors estimated cost including an overhead set-aside of 3.8M pending final overhead settlement. The improvement in schedule variance is due to completion of work that was behind schedule as a result of problems associated with failure of the RAM microchip.

15. [redacted] Contract Information: (Continued)

	Initial Contract Price		
	Target	Ceiling	Qty
General Dynamics Corp., Pomona, CA			
Fiscal Year 1987 Multiyear Portion	$226.2	$226.2	5258
Fiscal Year 1988 Multiyear Portion	$243.8	$243.8	7012
Fiscal Year 1989 Multiyear Portion	$225.6	$225.6	8244

DAAH01-87-C-0607, FFP/CPAF
Award: Letter 26 Aug 87 (fixed) $120.0M
Award Fee $8.5M
Definitized: March 15, 1988
FY88 Portion Awarded: April 15, 1988
FY89 Portion Awarded: May 31, 1989

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$226.2	$226.2	5258	$226.2	$226.2
$273.7	$273.7	8062	$273.7	$273.7
$197.1	$197.1	7194	$197.1	$197.1

Note: Cost Performance Report (CPR) data is not required on Firm Fixed Price (FFP) contracts.

	Initial Contract Price		
Raytheon Missile Systems	Target	Ceiling	Qty
Bedford, MA	$26.4	$26.4	400

DAAH01-87-C-A070 Fixed Price Incentive (FPI)
Award: September 26, 1987
Definitized: September 26, 1987

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$81.2	$81.2	1900	$79.7	$81.2

	Cost Variance	Schedule Variance
Previous Cumulative Variance (Jul 89)	$ -1.0	$ +1.1
Cum Variances to date (Oct 89)	$ -2.5	$ -1.2
Net Change:	$ -1.5	$ -2.3

Explanation of Change: The cost variance is due to increased materiel costs, level-of-effort support tasks' costs, and weapons integration hardware costs. The schedule variance resulted from the later-than-scheduled start due to material kit shortages in the Guidance Section.

16. [redacted] Program Funding Summary: (Cur Estimate in Millions of Dollars)

a. [redacted] Program Status --

(1) [redacted] Percent STINGER-RMP program completed: 57.1% (8 years/14 years) (1983/1996) (Year Funds Appropriated/Total Program Years)

(2) [redacted] Percent STINGER-RMP program cost appropriated: 44.1% ($1185.3/2688.3) (Funds Appropriated to Date in Millions/Total Program Funding in Millions)

16. (U) Program Funding Summary: (Continued)

b. (U) Appropriation Summary --

Appropriation	Current & Prior Yrs (FY83-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-96)	Total
RDT&E	49.3	0.0	0.0	0.0	49.3
Procurement	1021.3	114.7	252.4	1250.6	2639.0
MILCON	0.0	0.0	0.0	0.0	0.0
Total	1070.6	114.7	252.4	1250.6	2688.3

c. (U) Annual Summary --

FISCAL YEAR	QTY	FY 83 BASE-YEAR DOLLAR			THEN-YEAR DOLLARS			ESCL RATE %
		FLYAWAY		TOTAL	Program	Obligated	Expended	
		NONREC	REC					
APPROPRIATION: RDT&E								
1983				20.3	20.0	20.0	20.0	4.9
1984								3.8
1985				4.5	5.0	5.0	4.2	3.4
1986				15.5	17.5	17.5	17.1	2.8
1987				3.3	3.8	3.5	0.8	2.7
1988				2.5	3.0	2.4		3.1
SUBTOT	9			46.1	49.3	48.4	42.1	
APPROPRIATION: PROCUREMENT								
1985	2360		158.7	165.9	198.9	194.8	182.9	3.4
1986	2909		143.0	172.2	212.2	208.7	193.7	2.8
1987*	3541		146.1	157.4	199.2	193.5	147.5	2.7
1988	3942		126.8	129.8	169.7	163.9	12.0	3.0
1989	6750		165.1	177.6	241.3	86.2	12.0	4.2
1990	2375		66.8	81.1	114.7	38.8		4.0
1991	6922		167.8	172.1	252.4			4.2
1992	7173		190.8	197.3	299.4			4.0
1993	5728		131.9	132.9	208.2			3.7
1994	2460		72.6	72.6	117.3			3.4
1995	6854		172.8	172.8	287.8			3.1
1996	8045		196.8	196.8	337.9			3.1
SUBTOT	59059		1739.2	1828.5	2639.0	885.9	548.1	
TOTAL	59068		1739.2	1874.6	2688.3	934.3	590.2	

*FY87 Procurement does not include $41.2M funding reported in the AVENGER (LOS-R) SAR.

17. (U) **Production Rate Data:**

a. (U) Annualized Production Rates -- Based on a 1-8-5 production schedule. The Annual production rates differ from the annual funded quantities as shown because the funded delivery period for Fiscal Year 1990 is 5 months.

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1985		3933	2360	2360
1986		6467	2909	2909
1987		6675	3541	3541
1988		8113	3942	3942
1989		7486	6750	6750
1990		3354	5700	8100
1991			6922	8100
1992			7173	8100
1993			5728	8100
1994			2460	8100
1995			6854	
1996			8045	

Estimates display Fiscal Year procurements.

b. (U) Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE Less PDE)	Current Estimate	Variance (CE Less MAX)	Maximum Economic
Prog Acq Cost (BY $)	844.0	1030.6	1,874.6	+0.0	1874.6
(TY $)	2,961.2	-272.9	2,688.3	+0.0	2688.3
PAUC (BY $)	0.023	0.009	0.032	+0.0	0.032
(TY $)	0.082	-0.036	0.046	+0.0	.046

c. (U) Schedule Variance --

Item	Production Estimate	Variance (CE Less PDE)	Current Estimate	Variance (CE Less MAX)	Maximum Economic
Start Date (Mo/Yr)	10 / 1987	0	10 / 1987	0	10 / 1987
Duration (in Months)	130	0	130	+17	113
End Date (Mo/Yr)	8 / 1998	0	8 / 1998	+17	3 / 1996

d. (U) Deliveries (Plan/Actual) --

	TO DATE
RDT&E	9/9
Procurement	12461/2209

e. (U) Approved Design to Cost Goal -- No DTC goal was established.

18. Operating and Support Costs:

a. Assumptions and Ground Rules -- The STINGER RMP Baseline Cost Estimate, dated July 1989 was the source document for developing the Operating and Support (O&S) Costs. Year 2002 was selected for O&S Cost Analysis as it depicted a typical year for sustainment activities with all 59059 missiles produced and deployed. Numbers of personnel for cost estimating were derived from the organizational structure of the 2nd BTN, 67th ADA, Fort Riley, KS. Attrition rates, training costs and loss rates were obtained from the MOS Training Cost Handbook, OMA MPA Cost Factor Handbook and historical data. An AMC directed value of the 1440 miles per year was utilized in determining POL requirements with POL diesel costs estimated at the consumption rate of 10 miles per gallon.

b. Costs -- Annual cost per STINGER RMP Missile if $3K in FY 83 constant dollars.

	per missile
Personnel	0.003
O&S Consumables	0.000
Direct Depot Maintenance	0.000
Sustaining Investment	0.000
Other Direct Costs	0.000
Indirect Costs	0.000
Total	0.003

c. Contractor Support Costs -- (Current (Then-Year) Dollars in Millions)

Funding	FY 1989 & Prior	FY1990	FY1991	Balance To Complete	Total
O&M	0.5	0.2	0.2	0.0	0.9
Industrial Fund	0.0	0.0	0.0	0.0	0
Total	0.5	0.2	0.2	0.0	0.9

A-8 FAAD C²I

SAR-89-107

~~SECRET NOFORN~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(O&A)823)

PROGRAM: FORWARD AREA AIR DEFENSE COMMAND, CONTROL, AND INTELLIGENCE (FAAD C²I)

AS OF DATE: December 31, 1989

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(b)(1) [redacted]

1. **Designation and Nomenclature (Popular Name):** Forward Area Air Defense System (FAADS) Command, Control, and Intelligence (FAAD C²I). (Includes FAAD C², Ground Based Sensor (GBS), and Non Cooperative Target Recognition-Positive Hostile Identification/Aerial Sensor (Masked Target Sensor) (NCTR-PHID/Aerial Sensor (MTS)))

AS AMENDED

2. [ ] **DoD Component:** Department of the Army

3. [ ] **Responsible Office and Telephone Number:**

[FAAD C²I]

Air Defense Command and Control Systems Project Office
Program Executive Office, Command and Control Systems
Redstone Arsenal, AL 35898-5600

Project Manager: COL David R. Taylor
Assigned: April 18, 1988
Autovon: 742-3441
Commercial: (205) 895-3441

[FAAD C²]

Air Defense Command and Control Systems Project Office
Program Executive Office, Command and Control Systems
Redstone Arsenal, AL 35898-5600

Product Manager: LTC David M. Noe
Assigned: September 8, 1988
Autovon: 742-3515
Commercial: (205) 895-3515

[GBS/NCTR-PHID]

GBS:FAAD Sensor-Target Ident Product Office
Program Executive Office, Air Defense
Redstone Arsenal, AL 35898-5600

Product Manager: LTC(P) Gregory A. Stolt
Assigned: August 17, 1987
Autovon: 788-1673
Commercial: (205) 722-1673

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21

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~~Declassify On: OADR~~

3. ~~(U)~~ **Responsible Office and Telephone Number:** (cont)

[NCTRS-PHID]

Program Executive Office	Assistant Prod Mgr	John F. Comer
Intelligence and Electronic Warfare	Assigned:	July 1, 1987
Vint Hill Farms Station	Autovon:	788-1673
Warrenton, Va 22186-5115	Commercial:	(205)722-1673

[Aerial Sensor (MTS)]

Project Manager RADAR	Product Manager:	COL Peter P. Belch
Program Executive Office,	Assigned:	July 5, 1989
Intelligence, Electronic Warfare	Autovon:	996-5324
Fort Monmouth, NJ 07703-5000	Commercial:	(201) 544-5324

4. ~~(U)~~ **Program Elements/Procurement Line Items:**

RDT&E:

[FAAD C^2]

PE 63740 Project 593 (SHORAD) -- *Sunk*
PE 64741 Project 126 (FAAD C^2) (Shared Funding)

[GBS]

PE 64741 Project 126 (FAAD C^2) (Shared Funding)
PE 64820 Project E10 (FAAD GBS)

[NCTR-PHID/IFF/Aerial Sensor (MTS)]

PE 63740 Project 464 (Aerial Sensor)
PE 64741 Project 421 (Aerial Sensor)
PE 63706 Project 243 (Positive Hostile ID) (Shared Funding) -- *Sunk*
PE 64709 Project 355 (Positive Hostile ID) (Shared Funding)
PE 63709 Project 356 (Positive Hostile ID) (Shared Funding)
PE 64709 Project 530 (Coop IFF) (Shared Funding)-- non-add
PE 63706 Project 297 (Coop IFF) (Shared Funding)--(*Sunk*)non-add

PE ---- Proj. D495

PROCUREMENT:**[FAAD C^2]**

APPN 2035 SSN AD5050 (FAAD C^2) (Shared Funding)
APPN 2035 BA 9620 (Initial Spares/Repair Parts-Other) (Shared Funding)

[GBS]

APPN 2035 SSN WK5053 (FAAD GBS)
APPN 2035 BA 9620 (Initial Spares/Repair Parts-Other) (Shared Funding)

[NCTR-PHID/IFF/Aerial Sensor (MTS)]

APPN 2035 SSN AD5051 (NCTR-PHID)
APPN 2035 SSN AD5052 (Aerial Sensor)
APPN 2035 ~~SSN AD5053 (IFF (MK XV)/Air Force SAR)~~ SSN AD 5054

MILCON: None

O&M: None

5. (U) **Related Programs**: Combined Arms, Line of Sight-Forward-Heavy, Line of Sight-Rear, Non-Line of Sight, Enhanced Position Location Reporting System (EPLRS), Joint Tactical Information Distribution System (JTIDS), Common Hardware/ Software (CHS), and High-to-Medium Air Defense Command and Control (HIMAD C^2).

6. (U) **Mission and Description**: In January 1986, OSD approved in principle an integrated air defense program to meet the growing air threat to the forward area of the battlefield. The FAAD C^2I program integrates weapons, sensors, communications and command, control and intelligence (C^2I) architecture to counter the entire spectrum of the air threat to the forward area through the 90's. The acquisition strategy relies heavily on non-developmental items (NDI) and preplanned product improvements (P^3I) to rapidly overcome our current air defense command, control and intelligence deficiencies to keep pace with the advancing threat.

(U) As the air defense node of the Army Tactical Command and Control Systems (ATCCS), the FAAD C^2I System ties weapons together by a C^2I network and integrates FAADS into the Army Command and Control Systems (ACCS) architecture. The C^2I initiative incorporates a family of sensors and identification equipment (ground and aerial, active and passive) with automated data processing and distribution capability. The mission will be accomplished through collection, digital processing and dissemination of target information; air threat warning and weapon control orders, and provide target data processing and display capabilities at ABMOC, A2C2, Sensor/C2, battery, platoon and fire unit levels.

(U) The FAAD C^2I System also provides track information to the Combined Arms Initiative (armor, infantry and aviation). The FAAD C^2I program, using a systems approach, will integrate these relatively independent systems together to allow engagement of the enemy air threat at maximum weapons ranges in the forward area. The components will work together to maximize total force effectiveness across the divisional areas.

7. (U) **Program Highlights**:

a. (U) Significant Historical Developments --

SHORAD C^2 program was presented to the Army Systems Acquisition Review Council (ASARC) (MDR II) on March 26, 1985. On September 3, 1985, the ASARC program was approved by the Vice Chief of Staff of the Army (VCSA). On January 3 and 4, 1986, an ASARC level review directed that SHORAD C^2 become a subsystem of the FAAD system and that SHORAD C^2 be redesignated FAAD C^2I. On July 29, 1986, the JRMB approved the concept for execution of the overall FAAD program as a system of systems and approved the following segments of FAAD C^2I:

(U) (1) Full scale development (beginning with a Build I demonstration) of the FAAD C^2I system software.

(U) (2) A ground based sensor NDI acquisition strategy to procure four test articles to support other FAAD developmental and operational testing, and 13 low rate initial production (LRIP) units to be used for operational test and evaluation, production verification, and initial training.

7. (U) Program Highlights (cont)

(U) FAAD C2 Program: In November 1988, the Deputy Secretary of Defense concurred with the Chief of Staff of the Army's request to restructure the FAAD C²I program to field a FAAD C² capability by transferring portions of Build II into Build I. A March 1989 SDDM approved the restructure of the FAAD C² program to field an initial capability to perform limited air defense engagement and essential force control interfaces within the division. (The fully automated force control software will be a follow-on Pre-Planned Product Improvement, P³I, as stated in the Deputy Secretary of Defense Memorandum, dated 17 March 1989.)

(U) GBS Program: A Request for Proposal (RFP) was released in April 1988 for a Firm Fixed Price contract for GBS. Offerers were to be prepared to demonstrate their sensor at a government-hosted evaluation to be followed by a candidate "sense off", testing sensors in a military environment. The contract was then to be awarded for the system which met initial requirements. Only one proposal was received in response to the solicitation and test revealed that the proposed system did not meet all minimum performance requirements. The solicitation was terminated in June 1989. Evaluation of the contractor proposal and accompanying tests indicated that the army requirements were too stringent. Requirements were revised and a new competitive solicitation was prepared for a best value NDI sensor with growth capabilities.

(U) MTS Program: Studies were completed during FY89 that verified the applicability of non-Development Item (NDI) hardware to meet the FAAD mission need. An acquisition strategy was formulated but was unable to be executed due to funding cut. Funds are being requested that would allow Full Scale Engineering development to begin in FY92.

(U) b. (U) Significant Developments Since Last Report --

(U) NCTR Program: The non-cooperative target recognition program consists of unique technologies for application on air defense weapons systems. Currently, a request for proposal (RFP) has been prepared on one technology and will be released to industry on 31 January 1990. The projected Full Scale Equipment Development (FSED) contract award is 4th quarter FY90. A RFP for another technology was released in FY 89 with a projected contract award of February 1990.

(U) MTS Program: Funding for the MTS is being requested. MTS management and reporting responsibility has transferred to the IEW mission area.

(U) The FAADS, to include the FAAD C²I component, is expected to satisfy mission requirements.

c. (U) Changes Since "As of" Date -- None

8. (U) Threshold Breaches: There are currently no DAE approved baselines for the program.

9. [ ] **Schedule:**

a. [ ] Milestones --

	Development Estimate	Approved Program	Current Estimate	
[FAAD C²]				
Milestone II DAB	Aug 86	NA	Jul 86	
Contract Award (Build I)	Sep 86	NA	Sep 86	
Contract Award (Build II)	Jun 88	NA	NA	
Contract Award (GBS LRIP)	Jun 88	NA	NA	
Begin Technical Test (Build I)	Jun 89	NA	NA	
Complete Technical Test (Build I)	Jun 90	NA	NA	
Begin Technical Test/IOTE	Sep 90	NA	Feb 94	(Ch1)
Complete Technical Test/IOTE	Jun 91	NA	Jan 95	(Ch1)
FUE (CONUS)	Jun 91	NA	Dec 93	(Ch1)

	Development Estimate	Approved Program	Current Estimate	
[GBS]				
Milestone IIIA (JRMB)	Jul 86	NA	Jul 86	
RFP Issued	NA	NA	May 90	(Ch2)
Proposal Received	NA	NA	Aug 90	(Ch2)
Candidate Evaluation Contract Award	Aug 88	NA	Sep 90	(Ch2)
Candidate Evaluation Complete	Mar 89	NA	Jan 91	(Ch2)
Contract Award (Pre-Prod)	May 89	NA	Oct 91	(CH2)
Contract Award (LRIP)	Jun 88	NA	NA	
1st Delivery - Pre-Production Contract	Apr 91	NA	Oct 93	(Ch2)
Technical Test Start	May 91	NA	Nov 93	(Ch2)
Technical Test Complete	Oct 91	NA	Aug 94	(Ch2)
IOT&E Start	Nov 91	NA	Jun 94	(Ch2)
IOTE Completed	Dec 91	NA	Sep 94	(Ch2)
Milestone III (DAB) FSP Decision	Jan 92	NA	Nov 94	(Ch2)
1st Delivery - LRIP Contract	Jan 92	NA	NA	(Ch2)
Contract Award (FSP)	Feb 92	NA	Dec 94	(Ch2)
FUE	Jun 93	NA	Mar 95	(Ch2)
1st Delivery - FSP Contract	May 93	NA	Dec 96	(Ch2)

	Planning Estimate	Approved Program	Current Estimate	
[Aerial Sensor (MTS)]				
Start Advanced Development	Dec 87	NA	N/A	(Ch 3)
Complete Advanced Development	Dec 90	NA	N/A	(Ch 3)

9. ~~(U)~~ Schedule (cont):

	Planning Estimate	Approved Program	Current Estimate	
[NCTR-PHID Technology #1] 1/				
Contract Award (FSD)	Jul 90	NA	Jul 90	(CH 4)
Begin Development Test	Mar 93	NA	Mar 93	(CH 4)
Complete Development Test	Jun 93	NA	Jun 93	(CH 4)
Begin Pre-Pro Qual/Operational Assessment Test	Jun 93	NA	Jun 93	(CH 4)
Complete Pre-Prod Qual/Operational Assessment test	Sep 93	NA	Sep 93	(CH 4)
Milestone IIIA IPR	Nov 93	NA	Nov 93	(CH 4)
LRIP Contract Award	Feb 94	NA	Feb 94	(CH 4)
1st Delivery - LRIP Contract	Sep 95	NA	Sep 95	(CH 4)
Contract award for FSP	Apr 96	NA	Apr 96	(CH 4)
FUE	Sep 96	NA	Sep 96	(CH 4)
[NCTR-PHID Technology #2]				
Contract Award (FSD)	Apr 90	NA	Apr 90	(CH 4)
Begin Development Test	Nov 92	NA	Nov 92	(CH 4)
Complete Development Test	Feb 93	NA	Feb 93	(CH 4)
Begin Pre-Pro Qual/Operational Assessment Test	Feb 93	NA	Feb 93	(CH 4)
Complete Pre-Prod Qual/Operational Assessment test	May 93	NA	May 93	(CH 4)
Milestone IIIA IPR	Jul 93	NA	Jul 93	(CH 4)
LRIP Contract Award	Oct 93	NA	Oct 93	(CH 4)
1st Delivery - LRIP Contract	Apr 95	NA	Apr 95	(CH 4)
Contract award for FSP	Nov 95	NA	Nov 95	(CH 4)
FUE	Nov 95	NA	Nov 95	(CH 4)

1/ Current estimates are shown for three NCTR technologies. Technology 4 was previously reported. Technology 1 and 2 were not previously reported.

9. [redacted] Schedule (cont):

	Planning Estimate	Approved Program	Current Estimate	
[NCTR-PHID Technology #4]				
Contract Award (FSD)	Aug 88	NA	Feb 90	(CH 5)
Begin Development Test	May 90	NA	Sep 91	(CH 5)
Complete Development Test	Aug 90	NA	Jan 92	(CH 5)
- Begin Pre-Pro Qual/Operational Assessment Test	NA	NA	Jan 92	(CH 5)
Complete Pre-Prod Qual/Operational Assessment test	NA	NA	May 92	(CH 5)
Milestone IIIA IPR	Jan 91	NA	Jul 92	(CH 5)
Begin Technical Test/Operational Test (w/GBS)	Feb 92	NA	NA	(CH 5)
Complete Technical Test/Operational Test (w/GBS)	May 92	NA	NA	(CH 5)
LRIP Contract Award	NA	NA	Nov 92	(CH 5)
1st Delivery - LRIP Contract	Feb 93	NA	May 94	(CH 5)
Contract award for (FSP)	NA	NA	Jan 95	(CH 5)
FUE	May 93	NA	Jan 95	(CH 5)
[IFF] 1/				

1/ IFF Milestones which have been previously reported in the FAAD C²I SAR are now in the Mark XV Air Force SAR.

b. [redacted] Previous Change Explanations -

FAAD C2 - Program was restructured. The contract award for Build II and the technical test for Build I were deleted.

GBS - Ground-Based Sensor plans and schedule were revised because the solicitation was cancelled; the ROC was revised and changes were incorporated into the acquisition strategy; start of the technical test changed from Feb 92 to Jul 92; completion of IOT&E changed from Nov 92 to Mar 93; and FUE changed from Apr 93 to June 93 to reflect the restructured program schedule (IAW revised SDDM,17 Mar 89).

9. [ ] Schedule (cont):

c. [ ] Current Change Explanations --

Ch1- FAAD C2 - The start of the IOTE changed from July 92 Feb 94, completion of IOTE changed from Mar 93 to Jan 95, and FUE (CONUS) changed from Jun 93 to Dec 93. These changes are the result of budget reductions.

CH-2 GBS plans and schedules were revised to reflect resolicitation because the original candidate failed to meet all RFP requirements; revision of the GBS ROC; incorporation of the "best value" acquisition strategy and loss of FY91 RDTE funds. Changes included the following:

MILESTONES	FROM	TO	RATIONALE
RFP Issued	NA	May 90	Added because original RFP was cancelled and new solicitation was required.
Proposals Received	NA	Aug 90	Added because original proposals did not result in selection of a sensor.
Candidate Evaluation Contract Award	Aug 88	Sep 90	Revised to reflect contracts for GBS candidate tests based on new solicitation.
Candidate Evaluation Complete	Mar 89	Jan 91	Revised to reflect completion of GBS candidate tests based on new solicitation.
Contract Award (Pre-Prod)	Dec 90	Oct 91	Revised to reflect new GBS sensor award date based on cancellation of the original solicitation because candidate failed to meet all RFP requirements and deletion of FY91 funding.
1st Delivery - Pre-Production Contract	Nov 92	Oct 93	Revised to reflect delayed delivery based on cancellation of the original contract and resolicitation. Also, original date of Nov 93 should have been Nov 92.
Technical Test Start	Nov 92	Nov 93	Revised to reflect delayed test start because of cancellation of the original contract and resolicitation.
Technical Test Complete	Jul 93	Aug 94	Revised to reflect delayed test completion because of cancellation of the original contract and resolicitation.

9. [U] Schedule (cont):

c. [U] Current Change Explanations (cont) --

[GBS cont]

MILESTONE	FROM	TO	RATIONALE
IOT&E Start -	Aug 93	Jun 94	Revised to reflect delayed IOT&E start because of cancellation of the original contract and resolicitation.
IOT&E Complete	Oct 93	Sep 94	Revised to reflect delayed IOT&E completion because of cancellation of the original contract and resolicitation.
Milestone III (DAB) FSP Decision	Dec 93	Nov 94	Revised to reflect delayed decision because of cancellation of the original contract and resolicitation.
Contract Award	Jan 94	Dec 94	Revised to reflect delayed FSP award (FSP) because of cancellation of the original contract and resolicitation.
FUE	Sep 96	Mar 95	Revised to reflect delayed FUE because of cancellation of the original contract and resolicitation.
1st Delivery - FSP Contract	Jan 96	Dec 96	Revised to reflect delayed 1st delivery because of cancellation of the original contract and resolicitation.

[MTS]

CH3- MTS- Current President's Budget does not included funding for this program.

[NCTR]

Technologies 1 and 2

(CH-4) NCTR Technologies 1 and 2 were not previously reported. This report is the initial submission for these technologies.

Technology 4

(CH-5) NCTR Technology 4, submitted initially in September 1989 has changed as follows:

MILESTONE	FROM	TO	RATIONALE
Contract Award (FSD)	Aug 88	Feb 90	Revised to reflect delays due to approval and release of solicitations and failure to receive approval of ROC for T4.
Begin Development Test	May 90	Sep 91	Revised to reflect delay in contract award and increase in projected leadtime.

9. [U] Schedule (cont)

c. [U] Current Change Explanations (cont): --

[NCTR cont]

MILESTONE	FROM	TO	RATIONALE
Complete Development Test	Aug 90	Jan 92	Revised to reflect delay in contract test award and test start date.
Milestone IPR IIIA	Jan 91	NA	Deleted and replaced with Milestone IIIA shown below Complete Development.
Begin Technical Test/ Operational Test (with GBS)	Feb 92	NA	Deleted and replaced with Pre-Prod Operational Test Qualification/Operational Assessment test shown below.
Complete Technical Test/Operational Test (with GBS)	May 92	NA	Deleted and replaced with Pre-Prod Qualification/Operational Assessment Test shown below.
Begin Pre-Prod Qual/ Operational Test	NA	Jan 92	Revised to reflect name change and delay in contract award and prototype leadtime.
Complete Pre-Prod Qual/ Operational Assessment Test	NA	May 92	Revised to reflect name change and delay in contract award and prototype leadtime.
Milestone IIIA IPR	NA	Jul 92	Revised to reflect IPR for approval to enter LRIP and delay in contract award and prototype leadtime.Begin Technical
LRIP Contract Award	NA	Nov 92	Revised to reflect delay in FSD completion and review.
1st Delivery - LRIP Contract	Feb 93	May 94	Revised to reflect delay in placing LRIP contract award.
Contract Award (FSP)	NA	Jan. 95	Revised to reflect delay in completing FSD and LRIP.
FUE	May 93	Jan 95	Revised to reflect delay in FSD and LRIP completion.

d. [U] References --

Planning/Development Estimate: DCP dated July 15, 1986; SDDM dated August 14, 1986.

Approved Program: There are currently no DAE approved baselines for this program.

10. [redacted] Technical/Operational Characteristics:

[FAAD C²]

a. [redacted] Technical --

	Development Estimate	Goal/ Threshold	Demo Perf	Cur Est
[redacted] RAM -- FAAD C²				
Sensor MTBOMF	125 hrs	NA/NA	NA	325 hrs
Generator MTBOMF	425 hrs	NA/NA	NA	500 hrs
ABMOC or AME C² subsystems MTBOMF	184 hrs	NA/NA	NA	184 hrs
System Requirements Ao	0.84	NA/NA	NA	0.84
Manpower Threshold	626	NA/NA	NA	626 max
MTTR (Subsystem)	0.5 hrs	NA/NA	NA	0.5 hrs
(sensor)	2.0 hrs	NA/NA	NA	2.0 hrs

b. [redacted] Operational --

[redacted] ABMOC/C² Node, 90% of the time, will be capable of:

Target Correlation reports true position	w/i 1 km	NA/NA	NA	w/i 1 km
Target Information to fire unit after report entry	w/i 12 sec	NA/NA	NA	w/i 12 sec
Selection and simultaneous display of air track, ground situation, weapons and special points of interest	90%	NA/NA	NA	90%

[redacted] FAAD C²I subsystems, 90% of the time, will be capable of:

Air Battle Management Order (ABMO) dissemination to fire unit of:				
Air Defense Warning	w/i 90 sec	NA/NA NA/NA	NA	w/i 90 sec
Weapons Control	w/i 90 sec	NA/NA NA/NA	NA	w/i 90 sec
State of Alert	w/i 90 sec	NA/NA NA/NA	NA	w/i 30 sec
Manual Acknowledgement of ABMO from time of receipt	w/i 90 sec	NA/NA NA/NA	NA	w/i 90 sec

[redacted] FAAD C²I Ground Based Sensor w/FAAD C²I subsystem will be capable of fully initialized march order and emplacement 85% of the time. w/i 30 min NA/NA NA/NA NA w/i 30 min

10. (U) Technical/Operational Characteristics (cont):

(GBS)

	Development Estimate	Goal/ Threshold	Demo Perf	Current Estimate
a. (U) Technical -- (Initial Minimal Requirements)				
(S) Target Tracking in ECM, Clutter & Environments				
(S) Location Accuracy	(b)(1)			
(S) Range				
(S) Sensor Coverage Elevation				
b. (U) Operational -- (Initial Minimal Requirements)				
(U) March Order	≤10 MIN	N/A	N/A	N/A (CH-1)
(U) Fully Initialized Emplacement	≤10 MIN	N/A	N/A	N/A (CH-1)
(S) Survivability ARM	(b)(1)			
(U) Reliability - MTBF	208 hours	N/A	N/A	N/A (CH-1)
(U) Maintainability - MTTR	2.0 hours	N/A	N/A	N/A (CH-1)

Classified By: FAAD CPR SEG
Declassify On: OADR
dated January 5, 1990

10. (U) Technical/Operational Characteristics (cont):

(GBS)

c. (U) Previous Change Explanations -- None
d. (U) Current Change Explanations --

(CH-1) Technical and operational characteristics changed to reflect the revised GBS ROC approved November 29, 1989, and to incorporate "best value" acquisition strategy. The following changes were made:

Characteristic	From	To	Rationale
(S) Location Accuracy	(b)(1)		
(S) Range			
(S) Sensor Coverage Elevation			
(U) Operational -- (Initial Minimal Requirements)			
(U) March Order	≤10 min	N/A	Changed to reflect the "best value" concept described above.
(U) Fully Initialized Emplacement	≤30 min	N/A	Changed to reflect the "best value" concept described above.
(S) Survivability	(b)(1)		
(U) Reliability - MTBF	208 hours	N/A	Changed to reflect the "best value" concept described above.
(U) Maintainability - MTTR	2.0 hours	N/A	Changed to reflect the "best value" concept described above.

e. (U) References :
Planning/Development Estimate: ROC, July 10, 1986.
Approved Program: A DAE Baseline has not been approved for this program.

10. (U) Technical/Operational Characteristics (cont):

(NCTR - PHID)

[Technology 1, Electronic Support Measures (ESM) Technology (T1)] 1/

	Planning Estimate	Goal/ Threshold	Demo Perf	Cur Est
a. (U) Technical --				
(S/NF) Capability Both Model 1 and Model 2	(b)(1)			
(S/NF) Technology Both Model 1 and Model 2				
(S/NF) Detection/ ID Range				
Model 1 (emitters) Lower power				
High power				
Model 2 (emitters) Lower power				
High power				
(S/NF) Coverage (field of view)				
Model 1				
Model 2				
(S/NF) Azimuth Accuracy				
Model 1				
Model 2				
b. (U) Operational --				
(U) Weight				
Model 1	100 lbs	N/A	N/A	100 lbs
Model 2	100 lbs	N/A	N/A	100 lbs

Reference: (U) Development Specification FAAD, Electronic Support Measures (ESM) NCTR System dated November 1989

1/ Technology 1 was not previously reported

Classified By: FAAD NCTR Technology [illegible] dated April 5, 1989

Declassify On: OADR

10. ~~(U)~~ Technical/Operational Characteristics (cont):

(NCTR - PHID)

[Technology 2, Acoustics Technology (T2)] 1/

	Planning Estimate	Goal/ Threshold	Demo Perf	Cur Est
a. ~~(S/NF)~~ Technical --				
~~(S/NF)~~ Capability	(b)(1)			
~~(S/NF)~~ Technology				
~~(S/NF)~~ Detection/ ID Range				
~~(S/NF)~~ Coverage				
~~(S/NF)~~ Azimuth Accuracy Alerting to Host				
b. ~~(U)~~ Operational --				
~~(U)~~ Weight	30 lbs	N/A	N/A	30 lbs

Reference: ~~(S/NF)~~ Development specification FAADS, Non Imaging Sensor, NCTR System dated May 89.

1/ Technology 2 was not previously reported

~~SECRET NOFORN~~

~~Classified By: FAAD NCTR Non Imaging Sensor SPO dated October 6, 1988~~

~~Declassify On: OADR~~

10. (U) Technical/Operational Characteristics (cont):

(NCTR - PHID)

[Technology 4, Jet Engine Modulation (JEM) (T4)] 1/

	Planning Estimate	Goal/ Threshold	Demo Perf	Cur Est
a. (U) Technical --				
(S/NF) Capability	(b)(1)			
(S/NF) Technology				
(S/NF) ID Range				
(S/NF) Coverage				
(S/NF) Azimuth Accuracy				
b. (U) Operational --				
(U) Weight	80 lbs	N/A	N/A	80 lbs

Reference: (U) Development specification, HAIDE HAWK NCTR System dated September 1989

1/ This is the first report to contain technical and operational characteristics for Technology 4.

Classified By: FAAD NCTR HAWK-HAIDE NCTR SCG
dated February 1, 1984
Declassify On: OADR

10. [redacted] **Technical/Operational Characteristics (cont):**

[NCTR-PHID/Aerial Sensor (MTS)]

Development Estimate	Goal/ Threshold	Demo Perf	Cur Est
TBD	TBD/TBD	NA	TBD

c. [redacted] Previous Change Explanations --NCTR-PHID requirements were more clearly defined. Once requirements were approved, they were incorporated into the SAR. Current estimate was based on the draft ROC dated September 25, 1989.

d. [redacted] Current Change Explanations -- NCTR-PHID ROC revisions still await definition, staffing and approval.

e. [redacted] References --

Planning/Development Estimate: ROC, July, 1986.

Approved Program: There are currently no DAE approved baselines for this program.

11. [redacted] **Program Acquisition Cost:** (Current Estimate in Millions of Dollars)

[FAAD C²]

	Development Estimate	Approved Program	Current 1/ Estimate
a. [redacted] Cost --			
Development (RDT&E)	$ 474.3	NA	$ 700.4
Procurement	331.1	NA	330.8
Construction (MILCON)	0.0	NA	0.0
Total FY87 Base Year $	805.4	NA	1031.2
Escalation	88.6	NA	300.2
Development (RDT&E)	(27.0)	NA	(151.6)
Procurement	(61.6)	NA	(148.6)
Construction (MILCON)	(0.0)	NA	(0.0)
Total FAAD C² Then-Year $	$894.0	NA	$ 1331.4

1/ P³I dollars are included in the SAR but the reprograming requires DAE approval prior to execution.

11. [redacted] Program Acquisition Cost (cont): (Current Estimate in Millions of Dollars)

[GBS]

	Development Estimate	Approved Program	Current Estimate
[redacted] Cost --			
Development (RDT&E)	$ 31.8	NA	$ 82.8
Procurement	452.3	NA	334.3
Construction (MILCON)	0.0	NA	0.0
Total FY87 Base Year $	484.1	NA	417.1
Escalation	84.0	NA	128.9
Development (RDT&E)	(3.3)	NA	(13.3)
Procurement	(80.7)	NA	(115.6)
Construction (MILCON)	(0.0)	NA	(0.0)
Total Then-Year $	$ 568.1	NA	$ 546.0

[NCTR-PHID/Aerial Sensor (MTS)*]

	Planning Estimate	Approved Program	Current Estimate
[redacted] Cost --			
Development (RDT&E)	$ 221.2	NA	$ 146.1
Procurement	129.9	NA	129.6
Construction (MILCON)	0.0	NA	0.0
Total FY87 Base Year $	351.1	NA	275.7
Escalation	50.5	NA	70.8
Development (RDT&E)	(17.1)	NA	(26.6)
Procurement	(33.4)	NA	(44.2)
Construction (MILCON)	(0.0)	NA	(0.0)
Total Then-Year $	$ 401.6	NA	$ 346.5

* Constant $s adjusted to delete IFF from Planning Estimate. These costs appear in the Air Force Mark XV SAR.

[FAAD C²I]

	Development Estimate	Approved Program	Current Estimate
[redacted] Cost --			
Development (RDT&E)	$ 727.3	NA	$ 929.3
Procurement	913.3	NA	794.7
Construction (MILCON)	0.0	NA	0.0
Total FY87 Base Year $	1640.6	NA	1724.0
Escalation	223.1	NA	499.9.
Development (RDT&E)	(47.4)	NA	(191.5)
Procurement	(175.7)	NA	(308.4)
Construction (MILCON)	0	0	0
Total Then-Year $	$ 1863.7	NA	$ 2223.9

11. [redacted] Program Acquisition Cost (cont): (Current Estimate in Millions of Dollars)

b. [redacted] Quantities --

Quantities for FAAD C²I Systems vary in size based on specific mission requirements (i.e. Heavy Division, Light Division, Armored Cavalry Regiment, Training Base and Special Division). The size variation is relative to the number/type of components within the system and results in a considerable difference in cost. The quantities procured in each fiscal year consists of two or more systems of different configurations. Therefore, a unit of measure cannot be defined for the FAAD C²I Program.

c. [redacted] Foreign Military Sales -- None.

d. [redacted] Nuclear Costs -- None.

e. [redacted] References --

Planning/Development Estimate: SDDM, August 14, 1986; FY89-90 President's Budget.

Approved Program: There are currently no DAE approved baselines for this program.

12. [redacted] Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then Year) Dollars in Millions)

[FAAD C²I]

a. [redacted] Program Acquisition --

Quantities for FAAD C²I Systems vary in size based on specific mission requirements (i.e. Heavy Division, Light Division, Armored Cavalry Regiment, Training Base and Special Division). The size variation is relative to the number/type of components within the system and results in a considerable difference in cost. The quantities procured in each fiscal year consists of two or more systems of different configurations. Therefore, a unit of measure cannot be defined for the FAAD C²I Program.

b. [redacted] Current Procurement -- NA

13. [U] Cost Variance Analysis:

a. [U] Summary --

[FAAD C²]

(Current (Then-year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	501.3	392.7		894.0
Previous Changes:				
Economic	+3.6	+8.5		+12.1
Quantity				
Schedule	-2.2			-2.2
Engineering				
Estimating	+120.2	-100.0		+20.2
Other				
Support				
Subtotal	+121.6	-91.5		+30.1
Current Changes:				
Economic	-13.9	+20.7		+6.8
Quantity				
Schedule				
Engineering				
Estimating	+243.0	+157.5		+400.5
Other				
Support				
Subtotal	+229.1	+178.2		+407.3
Total Changes	+350.7	+86.7		+437.4
Current Estimate	852.0	479.4		1331.4

FY87 (Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	474.3	331.1		805.4
Previous Changes:				
Quantity				
Schedule	-2.1			-2.1
Engineering				
Estimating	+91.4	-88.7		+2.7
Other				
Support				
Subtotal	+89.3	-88.7		+.6
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	+136.8	+88.4		+225.2
Other				
Support				
Subtotal	+136.8	+88.4		+225.2
Total Changes	+226.1	-.3		+225.8
Current Estimate FY87$	700.4	330.8		1031.2

13. [U] Cost Variance Analysis (cont):

[FAAD C^2]

b. [U] Previous Change Explanations --

(1) RDT&E
Economic - Revised escalation indices
Estimating - budget reduction in FY 90
Schedule - Schedule adjustment

(2) Procurement
Estimating - budget reduction in FY 92
Economic - Revised escalation indices

c. [U] Current Change Explanations --

	(Dollars in Millions) Base- Year	Then-Year
(1) RDT&E		
Economic - Revised escalation indices		-13.9
Estimating - Program funding changes (+17.5) and the projected program requirements for P3I (119.3) through the year 2006.	+136.8	+243.0
(2) Procurement		
Economic - Revised escalation indices		+20.7
Estimating - Program funding changes (-100.0) and projected program requirements FY95-06 (+188.4)	+88.4	+157.5

13. [redacted] Cost Variance Analysis (cont):

[GBS]

a. [redacted] Summary --

(Current (Then-year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	35.1	533.0		568.1
Previous Changes:				
Economic	-0.1	+6.0		+5.9
Quantity				
Schedule				
Engineering				
Estimating	+69.3	-40.0		+29.3
Other				
Support				
Subtotal	+69.2	-34.0		+35.2
Current Changes:				
Economic	+1.5	+33.6		+35.1
Quantity				
Schedule				
Engineering				
Estimating	-9.7	-82.7		-92.4
Other				
Support				
Subtotal	-8.2	-49.1		-57.3
Total Changes	+61.0	-83.1		-22.1
Current Estimate	96.1	449.9		546.0

FY87 (Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	31.8	452.3		484.1
Previous Changes:				
Quantity				
Schedule				
Engineering				
Estimating	+61.4	-53.2		+8.2
Other				
Support				
Subtotal	+61.4	-53.2		+8.2
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	-10.4	-64.8		-75.2
Other				
Support				
Subtotal	-10.4	-64.8		-75.2
Total Changes	+51.0	-118.0		-67.0
Current Estimate FY87$	82.8	334.3		417.1

13. [redacted] Cost Variance Analysis (cont):

[GBS]

b. [redacted] Previous Change Explanations --

(1) RDT&E

Economic - Revised escalation indices; adjustments for changes that were miscategorized.

Estimating - Adjustment for budget reduction; actual contract proposals and definitized testing requirements; adjustments for changes that were miscategorized; and adjustments for funds that were reprogrammed to other effort

(2) Procurement

Economic - Revised escalation indices; adjustments for changes that were miscategorized.

Estimating -Adjustment for previous changes which were miscategorized; delays ir award of the contract resulted in the loss of some funding and funding changes.

c. [redacted] Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E -		
Economic - Revised escalation indices		+1.5
Estimating - Adjustment for funds that were reprogrammed to other efforts and for reduction in tests.	-10.4	-9.7
(2) Procurement		
Economic - Revised escalation indices		+33.6
Estimating - Budget reductions in FY90 and FY91.	-64.8	-82.7

13. [U] Cost Variance Analysis (cont):

[NCTR-PEID/Aerial Sensor (MTS)]

a. [U] Summary --

(Current (Then-year) Dollars in Millions) 1/

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	238.3	163.3		401.6
Previous Changes:				
Economic	-3.5			-3.5
Quantity				
Schedule	-37.7			-37.7
Engineering				
Estimating	-58.1			-58.1
Other				
Support				
Subtotal	-99.3	0.0		-99.3
Current Changes:				
Economic	+0.6	+9.9		+10.5
Quantity				
Schedule				
Engineering				
Estimating	+33.1	+.6		+33.7
Other				
Support				
Subtotal	+33.7	+10.5		+44.2
Total Changes	-65.6	+10.5		-55.1
Current Estimate	172.7	173.8		346.5

FY87 (Constant (Base-Year) Dollars in Millions) 2/

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	221.2	129.9		351.1
Previous Changes:				
Quantity				
Schedule	-32.2			-32.2
Engineering				
Estimating	-70.0			-70.0
Other				
Support				
Subtotal	-102.2	0.0		-102.2
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	+27.1	-0.3		+26.8
Other				
Support				
Subtotal	+27.1	-0.3		+26.8
Total Changes	-75.1	-0.3		-75.4
Current Estimate FY87$	146.1	129.6		275.7

1/ Then-Year dollars adjusted to delete IFF from Planning Estimate and previous changes totaling 77.3 RDTE and 61.0 Proc.

2/ Constant dollars adjusted to delete IFF from Planning Estimate and previous changes totaling 65.4 RDTE and 48.1 Proc.

13. [redacted] Cost Variance Analysis (cont):

[NCTR-PHID/Aerial Sensor (MTS)]

b. [redacted] Previous Change Explanations --None

c. [redacted] Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E -		
Economic - Revised escalation indices		+0.6
Estimating - Refinement of engineering estimates for NCTR-PHID	+27.1	+33.1
(2) Procurement -		
Economic - Revised escalation indices		+9.9
Estimating - Refinement of estimate based on development engineering estimates changes in Sensor program funding.	-0.3	+0.6

13. [redacted] Cost Variance Analysis (cont):

[FAAD C²I SUMMARY]1/

(Current (Then-year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development/Planning Estimate	774.7	1089.0		1863.7
Previous Changes:				
Economic		+14.5		+14.5
Quantity				
Schedule	-39.9			-39.9
Engineering				
Estimating	+131.4	-140.0		-8.6
Other				
Support				
Subtotal	+91.5	-125.5		-34.0
Current Changes:				
Economic	-11.8	+64.2		+52.4
Quantity				
Schedule				
Engineering				
Estimating	+266.4	+75.4		+341.8
Other				
Support				
Subtotal	+254.6	+139.6		+394.2
Total Changes	+346.1	+14.1		+360.2
Current Estimate	1120.8	1103.1		2223.9

FY87 (Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development/Planning Estimate	727.3	913.3		1640.6
Previous Changes:				
Quantity				
Schedule	-34.3			-34.3
Engineering				
Estimating	+82.8	-141.9		-59.1
Other				
Support				
Subtotal	+48.5	-141.9		-93.4
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	+153.5	+23.3		+176.8
Other				
Support				
Subtotal	+153.5	+23.3		+176.8
Total Changes	+202.0	-118.6		+83.4
Current Estimate FY87$	929.3	794.7		1724.0

1/ IFF costs have been deleted, and appear in Air Force Mark XV SAR.

14. [TOP] **Program Acquisition Unit Cost (PAUC) History:** (Then-Year Dollars in Millions)

[U] Quantities for FAAD C²I Systems vary in size based on specific mission requirements (i.e. Heavy Division, Light Division, Armored Cavalry Regiment, Training Base and Special Division). The size variation is relative to the number/type of components within the system and results in a considerable difference in cost. The quantities procured in each fiscal year consists of two or more systems of different configurations. Therefore, a unit of measure cannot be defined for the FAAD C²I Program.

15. [U] **Contract Information:** (Then-Year Dollars in Millions)

[FAAD C²]

a. [U] RDT&E --

TRW Defense Systems
One Space Park
Redondo Beach, CA 90278
DAAH01-86-C-A065, CPIF
Award: Sep 29, 1986
Definitized Date: Same

Initial Contract Price		
Target	Ceiling	Qty
58.1	NA	NA

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
128.5	NA	NA	$146.7	$128.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-11.2	$-3.9
Cumulative Variances to Date (12/31/89)	$-1.6	$-3.1
Net Change	$+9.6	$+0.8

Explanation of Change: Contract has been reprogrammed.

b. [U] Procurement -- None

c. [U] MILCON -- NA

[GBS/NCTR-PHID/Aerial Sensor (MTS)]

a. [U] RDT&E -- None (No major contracts awarded)

b. [U] Procurement -- None

c. [U] MILCON -- None

16. [redacted] **Program Funding Summary:** (Current Estimate in Millions of Dollars)

a. [redacted] Program Status --

[FAAD C^2]

(1) Percent Program Completed: 40.8% (11 years/27 years)
(2) Percent Program Cost Appropriated: 22.9% ($304.4/$1331.4)

[GBS]

(1) Percent program complete: 42.9% (3 years/7 years)
(2) Percent program cost Appropriated: 10.3% ($56.2/546.0)

[NCTR-PHID/Aerial Sensor (MTS)]

(1) Percent Program Completed: 36.4% (4 years/11 years)
(2) Percent Program Cost Appropriated: 22.7% ($78.6/$346.5)

b. [redacted] Appropriation Summary -- (Then-Year Dollars in Millions)

[FAAD C^2]

Appropriation	Prior Yrs (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Bal To Comp (FY92-06)	Total
RDT&E	$ 255.3	$ 49.1	$ 86.7	$ 460.9	$ 852.0
Procurement	$ 0.0	$ 0.0	$ 0.0	$ 479.4	$ 479.4
MILCON	0.0	0.0	0.0	0.0	0.0
Total	$ 255.3	$ 49.1	$ 86.7	$ 940.3	$1331.4

[GBS]

Appropriation	Prior Yrs (FY87-89)	Budget Year (FY90)	Budget Year (FY91)	Bal To Comp (FY92-94)	Total
RDT&E	$ 39.3	$ 16.9	$ 0.0	$ 39.9	$ 96.1
Procurement	$ 0.0	$ 0.0	$ 0.0	$ 449.9	$ 449.9
MILCON	0.0	0.0	0.0	0.0	0.0
Total	$ 39.3	$ 16.9	$ 0.0	$ 489.8	$ 546.0

[NCTR-PHID/Aerial Sensor (MTS)]

Appropriation	Prior Yrs (FY87-89)	Budget Year (FY90	Budget Year (FY91)	Bal To Comp (FY92-94)	Total
RDT&E	$ 59.8	$ 17.8	$ 14.4	$ 80.7	$ 172.7
Procurement	$ 0.0	$ 1.0	$ 0.0	$ 172.8	$ 173.8
MILCON	0.0	0.0	0.0	0.0	0.0
Total	$ 59.8	$ 18.8	$ 14.4	$ 253.5	$ 346.5

[FAAD C^2I SUMMARY]

Appropriation	Prior Yrs (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Bal To Comp (FY92-06)	Total
RDT&E	$ 354.4	$ 83.8	$ 101.1	$ 581.5	$1120.8
Procurement	$ 0.0	$ 1.0	$ 0.0	$ 1102.1	$1103.1
MILCON	0.0	0.0	0.0	0.0	0.0
Total	$ 354.4	$ 84.8	$ 101.1	$1683.6	$2223.9

6. [redacted] **Program Funding Summary (cont):**
c. [redacted] Annual Summary --

[FAAD C²]

Fiscal Year	Qty	Flyaway FY87 Dollars Nonrec	Flyaway FY87 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: RDT&E (D126)								
1980				4.1	3.0	3.0	2.9	5.9
1981				12.3	10.0	10.0	9.7	6.1
1982				15.3	13.2	13.1	12.8	7.6
1983				1.1	1.0	1.0	1.0	4.9
1984				33.3	31.2	31.2	30.7	3.8
1985				18.7	18.1	18.1	15.5	3.4
1986				20.2	20.1	20.1	19.3	2.8
1987				36.4	37.2	37.2	33.2	2.7
1988				52.2	55.2	55.2	50.6	3.0
1989				60.4	66.3	66.0	52.0	4.2
1990				42.8	49.1			4.0
1991				72.7	86.7			4.2
1992				93.9	116.3			4.0
1993				74.4	95.3			3.7
1994				43.3	57.3			3.4
1995				17.6	24.0			3.1
1996				8.5	12.0			3.1
1997				8.3	12.0			3.1
1998				9.4	14.0			3.1
1999				9.1	14.0			3.1
2000				8.8	14.0			3.1
2001				9.8	16.0			3.1
2002				9.5	16.0			3.1
2003				9.2	16.0			3.1
2004				10.0	18.0			3.1
2005				9.7	18.0			3.1
2006				9.4	18.0			3.1
Total				700.4	852.0	254.9	228.4	
Appropriation: Procurement (AD5050 & BA96201994)								
1992				9.8	12.7			4.0
1993				52.4	70.0			3.7
1994				80.2	110.4			3.4
1995				75.5	107.2			3.1
1996				31.7	46.4			3.1
1997				19.9	30.0			3.1
1998				18.6	29.9			3.1
1999				17.5	28.0			3.1
2000				6.5	10.8			3.1
2001				1.2	2.0			3.1
2002				4.6	8.0			3.1
2003				4.4	8.0			3.1
2004				4.3	8.0			3.1
2005				4.2	8.0			3.1
Subtotal				330.8	479.4			
Total				1031.2	1331.4	254.9	228.4	

16. [redacted] Program Funding Summary (cont):

c. [redacted] Annual Summary -- (cont)

[GBS]

Fiscal Year	Qty	Flyaway FY87 Dollars Nonrec	Flyaway FY87 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: RDT&E (D126 & DE10)								
1988		17.1		17.1	18.1	17.5	12.9	3.0
1989		19.2		19.2	21.2	12.9	4.8	4.2
1990		14.8		14.8	16.9			4.0
1991		0.0		0.0	0.0			4.2
1992		17.8		17.8	22.0			4.0
1993		10.5		10.5	13.4			3.7
1994		3.4		3.4	4.5			3.4
Subtotal		82.8		82.8	96.1	30.4	17.7	
Appropriation: Procurement (WK5053 & BA9620)								
1992				66.1	85.4			4.0
1993				114.1	152.3			3.7
1994				154.1	212.2			3.4
Subtotal				334.3	449.9			
Total		82.8		417.1	546.0	30.4	17.7	

16. Program Funding Summary (cont):

[NCTR-PHID]
("T1" and "T4")

Fiscal Year	Qty	Flyaway FY87 Dollars Nonrec	Flyaway FY87 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: RDT&E (D355 & D356)								
1987				0.4	0.4	0.4	0.4	2.7
1988				12.2	12.9	12.9	8.2	3.0
1989				14.7	16.2	7.3	3.1	4.2
1990				13.9	15.9			4.0
1991				11.6	13.9			4.2
1992				6.3	7.8			4.0
1993				4.8	6.2			3.7
1994				3.3	4.4			3.4
Subtotal				67.2	77.7	20.6	11.7	
Appropriation: Procurement (AD5051)								
1992				29.5	38.1			4.0
1993				34.0	45.4			3.7
1994				48.6	67.0			3.4
Subtotal				112.1	150.5			
Total				179.3	228.2	20.6	11.7	

[NCTR-PHID]
("T2")

Appropriation: RDT&E (D495)								
1987				4.1	4.2	4.2	4.2	2.7
1988				7.8	8.2	8.2	6.6	3.0
1989				8.3	9.2	2.3	1.2	4.2
1990				1.7	1.9			4.0
1991				0.4	0.5			4.2
1992				2.5	3.1			4.0
1993				1.6	2.1			3.7
Subtotal				26.4	29.2	14.7	12.0	
Appropriation: Procurement (AD5054)								
1990				0.8	1.0			4.0
1991				0.0	0.0			4.2
1992				5.6	7.3			4.0
1993				5.5	7.3			3.7
1994				5.6	7.7			3.4
Subtotal				17.5	23.3			
Total				43.9	52.5	14.7	12.0	

[Aerial Sensor (MTS)]

Fiscal Year	Qty	Flyaway FY87 Dollars Nonrec	Flyaway FY87 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: RDT&E (D464 & D421)								
1987				4.0	4.1	4.1	4.1	2.7
1988				4.4	4.6	4.6	4.4	3.0
1989				0.0	0.0			
1990				0.0	0.0			
1991				0.0	0.0			
1992				7.7	9.6			4.0
1993				16.3	20.9			3.7
1994				20.1	26.6			3.4
1995				0	0			
1996				0	0			
1997				0	0			
Subtotal				52.5	65.8	8.7	8.5	
Appropriation: Procurement (AD5052)								
1994				0	0			
1995				0	0			
1996				0	0			
1997				0	0			
1998				0	0			
1999				0	0			
2000				0	0			
2001				0	0			
2002				0	0			
2003				0	0			
2004				0	0			
Subtotal				0	0			
Total				0	0			

16. [redacted] Program Funding Summary (cont):

[IFF] (Non-Add Entry)

Fiscal Year	Qty	Flyaway FY87 Dollars Nonrec	Flyaway FY87 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: RDT&E (D297 & D530)								
1980				2.9	2.5	2.5	2.5	3.1
1981				2.6	2.5	2.5	2.5	11.9
1982				5.8	5.9	5.9	5.9	9.2
1983				2.8	3.0	3.0	3.0	4.9
1984				3.6	4.0	4.0	4.0	3.8
1985				3.7	4.2	4.2	4.2	3.4
1986				7.6	9.1	9.1	9.1	2.8
1987				4.5	5.5	5.5	4.4	2.7
1988				1.1	1.4	1.4	1.0	3.1
1989				3.7	4.9	4.9	0.4	4.2
1990				5.1	6.9	1.7	0.0	4.0
1991				0	0			
1992				0	0			
1993				0	0			
1994				0	0			
Subtotal				43.4	49.9	44.7	37.0	
Appropriation: Procurement (AD5053)								
1993				0	0			
1994				0	0			
1995				0	0			
1996				0	0			
1997				0	0			
1998				0	0			
1999				0	0			
2000				0	0			
2001				0	0			
2002				0	0			
Subtotal				0	0			
Appropriation: O & M (ARMY)								
1995				0	0			1.8
1996				0	0			1.8
1997				0	0			1.8
1998				0	0			1.8
Subtotal				0	0			
Total				43.4	49.9	44.7	37.0	

16. [redacted] Program Funding Summary (cont):

[FAAD C²I SUMMARY]

Fiscal Year	Qty	Flyaway FY87 Dollars Nonrec	Flyaway FY87 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Esc Rate (%)
Appropriation: RDT&E								
1980				4.1	3.0	3.0	3.0	5.9
1981				12.3	10.0	10.0	10.0	6.1
1982				15.3	13.2	13.1	13.1	7.6
1983				1.1	1.0	1.0	1.0	4.9
1984				33.3	31.2	31.2	30.7	3.8
1985				18.7	18.1	18.1	15.5	3.4
1986				20.2	20.1	20.1	19.3	2.8
1987				44.9	45.9	45.9	41.9	2.7
1988				93.7	99.0	98.4	82.7	3.0
1989				102.6	112.9	88.5	61.1	4.2
1990				73.2	83.8			4.0
1991				84.7	101.1			4.2
1992				128.2	158.8			4.0
1993				107.6	137.9			3.7
1994				70.1	92.8			3.4
1995				17.6	24.0			3.1
1996				8.5	12.0			3.1
1997				8.3	12.0			3.1
1998				9.4	14.0			3.1
1999				9.1	14.0			3.1
2000				8.8	14.0			3.1
2001				9.8	16.0			3.1
2002				9.5	16.0			3.1
2003				9.2	16.0			3.1
2004				10.0	18.0			3.1
2005				9.7	18.0			3.1
2006				9.4	18.0			3.1
Total				929.3	1120.8	329.3	278.3	
Appropriation: Procurement								
1990				0.8	1.0			4.0
1991				.0	.0			4.2
1992				111.0	143.5			2.8
1993				206.0	275.0			2.3
1994				288.5	397.3			1.8
1995				75.5	107.2			
1996				31.7	46.4			6.1
1997				19.9	30.0			7.6
1998				18.6	29.9			4.6
1999				17.5	28.0			3.8
2000				6.5	10.8			3.5
2001				1.2	2.0			2.8
2002				4.6	8.0			2.7
2003				4.4	8.0			4.1
2004				4.3	8.0			4.0
2005				4.2	8.0			4.0
Subtotal				794.7	1103.1			
Total				1724.0	2223.9	310.2	241.6	

17. [redacted] Production Rate Data

[FAAD C2/GBS/NCTR-PHID/Aerial Sensor (MTS)]

a. [redacted] Annualized Production Rates -- NA

b. [redacted] Cost Variance -- NA

c. [redacted] Schedule Variance -- NA

d. [redacted] Deliveries (Plan/Actual) -- NA

e. [redacted] Approved Design-to-Cost Goal -- NA (primarily NDI).

18. [redacted] Operating and Support Costs:

[FAAD C2/GBS/NCTR-PHID/Aerial Sensor (MTS)]

a. [redacted] Assumptions and Ground Rules -- NA

b. [redacted] Costs -- NA

c. [redacted] Contractor Support Costs -- (Current Then-Year Dollars in Millions)

	FY90 and Prior	Budget FY91	Budget FY92	Balance to Complete	Total
O&M	0.0	0.1	0.0	--	0.1

(1)

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: Advanced Cruise Missile SAR-89-065

AF-1 ACM ~~SECRET~~ AS OF DATE: December 31, 1989

AF/PAS
90-099 -T
#09

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1. (U) Designation/Nomenclature (Popular Name): AGM-129A/Advanced Cruise Missile (ACM)

2. (U) DoD Component: U.S. Air Force

(U) Responsible Office and Telephone Number:

Advanced Cruise Missile (ACM) Program Office
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433-6503

Colonel Claude M. Bolton, Jr.
Assigned: August 1, 1989
AV785-7885; Comm (513)255-788

4. ~~(U)~~ Program Elements:

RDT&E: APPN 3600, PE 0603001F

PROCUREMENT: APPN 3020, ICN AGM129A; PE 0101120F
APPN 3010, ICN AGM129A; PE 0101120F

MILCON: APPN 3300, PE 0101120F

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DIRECTORATE FOR FREEDOM OF INFORMATION
AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

5. ~~(U)~~ Related Programs: F112 Engine, B-52 ACM Integration (PE 11113F), B- Integration (PE 11126F), Common Strategic Rotary Launcher (PE 63258F).

THIS PAGE IS ~~UNCLASSIFIED~~

~~Classified By: ACM [illegible], dtd 1 Oct 89~~
~~Declassify On: OADR~~

6. (U) Mission and Description:

a. (U) The ACM is an airbreathing, air-to-surface, subsonic, strategic nuclear cruise missile which satisfies the Strategic Air Command's requirement for increased range, enhanced survivability and improved accuracy as compared to the AGM-86B, ALCM (Air Launched Cruise Missile). The ACM will be launched at extended standoff distances from enemy borders and penetrate and evade enemy defenses by exploiting low observable technologies. Mission loading and deployment compatibility exists with the ALCM and SRAM (Short Range Attack Missile). Operational integration is required with the B-52H and B-1B.

b. (S) Background -- The ACM is a presidentially directed program designed to satisfy the Strategic Air Command's (SAC) requirement for an Advanced Cruise Missile which will (b)(1) [redacted] (b)(1) [redacted] The ACM is designed to provide this capability through extended operational range, improved survivability and increased accuracy. The ACM takes advantage of ALCM and other existing cruise missile technologies, operational concepts and support structures. Testing to date has demonstrated (b)(1) [redacted] (non-spec conditions) with (b)(1) [redacted] Survivability testing demonstrates significant improvement over the existing fleet of cruise missiles. Pilot production was started in 1985, with low rate production beginning in 1986. A full rate production decision is anticipated by fall of 1990.

7. (U) Program Highlights:

a. (U) Significant Historical Developments --

(1) (U) Early activity on this program was performed under other program elements. Direction provided in October 1982 designated it as a special access program and authorized streamlined management procedures. As a result of competitive source selection, General Dynamics/Convair (GD/C) was placed on contract April 1983. Sole source contracts were awarded to Williams International for the engine, Boeing-Wichita for the B-52 integration and missile launcher (CSRL), and Boeing-Seattle and Rockwell International for B-1B integration.

(2) (U) The first free flight took place July 1985. Subsequently, a concurrent full-scale development/pilot production (Lot I) contract was awarded to GD/C in September 1985, with a low rate production decision (Lot II) following in July 1986. The original quantity for Lot II was later reduced.

(3) (U) In November 1986, after three successive failures, quantities for Lot III were cut from 300 to 250. Of these, only 150 missiles were fully funded. Subsequent program restructurings have resulted in additional reductions in funding and quantities, and the introduction of a second source. In November 1987, a Technology Transfer and Qualification contract was awarded to McDonnell Douglas Missile Systems Company (MDMSC). Building to GD/C drawings, MDMSC will deliver 14 qualification missiles by December 1990. The Lot V/VI contracts, currently in work, will be a directed 50/50 split buy of 100 missiles each; subsequent lots will be competed.

7. (U) Program Highlights (Cont'd):

(4) (S) Flight test results to date have been mixed. (b)(1) [redacted] including the last five [redacted] row in 1989. Data from the twelve successful flights, however, has shown excellent correlation with predictions and good performance against specification requirements. Coupled with ground testing, flight test continue to demonstrate that the ACM meets range, survivability, and accuracy requirements. Ground qualification testing has been completed with electromagnetic pulse (EMP) testing demonstrating a 200% margin and warhead impact testing over 100% margin.

(5) (U) An aggressive reliability improvement program has been initiated for the air vehicle and components. Functional ground test and design margin testing will identify system weaknesses while aggressive steps are being taken to enhance the effectiveness of the environmental stress screening at the piece part, board, and box levels.

(6) (S) Successful production transition is underway with facilities in place and operating. Missile supportability is progressing with Main Operating Base 1 (K.I. Sawyer AFB MI) and facility construction complete. Most support and training equipment is in place, and maintenance personnel training is in progress.

(7) (U) A Limited Nuclear Surety Inspection (LNSI), conducted by a Strategic Air Command Inspector General team,was successfully completed at K.I. Sawyer AFB in September 1988.

b. (S) Significant Developments Since Last Report --

(1) (U) The dual source producer, McDonnell Douglas Missile Systems Company (MDMSC), successfully completed requirements for Milestone I (Initial Production Review) in April 1989 with the exception of composites process validation. The composites process validation was successfully completed in September 1989. Currently MDMSC is on track toward meeting its Milestone II requirements (Qualification Review) in April 1990.

(2) (U) Upon satisfaction of the FY87 Congressional requirement for six successful test flights, the Lot III contract was definitized in September 1989.

(3) (U) Five out of five free flights were successfully completed during 1989, including four since June 1989 satisfying the FY90 Congressional requirement. Based on this flight success, Congress fully funded 100 missiles (50 for GD/C and 50 for MDMSC) in the FY90 Appropriation Act.

(4) (S) Thirty-one missiles have been delivered to K.I. Sawyer AFB MI, ACM Main Operating Base (MOB) #1.

(5) (U) Depot maintenance planning is progressing satisfactorily. The Ogden Air Logistics Center missile depot was activated in December 1989 with a very basic Level I-II capability. Depot training [redacted] vities are underway. Further missile related depot activities will [redacted] ow shortly.

7. (U) Program Highlights (Cont'd):

(6) (U) Variant risk reduction activities were accomplished in 1989. (b)(1) (b)(1) (b)(1) In December 1989, direction was received to begin Full Scale Development of the Variant.

(7) (U) The RFP for Lot V/VI was released November 1989. Proposals are due from GD/C and MDMSC February 1990 and contract award is projected for August 1990.

(8) (U) A successful warhead integration flight using a DoE instrumented payload was conducted in November 1989. The mission was planned using the HQ SAC planning system and procedures.

(9) (U) The ACM is expected to satisfy the mission requirement.

c. (U) Changes since "As of Date" --

(1) (U) The Lot IV contract option was exercised January 31, 1990.

8. (U) Threshold Breaches: There are no DAE Baseline (Nov 1989) breaches.

9. (U) Schedule:

a. (U) Milestones

	Production Estimate	Approved Program	Current Estimate
( ) FSD Contract Award/Start	Apr 83	Apr 83	Apr 83
( ) Preliminary Design Review (PDR)	Sep 84	Sep 84	Sep 84
( ) Critical Design Review (CDR)	Mar 85	Mar 85	Mar 85
( ) First Free Flight	Jul 85	Jul 85	Jul 85
( ) Pilot Production (Lot I PP)	Jul 85	Jul 85	Jul 85
( ) Low Rate Initial Production (LRIP) Decision	Jul 86	Jul 86	Jul 86
( ) Limited Nuclear Surety Inspection (LNSI)*	Sep 88	Aug 88	Sep 88
( ) Physical Configuration Audit (PCA)	Feb 88	Feb 88	Feb 88
( ) Go Ahead Full Rate Prod (Lot V) (Ch-1) Decision	Sep 88	Jun 90(Ch-1)	Aug 90(Ch-1)
( ) Functional Configuration Audit (FCA)	Jun 89	Sep 90(Ch-2)	Sep 90(Ch-2)

(b)(1)

* (U) The Dec 87 SAR referred to this milestone as the Initial (Nuclear Surety Inspection) NSI. The correct nomenclature is printed in this SAR. Furthermore, no difference other than the name exists between the Initial Nuclear Surety Inspection and the Limited Nuclear Surety Inspection.

(b)(1)

9. (U) Schedule Cont'd:

b. (U) Previous Change Explanations

(U) The delay in the full rate production decision could not be made until six successful flight tests had been conducted. As of December 31, 1988, only three of the six required flights had been completed.

c. (U) Current Change Explanations --

(Ch - 1) (U) Program restructure due to fiscal adjustments and reduction of concurrency delayed Full Rate Decision to Lot V from August 1989 to August 1990).

(Ch - 2) (U) The final FCA was changed from June 1989 to September 1990, four months after completion of B-52 Flight Testing, to allow for analysis of complete performance data rather than require a number of open items. The audit, therefore, can be on demonstrated DT&E/IOT&E performance, not future events or incomplete tasks.

(Ch - 3) (U) The (b)(1) to reflect (b)(1) (b)(1) (b)(1)

d. (U) References --

(U) Production Estimate:

(1) (U) PMD 3006(7), Jun 27, 1985 (S/NOFORN)
(2) (U) DEPSECDEF Memo: Low Rate Initial Production, (LRIP) Jul 21, 1986 (S)
(3) (U) SECDEF Breifing, Nov 9, 1987 (S/NOFORN)
(4) (U) PMD 3006(10), ACM Procurement Direction, Apr 1987 (S).
(5) (U) PMD 3006(11), Undated (S).

(U) Approved Program:

(1) (U) DAE Baseline, November 16, 1989.

10. (U) Technical/Operational Characteristics:

	Prod Est	Approved Program Goal/ Threshold	Demon-strated Perf	Current Estimate
a. (U) Technical --				
(U) Penetration speed (b)(1) (Mach No.)		(b)(1)	-	(b)(1)
(U) Missile Carriage				
(U) External:				
B-1B (Each)	12	10/10	-	10
B-52H (Each)	12	12/12	12	12

10. (U) Technical/Operational Characteristics Cont'd:

	Prod Est	Approved Program Goal/ Threshold	Demon-strated Perf	Current Estimate
(U) Internal B-1B (Each)	4	4/4	-	4
(U) Missile Launch				
(S) Max Altitude (in feet)		(b)(1)		
Min Altitude	N/A	(b)(1)		
(S) System Operational Range (NM)		(b)(1)		(Ch-1)
(S) System Accuracy (CEP)	150	(b)(1)		
(S) Max Standoff Launch (for (b)(1) (in NM)		(b)(1)		
(S) Service Ceiling (in feet)	-	(b)(1)		
(S) Mean Time To Repair (MTTR in hours)	-			

**(S) Have flown at (b)(1) feet but have not fully demonstrated Service Ceiling.

b. (U) Operational (b)(1)
(S) Readiness/Supportability:
(S) Operational Availability (in percent) (b)(1)
(S) Reliability:
(S) Air Vehicle Reliability (in percent)

c. (U) Previous Change Explanations
(U) The System Operational Range was revised to (b)(1) (NM) from (b)(1) based on analysis as of December 31, 1988.

d. (U) Current Change Explanations --
(Ch - 1) (S) The demonstrated System Operational Range of (b)(1) is based on flight demonstration and current analysis with adjusted weight.

e. (U) References --
(U) Production Estimates
(1) (U) PMD 3006(7), June 27, 1985 (S/SAR)
(2) (U) PMD 3006(8), November 10, 1987 (S/SAR)

(U) Approved Program:
DAE Baseline, November 16, 1989

11. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Cost --

	Production Estimate	Approved Program	Current Estimate
Development	1,349.1	1,417.4	1,389.2
Missile Procurement	3,686.0	3,575.4	3,592.2
(Flyaway)	(3,157.9)	(3,203.4)	(3,305.0)
(Other Weapon System Costs)	(464.8)	(273.6)	(208.7)
(Initial Spares)	(63.3)	(98.4)	(78.5)
Aircraft Integration	112.8	110.2	113.4
MILCON	49.6	30.1	20.9
Total FY 83 Base Year $	5,197.5	5,133.1	5,115.7
Escalation	1,467.9	1,532.5	1,731.4
Development	(143.3)	(164.9)	(158.2)
Missile Procurement	(1,285.8)	(1,339.7)	(1,546.9)
Aircraft Integration	(22.2)	(21.0)	(22.2)
MILCON	(16.6)	(6.9)	(4.1)
Total Then Year $	6,665.4	6,665.6	6,847.1

b. (U) Quantities --

Development	25	25	25
Missile Procurement	1,461	1,461	1,461
Total	1,486	1,486	1,486

c. (U) Foreign Military Sales -- None.

d. (U) Nuclear Costs -- $979.9 Millions

e. (U) References -- (U) Production Estimate: FY1989 Presidents Budget as documented in December 31, 1987 SAR

(U) Approved Program: DAE Baseline, November 16, 1989

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then Year) Dollars in Millions)

a. (U) Program Acquisition --

	Current Estimate (Dec 89 SAR)	Current Year UCR Baseline (Dec 88 SAR*)	Budget Year UCR Baseline (Dec 89 SAR)
(1) Cost	6,847.1	6,668.1	6,847.1
(2) Quantity *	1,461	1,461	1,461
(3) Unit Cost	4.687	4.564	4.687

* (U) This value has been revised to exclude 25 R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully configured end items for the purposes of this calculation.

b. (U) Current Procurement --

	FY90	FY90 APPN*	(FY91)
(1) Cost	326.1	326.1	488.6
Less CY Adv Proc	-57.0	-57.0 *	-107.4
Plus PY Adv Proc	117.0	117.0	57.0
Net Total	386.1	386.1	438.2
(2) Quantity	100	100	100
(3) Unit Cost	3.861	3.861	4.382

* (U) Adjusted to reflect the FY90 Appropriation Act

13. (U) Cost Variance Analysis:

a. (U) Summary — (Current (Then Year) Dollars in Millions)

	RDT&E	MSL PROC	A/C INTEG	MILCON	TOTAL
Production Estimate	1,492.4	4,971.8	135.0	66.2	6,665.4
Previous Changes:					
Economic	0.3	10.6	-0.3	-0.7	9.9
Quantity	0.0	0.0	0.0	0.0	0.0
Schedule	0.0	158.5	0.0	0.0	158.5
Engineering	102.6	63.4	0.0	0.0	166.0
Estimating	-10.5	-76.7	-3.5	-28.5	-119.2
Other	0.0	0.0	0.0	0.0	0.0
Support	0.0	-212.5	0.0	0.0	-212.5
Subtotal	92.4	-56.7	-3.8	-29.2	2.7
Current Changes:					
Economic	2.7	224.1	0.0	0.3	227.1
Quantity	0.0	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0	0.0
Engineering	-40.1	-9.0	0.0	0.0	-49.1
Estimating	0.0	25.4	4.4	-12.3	17.5
Other	0.0	0.0	0.0	0.0	0.0
Support	0.0	-16.5	0.0	0.0	-16.5
Subtotal	-37.4	224.0	4.4	-12.0	179.0
Total Changes	55.0	167.3	0.6	-41.2	181.7
Current Estimate	1,547.4	5,139.1	135.6	25.0	6,847.1

13. (U) Cost Variance Analysis (Cont'd):

a. Summary -- (Constant (Base Year) Dollars in Millions)

	RDT&E	MSL PROC	A/C INTEG	MILCON	TOTAL
Production Estimate	1,349.1	3,686.0	112.8	49.6	5,197.5
Previous Changes:					
Quantity	0.0	0.0	0.0	0.0	0.0
Schedule	0.0	46.8	0.0	0.0	46.8
Engineering	78.5	44.0	0.0	0.0	122.5
Estimating	-7.7	-45.3	-2.6	-19.5	-75.1
Other	0.0	0.0	0.0	0.0	0.0
Support	0.0	-156.1	0.0	0.0	-156.1
Subtotal	70.8	-110.6	-2.6	-19.5	-61.9
Current Changes:					
Quantity	0.0	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0	0.0
Engineering	-31.1	-6.5	0.0	0.0	-37.6
Estimating	0.4	41.5	3.2	-9.2	35.9
Other	0.0	0.0	0.0	0.0	0.0
Support	0.0	-18.2	0.0	0.0	-18.2
Subtotal	-30.7	16.8	3.2	-9.2	-19.9
Total Changes	40.1	-93.8	0.6	-28.7	-81.8
Current Estimate	1,389.2	3,592.2	113.4	20.9	5115.7

13. (U) Cost Variance Analysis:

b. (U) Previous Change Explanations

RDT&E

Economic:	Revised economic escalation indices.
Engineering:	Addition of Variant Missile.
Estimating:	Reflection of fiscal adjustments.

Procurement

Economic:	Revised economic escalation indices.
Schedule:	Program rephasing.
Engineering:	Addition of the Variant program.
Estimating:	Effects of competition and prior year inflation adjustments.
Support:	Reevaluation of support requirements

A/C Integration

Economic:	Revised economic escalation indices.
Estimating:	Removal of Common Support Equipment funds.

MILCON

Economic:	Revised economic escalation indices.
Estimating:	MOB requirements.

c. Current Change Explanation:

	(Dollars in Millions) Base-Year	Then-Year
1) RDT&E		
Changes based on new inflation indices dated JAN 90 (Economics).	-	+ 2.7
Restructure of Variant program due to directed Congressional reductions (Engineering).	-31.1	-40.1
Changes include PY inflation (Estimating)	+ 0.4	
(2) Procurement		
Changes based on new inflation indices dated JAN 90 (Economic)	-	+224.1
Congressionally directed reductions to Variant program (Engineering).	- 6.5	- 9.0
Changes include prior year inflation adjustments and revised production estimate (Estimating).	+41.5	+25.4
Changes based on reevaluation of support requirements (Support)	-18.2	-16.5

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	(Dollars in Millions) Base-Year	Then-Year
c. Current Change Explanation Cont'd:		
Changes based on reevaluation of support requirements and transfer of variant cost from other System Costs to Flyaway (Support)	-85.0	-123.3
(3) Aircraft Integration		
Changes based on reevaluation of out-year requirements (Estimating).	+3.2	+4.4
(4) MILCON		
Changes based on new inflation indices dated Jan 90 (Economic)		+.3
Changes due to revision to prior year inflation indices (Estimating).	-.3	-.3
Revised estimate	-8.9	-12.3

14. (U) Program Acquisition Unit Cost (PAUC) History: (Millions of then-year dollars)

(U) Initial SAR Production Estimate to Current Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Current) Est
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
4.562	0.162	0.000	0.109	0.080	-0.069	0.000	-0.157	0.125	4.687

(U) NOTE: This value has been revised to exclude 25 R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully configured end items for the purposes of this calculation.

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E

	(U) Initial Contract Price Target	Ceiling	Qty
(1) (U) Advanced Cruise Missile Full Scale Development General Dynamics/Convair Division F33657-83-C-2003, FPIF Award: April 15, 1983 Definitized: April 15, 1983	$ 422.7	$ 483.8	25

(U) Current Contract Price Target	Ceiling	Qty	(U) Estimated Price at Completion Contractor	Program Manager
$ 618.3	$ 705.5	25	$ 769.6	$ 705.5

	Cost Variance	Schedule Vari
(U) Previous Cumulative Variances	-204.9	-28.8
(U) Cumulative Variances to Date (10/31/89)	-1.7	- 8.1
(U) Net Change	+203.2	+20.7
(U) Cumulative Variance Change Percent	+ 99.2	+71.9%

(U) Explanation of Change: As the contract nears completion, the schedule variance is improving. The cost variance improved markedly due to the implementation of an over-target-baseline during November 1989. The government estimate to complete indicates the contract will over-run ceil- [redacted] g. No Impact: Government liability is limited to the ceiling price [redacted] $705.5M).

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) Production

	(U) Initial Contract Price Target	Ceiling	Qty
(1) (U) Advanced Cruise Missile Production - Lot II General Dynamics/Convair Division F33657-85-C-0008, FPIF Award: November 1, 1984 Definitized: April 8, 1987	$ 378.0	$ 428.5	100

(U) Current Contract Price Target	Ceiling	Qty	(U) Estimated Price at Completion Contractor	Program Manager
$ 458.9	$ 519.4	100	$ 519.4	$ 519.4

	Cost Variance	Schedule Variance
(U) Previous Cumulative Variances	-38.3	-44.9
(U) Cumulative Variances to Date (10/31/89)	-66.5	-36.4
(U) Net Change	-28.2	+ 8.5
(U) Cumulative Variance Change Percent	-73.6%	+18.9%

(U) Explanation of Change: The cost variance worsened due to technical problems, rework, and underestimating the scope of various tasks. The [redacted]tract is currently projected to go to ceiling. No Impact: Government's [redacted]bility is capped at the ceiling price. This contract will be complete the next SAR and will no longer be reported.

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) Production

	(U) Initial Contract Price		
	Target	Ceiling	Qty
(1) (U) Advanced Cruise Missile B1-B A/C Integration	$ 33.8	$ 39.7	N/A

North American Aircraft, Rockwell International Corp.
F33657-81-C-0210, FPI
Award: July 1, 1984
Definitized: December 1, 1984

(U) Current Contract Price			(U) Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 166.8	$ 185.4	N/A	$ 166.8	$ 149.3

	Cost Variance	Schedule Variance
(U) Previous Cumulative Variances	+1.7	-7.5
(U) Cumulative Variances to Date (10/31/89)	-1.0	-1.5
(U) Net Change	-2.7	+6.0
(U) Cumulative Variance Change Percent	-158.8%	+80.0%

(U) Explanation of Change: This contract is nearing completion and will not be reported on the next SAR. No Impact: Current cost and schedule variances are satisfactory.

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E

	(U) Initial Contract Price		
	Target	Ceiling	Qty
(1) (U) Advanced Cruise Missile B1-B Integration and Test	$ 85.7	$ 101.2	N/A

North American Aircraft, Rockwell International
F33657-81-C-0208, FPI
Award: July 1, 1984
Definitized: December 1, 1984

(U) Current Contract Price			(U) Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 86.5	$ 102.1	N/A	$ 88.3	$ 80.6

	Cost Variance	Schedule Variance
(U) Previous Cumulative Variances	+5.4	-0.8
(U) Cumulative Variances to Date (10/31/89)	-0.1	+0.1
(U) Net Change		+0.9
(U) Cumulative Variance Change	-5.5	+112.5%
(Percent)	-102.0%	

(U) Explanation of Change: No Impact: Both cost and schedule variances are satisfactory.

15. (U) Contract Information: (Then-Year Dollars in Millions)
a. (U) Production

	(U) Initial Contract Price Target	Ceiling	Qty
(1) (U) Advanced Cruise Missile Production - Lot III	$ 528.3	$ 585.3	150

General Dynamics/Convair Division
F33657-88-C-0103, FPI
Award: March 11, 1986
Definitized: September 22, 1989

(U) Current Contract Price Target	Ceiling	Qty	(U) Estimated Price at Completion Contractor	Program Manager
$ 580.6	$ 638.6	150	$ 585.8	$ 616.0

	Cost Variance	Schedule Variance
(U) Previous Cumulative Variances	-0.2	0.0
(U) Cumulative Variances to Date (10/31/89)	-31.6	-38.9
(U) Net Change	-31.4	-38.9
(U) Cumulative Variance Change Percent	-15700.0%	N/A

(U) Explanation of Change: The cost variance results from an unrecoverable cost impact to structurally reinforce and resolve leaking fuel expansion bladder problem, additional effort for software and rework. The [redacted]edule variance results primarily from the full bladder problem and [redacted]ffing shortages. The current values reflect the initial CPR submission since definitization of the contract late September 1989. Initial indications are that the contractor will over-run but stay within ceiling. No Impact: Government's liability is capped at ceiling price.

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) Production

	(U) Initial Contract Price		
	Target	Ceiling	Qty
(1) (U) Advanced Cruise Missile Production Second Source McDonnell Douglas Astronautics F33657-87-C-0128, FFP Award: November 4, 1987 Definitized: November 4, 1987	$ 1.2	N/A	N/A

(U) Current Contract Price			(U) Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 40.4*	N/A	N/A	$ 40.4	$ 40.4

(U) Firm Fixed Price Contract. Cost Performance Reporting not required.

*Correction of error in December 1988 SAR.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status —

(1) (U) Percent Program Completed: (9/14) (Years Funds Appropriated/Total Program Years)	64.3%	
(2) (U) Percent Program Cost Appropriated: (Funds Appropriated To Date in Millions/Total Program Funding in Millions)	56.0	(3836.5/6,847.1)

b. (U) Appropriation Summary —

(Then Year Dollars in Millions)

Appropriation	Prior Years (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-95)	Total
RDT & E	1,445.4	43.0	52.3	6.7	1,547.4
Msl Procurement	1,862.8	324.7	488.6	2,463.0	5,139.1
A/C Integration	134.2	1.4	0.0	0.0	135.6
MILCON	25.0	0	0.0	0.0	25.0
Total	3,467.4	369.1	540.9	2,469.7	6,847.1

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary —

FISCAL YEAR	QTY	FLYAWAY FY83 DOLLARS		TOTAL BASE YEAR $	TOTAL THEN - YEAR $			ESCL RATE (%)
		Nonrec	Rec		PROGRAM	OBLI-GATED*	EX-PENDED*	
APPROPRIATION: RDT & E								
1982				3.4	3.3	3.3	3.3	9.2
1983				140.7	143.4	143.4	143.4	4.9
1984				457.4	484.4	484.4	484.1	3.8
1985				232.0	253.3	253.3	251.8	3.4
1986				158.6	178.0	178.0	172.3	2.8
1987				120.0	138.7	138.7	106.9	2.7
1988				123.0	147.4	147.4	43.8	3.1
1989				77.5	96.9	59.2	8.0	4.2
1990				33.1	43.0	0.9	0.2	4.0
1991				38.7	52.3			4.2
1992				4.8	6.7			4.0
SUB-TOTAL	25			1,389.2	1,547.4	1,408.6	1,213.8	

* (U) Reflects Program Office records as of December 31, 1989

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary --

FISCAL YEAR	QTY	FLYAWAY FYB3 DOLLARS		TOTAL BASE YEAR $	TOTAL THEN - YEAR $			ESCL RATE (%)
		Nonrec	Rec		PROGRAM	OBLI-GATED*	EX-PENDED*	
APPROPRIATION: MISSILE PROCUREMENT								
1983		0.0	0.0	0.0	0.0	0.0	0.0	9.1
1984		0.0	34.6	34.6	39.6	39.6	39.6	8.0
1985	10	0.4	48.2	128.9	151.0	151.0	151.0	3.4
1986	100	20.0	393.0	454.4	552.5	552.5	539.5	2.8
1987	150	36.8	444.2	596.0	752.1	736.3	313.7	2.7
1988	100	76.1	210.1	279.8	367.6	149.0	54.0	3.1
1989	0	0.0	0.0	0.0	0.0	0.0	0.0	4.2
1990	100	12.1	238.8	226.3	324.7	0.0	0.0	4.0
1991	100	4.3	267.5	328.6	488.6			4.2
1992	250	3.0	486.9	526.5	809.8			4.0
1993	250	2.8	418.6	443.2	703.4			3.7
1994	250	2.6	364.0	366.6	600.1			3.4
1995	151	1.6	239.4	207.3	349.7			3.1
SUB-TOTAL	1,461	159.7	3,145.3	3,592.2	5,139.1	1,628.4	1,097.8	
APPROPRIATION: AIRCRAFT INTEGRATION								
1985				51.2	60.0	60.0	58.7	3.4
1986				59.0	71.2	71.2	65.0	2.8
1987				0.6	0.8	0.8	0.8	2.7
1988				0.8	1.0	1.0	0.8	3.1
1989				0.9	1.2	1.2	0.3	4.2
1990				0.9	1.4	0.0	0.0	4.0
SUB-TOTAL				113.4	135.6	134.2	125.6	

* (U) Reflects Program Office records as of December 31, 1989

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary —

FISCAL YEAR	QTY	FLYAWAY FY83 DOLLARS		TOTAL BASE YEAR $	TOTAL THEN - YEAR $			ESCL RATE (%)
		Nonrec	Rec		PROGRAM	OBLI-GATED*	EX-PENDED*	
APPROPRIATION: MILCON								
1987				20.9	25.0	19.6	16.2	2.7
1988				0.0	0.0	0.0	0.0	3.1
1989				0.0	0.0	0.0	0.0	4.2
1990				0.0	0.0	0.0	0.0	4.0
SUB-TOTAL				20.9	25.0	19.6	16.2	

* (U) Reflects Program Office records as of December 31, 1989

TOTAL	1486	159.7	3,145.3	5,115.7	6,847.1	3,190.8	2,453.4	

* (U) Reflects Program Office records as of December 31, 1989

17. (U) Production Rate Data:

a. (U) Annualized Production Rates -- (The annual production rate differs from the funded quantity because the funded delivery period is different than 12 months in the following years: FY85 - 18 months; FY86 - 24 months; FY87 - 18 months; FY88 - 10 months; FY90 - 10 months; FY95 - 7 months)

Fiscal Year	Production Rates (Quantity/Year)		
	Production Estimate	Current Estimate	Maximum Economic
1985	9	7	36
1986	100	50	120
1987	138	100	180
1988	133	120	336
1989	180	0	408
1990	225	63	381
1991	267	100	
1992	300	250	
1993	401	250	
1994		250	
1995		259	

b. (U) Cost Variance -- Dollars in Millions

Item	Prod Estimate	Change (Cur Est Less Prod Est)	Current Estimate	Change (Cur Est Less Maximum)	Maximum Economic
Acq Cost (BYB3$)	5,197.5	- 81.8	5,115.7	416.4	4,699.3
Acq Cost (TY$)	6,665.4	181.7	6,847.1	938.8	5,908.3
PAUC (BYB3$) *	3.557	-0.055	3.502	0.286	3.216
PAUC (TY$) *	4.562	0.125	4.687	0.643	4.044

* (U) This value has been revised to exclude 25 R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully configured end items for the purposes of this calculation.

17. (U) Production Rate Data (Con't):

c. (U) Schedule Variance

Item	Prod Estimate	Change (Cur Est Less Prod Est)	Current Estimate	Change (Cur Est Less Maximum)	Maximum Economic
Start Date (Mon/Yr)	11/84	N/A	11/84	N/A	11/84
Duration (Months)	123	20	143	42	101
End Date (Mon/Yr)	1/95	N/A	9/96	N/A	3/93

d. (U) Deliveries (Plan/Actual) —

	To Date
RDT&E	25/22
Procurement	48/40

e. (U) Approved Design-to-cost goals — None

18. (U) Operating and Support Costs:

a. (U) Assumptions and Groundrules - The ACM is designed as a "wooden round" requiring minimal scheduled maintenance. The operational environment consists primarily of a 90-day period of flight alert followed by a 270-day "ready storage" at the Weapon Storage Area. While on flight alert, periodic Built in Tests (BIT) are conducted to insure missile war readiness. In addition, Loaded Launcher Pylon Tests are scheduled at 20-month intervals to verify both missile and pylon integrity.. This test is conducted using the Electronic System Test Set (ESTS) and is more effective than aircraft software BIT tests. Scheduled missile maintenance is required only at the 5 year point, when the engine requires depot recertification and the pyrotechnic devices reach their certified life. Active efforts are underway to extend these intervals. The only other scheduled maintenance is a 48 month warhead recertification which is a DoE requirement. Personnel costs are direct costs to support primary consumption, contractor support, operational test launch support, operational software support, and maintenance training software support. Base consumables and contractor support are based on expected maintenance actions and number of Main Operating Bases (MOBs). Operational and maintenance training software support is estimated by comparison to similar operational systems. Depot cost is a summary cost to include Interim Contractor Support (ICS), unscheduled and scheduled depot maintenance manhours, and the air vehicle and component surveillance programs. Unscheduled maintenance manhours were estimated from demonstrated BIT failure rates, Optimum Repair Level Analysis data, and depot planning factors from AFLC Pamphlet 173-10. ICS includes both pipeline and condemnation spares for support maintenance requirements, air vehicle modification, depot software support, and technical data updates. Other direct costs include second destination transportation, system management support, contractor sustaining support, and material management. Indirect costs are indirect personnel costs at SAC operating facilities. This system does not replace another system in the inventory; no antecedent system cost shown below.

b. (U) Costs - (FY 1983 Constant (Base Year) Dollars in Millions)

COST ELEMENT	(Steady State Yr Per SAC Wing) AVERAGE ANNUAL COST
Personnel	3.37
Unit Consumption	1.68
Depot Level Maintenance	1.65
Sustaining Investment	5.37
Depot Non-Maintenance	2.27
Total	14.34

c. (U) Contractor Support Costs -- N/A.

A-9 FAADS LOS-F-H

SAR-89-105

~~CONFIDENTIAL~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: FORWARD AREA AIR DEFENSE SYSTEM (FAADS)
LINE OF SIGHT-FORWARD-HEAVY (LOS-F-H)

AS OF DATE: December 31, 1989

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1. (U) **Designation and Nomenclature (Popular Name):** Forward Area Air Defense System (FAADS) Line of Sight-Forward-Heavy (LOS-F-H)

2. (U) **DoD Component:** Department of the Army

3. (U) **Responsible Office and Telephone Number:**

Line of Sight-Forward-Heavy
Air Defense Program Executive Ofc
Redstone Arsenal, AL 35898-5750

Project Manager: COL John M. Gamino
Assigned: December 15, 1986
Autovon: 742-4449
Commercial: (205) 895-4449

AS AMENDED
CLEARED
FOR OPEN PUBLICATION
MAR 22 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

4. (U) **Program Elements/Procurement Line Items:**

RDT&E:	PE 63757A	Project 463 (LOS AD SYS FWD-HVY)
	PE 23801A	Project 683 (AIR DEF SYS - HEAVY P3I)
PROCUREMENT:	APPN 2032	SSN H01600 (AIR DEF SYS HVY)
	APPN 2032	SSN HO1700 (AIR DEF SYS HVY)
	APPN 2032	SSN CJ8001 (Initial Spares)

5. (U) **Related Programs:** Line of Sight-Rear; Non-Line of Sight; and Forward Area Air Defense Command, Control and Intelligence (C2I)

(b)(1)

CLASSIFIED BY: LOS-F-H SCG, April 28, 1989
DECLASSIFY ON: OADR

~~CONFIDENTIAL~~

OASD(PA) DFOISR 90-T-0703/1

6. ~~(U)~~ **Mission and Description**: The LOS-F-H component is a Non-Developmental Item (NDI) air defense system designed to maneuver with combined arms elements and defeat a fixed wing and stand-off line of sight helicopter threat.

~~(U)~~ Line of Sight-Forward-Heavy (LOS-F-H) component of the Forward Area Air Defense System (FAADS) consists of an armored, tracked vehicle (M3A2 Bradley variant) that integrates a missile system; communications equipment; and detection, identification, and tracking sensors. To field an effective air defense capability as soon as possible, the Army selected a Non-Developmental Item (NDI) acquisition strategy to overcome current air defense deficiencies, with concurrent pre-planned product improvements (P3I) to keep pace with the advancing threat. The Martin Marietta Air Defense Anti-Tank System (ADATS) was selected on November 30, 1987 after a rigorous NDI Candidate Evaluation for the LOS-F-H role. The system to be initially deployed meets or exceeds initial system Required Operational Capability (ROC) requirements aimed at meeting the early to mid-nineties air threat. An active P3I program is planned to meet the late nineties threat. The initial P3I (with funding start in FY 1991) will focus on inclusion of an integrated weapons display, improved mission processor, commander's viewer and integration of FAADS C3I. The LOS-F-H will be located in forward battle areas, maneuver with the combined arms team and will be used to protect tanks and infantry fighting vehicles from enemy helicopters and fixed-wing aircraft. The system will use radar and optics to detect, acquire, and identify targets and is line-of-sight in the sense that it can only fire at targets within its field of view. The system will operate autonomously or using FAAD C3I data in day or night, in obscurants, adverse weather, and in battlefield environments where electronic and physical countermeasures are prevalent. The system is integrated into the overall FAAD architecture to improve low-altitude counter-air operations. The system is manned by a crew of three: a driver, a commander and a gunner. The commander uses the frequency agile radar to search for targets. Target detections are handed off to the gunner, who tracks the target, automatically or manually, using the Forward Looking Infrared (FLIR) or TV sensors. When track is established and the target is identified, the gunner launches one of the eight on-board missiles, which is guided to the target via a receiver on the tail fins of the missile using a carbon dioxide (CO2) laser. The missile's high speed and maneuverability severely limit threat reaction time. Its dual-purpose impact/proximity fuze and highly lethal warhead minimize the threat's chances of survival.

7. (U) **Program Highlights**:

a. (U) Significant Historical Developments -- On July 29, 1986, the Defense Acquisition Board (DAB) approved the concept for execution of the overall FAAD program as a system of systems. An in-process review (Milestone II DAB) held in November 1986 reviewed the LOS-F-H program. At this review, OSD approved release of an RFP for the LOS-F-H system. The Army was directed to ensure that testing included provisions for comparing candidates of varying maturities and that the program be moved forward as quickly as possible. Following a successful seven month candidate evaluation phase, Martin Marietta was chosen as the prime contractor; announcement was made on November 30, 1987. A firm fixed price contract covering the RDT&E funded test program option was signed February 10, 1988. Compliance with Congressional direction contained in the FY 1989 Authorization Bill required revision of the negotiated technical and operational test program. The revised test program (addition of live fire testing and user changes to the operational test program) was approved by the DAB meeting on August 4, 1988. This test program included provisions for a Program Review; continuation of Low Rate Initial Production (LRIP) decision after

7. (U) **Program Highlights: (cont)**

completion of an Initial Operational Test and Evaluation (IOTE) followed by a Milestone IIIB full scale production decision upon completion of live fire testing. First Unit Equipped (FUE) was scheduled for September 1990 in the original contract baseline. As a result of FY89 budget reductions, FUE slipped to July 1992. Further reductions have slipped FUE to the current estimate of June 1993.

b. (U) Significant Developments Since Last Report -- The LOS-F-H program continues in the operational assessment test phase. All requirements of Technical Test B have been successfully completed. All requirements of Technical Test C have been completed with the exception of two missile firings. These firings have been rescheduled for June 1990, at which time suitable fog will be available on the West Coast test range. European environment testing has been completed. Preliminary observations of the system during test activities indicate that even in worst-case visibility, the system can properly decode the CO2 laser energy and guide the missile to its target. Force Development Test and Experimentation Phase II (FDTE II) was concluded in December and was considered to have been highly successful.

The LOS-F-H system is expected to satisfy mission requirements.

c. (U) Changes Since "As of" Date -- None

8. (U) **Threshold Breaches**: There are currently no milestone breaches to the DAE Baseline approved March 1990.

9. (U) **Schedule**:

a. (U) Milestones --

	Dev Est	Approved Program	Cur Est
(U) Milestone II (DAB)	Nov 86	Nov 86	Nov 86
(U) SDDM	Dec 86	Dec 86	Dec 86
(U) ROC Approved	Mar 87	Mar 87	Mar 87
(U) RFP Release	Mar 87	Mar 87	Mar 87
(U) Candidate Evaluation (CE) Contract Awarded	Jun 87	Jun 87	Jun 87
(U) CE Testing Begin	Jul 87	Jul 87	Jul 87
(U) CE Testing Complete	Nov 87	Nov 87	Nov 87
(U) Award Test Phase Contract Option (RDT&E)	Feb 88	Feb 88	Feb 88
(U) Force Development Test & Experimentation (FDTE) (I) Begin	May 88	May 88	May 88
(U) In Process Review (IPR)	Jun 88	Jun 88	Jun 88
(U) FAADS ASARC (Test Restructure)	Jun 88	Jun 88	Jun 88
(U) FDTE (I) Complete	Jul 88	Jul 88	Jul 88
(U) Technical Test (A) Begin - Fire Control	Jul 88	Jul 88	Jul 88
(U) FAADS DAB (Long Lead Item) (LLI) Revalidation	Aug 88	Aug 88	Aug 88

9. (U) Schedule: (cont.)

a. (U) Milestones -- (cont.)

	Dev Est	Approved Program	Cur Est	
(U) Award FY88 Advance Procurement Option - LLI	Oct 88	Oct 88	Oct 88	
(U) Technical Test (B) Begin - Durability	Feb 89	Feb 89	Feb 89	
(U) Award FY89 Production Option	Mar 89	Aug 89	Aug 89	(CH-1)
(U) Technical Test (A) Complete - Fire Control	Apr 89	Dec 88	Dec 88	
(U) Technical Test (B) Complete - Durability	May 89	Feb 90	Feb 90	(CH-2)
(U) Award FY89 Advance Procurement Option - LLI	Jul 89	Jan 90	Jan 90	(CH-3)
(U) FDTE (II) Begin	Jul 89	Oct 89	Oct 89	
(U) FDTE (II) Complete	Aug 89	Dec 89	Dec 89	
(U) Technical Test (C) Begin - European Environment	Oct 89	Oct 89	Oct 89	(CH-2)
(U) Initial Operational Test & Evaluation (IOT&E) Begin	Oct 89	Feb 90	Feb 90	(CH-4)
(U) Technical Test (C) Complete - European Environment	Dec 89	Jul 90	Jul 90	(CH-2)
(U) IOT&E Complete	Jan 90	May 90	May 90	
(U) Technical Test (D) Begin - Signature/Missile Firings	Jan 90	Feb 90	Feb 90	(CH-4)
(U) Technical Test (D) Complete - Signature/Missile Firings	Feb 90	Jul 90	Jul 90	
(U) Live Fire Test (A) Begin	N/A	Feb 90	Feb 90	(CH-9)
(U) Milestone III (DAB)	Apr 90	N/A	N/A	(CH-5)
(U) Live Fire Test (A) Complete	N/A	May 90	May 90	(CH-9)
(U) Award FY90 Production Option	May 90	N/A	N/A	(CH-6)
(U) Program Review	N/A	Jun 90	Jun 90	(CH-5)
(U) Award FY 90 Production Option (LRP)	N/A	Jun 90	Jun 90	(CH-6)
(U) Award FY 90 Advance Production Option - LLI	N/A	Jun 90	Jun 90	(CH-6)
(U) Live Fire Test (B) Begin	N/A	Jun 90	Jun 90	(CH-9)
(U) Live Fire Test (B) Complete	N/A	Nov 90	Nov 90	(CH-9)
(U) DAB (Milestone IIIB)	N/A	Mar 91	Mar 91	(CH-5)
(U) Award FY 91 Production Option (LRP)	N/A	Apr 91	Apr 91	(CH-9)
(U) Production Verification Test (PVT) Begin	Jan 91	Jul 91	Jul 91	(CH-7)
(U) Award FY 92 Production Option (FSP)	N/A	Apr 92	Apr 92	(CH-9)
(U) PVT Complete	Nov 91	Nov 92	Nov 92	
(U) First Unit Equipped (FUE)	Jul 92	Jun 93	Jun 93	(CH-8)

b. (U) Previous Change Explanations --

The LOS F-H program had undergone funding reductions and a revised test program. The LOS F-H Test program/schedule had been revised to reflect user concern over the adequacy of time allocated to unit level/combined arms training and test instrumentation/checkout at the test ranges.

9. [redacted] Schedule: (cont.)

c. [redacted] Current Change Explanations --

(CH-1) Recurrent budget reductions perturbated contract award schedules, slipping the FY89 Production Option award from July 1989 to August 1989.

(CH-2) All requirements of Technical Tests B have been successfully completed, changed from July 1989 to February 1990. All requirements of Technical Test C have been completed with the exception of two missile firings. The two Technical Test C Complete firings are now rescheduled to June 1990, at which time suitable fog conditions will be available on the West Coast test range. Technical Test C Begin and Complete changed from July 1989 to October 1989 and from October 1989 to July 1990, respectively.

(CH-3) The award of the FY89 Advanced Procurement Option has been slipped from August 1989 to January 1990 due to Congressional reductions of the FY90 program and the necessity to restructure the Advance Procurement contract action.

(CH-4) Both IOT&E Begin and Technical Test D Begin missile firings were slipped from January 1990 to February 1990, due to the delay in the prerequisite Technical Test B missile firings caused by range conditions.

(CH-5) Single Milestone III was converted to Program Review and Milestone IIIB to permit completion of live fire testing prior to full scale production decision. Program Review will be completed in June 1990, and Milestone IIIB will be completed in March 1991.

(CH-6) Award FY90 Production Option was converted to Award FY 90 Production Option (LRP) and Award FY 90 Advance Production Option - LLI and forecast subsequent to Program Review.

(CH-7) The designation of some critical production line assets as potential spare parts for IOT&E is expected to impact delivery of first production fire units. PVT Begin is expected to slip from June 1991 to July 1991.

(CH-8) Reduced funding has caused First Unit Equipped (FUE) to be slipped from May 1993 to June 1993 due to lower production rates in early lots, thereby reducing fire unit quantities available for FUE.

(CH-9) Milestones were added to align with the revised DAE Baseline.

e. [redacted] References --

Development Estimate: DAE Baseline approved dated March 2, 1989
Approved Program: DAE Baseline approved dated March 1990

10. ~~(U)~~ **Technical/Operational Characteristics:**

a. (U) Technical -- None

b. (U) Operational --

	Dev Est	Approved Program Goal/Thres	Demon-strated Perf	Cur Est
	(b)(1)			
(C) Engagement Range (km):				
Rotary Wing (Running)				
Rotary Wing (Hovering):				
Fixed Wing				
Unmanned Aerial Vehicle				
(U) No. of Ready Missiles	8	8/8		8
	(b)(1)			
(C) Minimum Range (km)				
(C) Maximum Altitude (km)				
(C) Probability of Detection				
(C) Reaction Time (sec) (Target Selection to Intercept				
(C) PSSKA:				
Rotary Wing (Running)				
Non-Maneuvering				
Maneuvering				
Rotary Wing (Hovering)				
Non-maneuvering				
Maneuvering				
Inbound Fixed Wing (250M/sec)				
Non-maneuvering				
Maneuvering				
Inbound (UAV) (150m/sec)				
Non-maneuvering				
Maneuvering				

10. (U) Technical/Operational Characteristics: (cont.)

b. (U) Operational -- (cont.)

		Dev Est	Approved Program Goal/Thres	Demonstrated Perf /1	Cur Est	
(U)	RAM					
	MTBOMF (Weapon System) (hrs)	92	92/92		92	
	MTBOMF (Fire Unit) (hrs)	44	60/44		44	(CH-1)
	MTTR (Fire Unit) (hrs)	1	1/1		1	
	MTBHUMA (Weapon System) (hrs)	34	34/34		34	
	MTBHUMA (Fire Unit) (hrs)	79	79/79		79	
	Missile Reliability	80%	80%/80%		80%	

c. (U) Previous Change Explanations -- None

d. (U) Current Change Explanations --

(CH-1) MTBOMF (Fire Unit) Approved Program Goal/Threshold values were transposed in the DAE Baseline. Development Estimate and Current Estimate have been changed from 60 to 44 to align with correct baseline value.

e. (U) References --

Development Estimate: DAE Baseline approved March 2, 1989; FY90/FY91 President's Budget; ROC, dated March 1987
Approved Program: DAE Baseline approved March 1990

/1 The threshold parameters are contract specification requirements which will be demonstrated during the Production Verification Test (PVT).

11. [redacted] **Program Acquisition Cost**: (Current Estimate in Millions of Dollars)

	Dev Est	Approved Program	Current Estimate
a. [redacted] Cost --			
Development (RDT&E)	$277.9	$310.1	$310.1
Procurement	4773.4	4778.5	4778.5
Total Flyaway	(4179.4)	(4243.2)	(4243.2)
Other Wpn Sys Cost	(193.2)	(157.4)	(157.4)
Initial Spares	(400.8)	(377.9)	(377.9)
Construction (MILCON)	0.0	0.0	0.0
Total FY89 Base Year $	5051.3	5088.6	5088.6
Escalation	974.4	1746.6	1746.6
Development (RDT&E)	(3.7)	(8.7)	(8.7)
Procurement	(970.7)	(1737.9)	(1737.9)
Construction (MILCON)	0.0	0.0	0.0
Total Then-Year $	$6025.7	$6835.2	$6835.2
b. [redacted] Quantities (Fire Units/Missiles) [1]			
Development (RDT&E)	4/14	4/14	4/14
Procurement	562/10078	562/10078	562/10078
Total	566/10092	566/10092	566/10092

c. [redacted] Foreign Military Sales -- None

d. [redacted] Nuclear Costs -- None

e. [redacted] References --

Development Estimate: DAE Baseline approved March 2, 1989
Approved Program: DAE Baseline approved March 1990

[1] The Army will procure the maximum number of supportable systems consistent with the dollars appropriated.

12. ~~(U)~~ **Program Acquisition/Current Procurement Unit Cost Summary:** (Current (Then Year) Dollars in Millions)

		Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a.	~~(U)~~ Program Acquisition --	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1)	Cost	$ 6835.2	$ 6025.7	$ 6835.2
(2)	Quantity (Fire Units) /1	562	562	562
(3)	Unit Cost	$ 12.2	$ 10.7	$ 12.2
b.	~~(U)~~ Current Procurement --	(FY90)	(FY90 Appn)	(FY91)
(1)	Cost	$ 208.9	$ 208.9	$ 271.8
	Less CY Adv Proc	31.7	31.7	36.2
	Plus PY Adv Proc	23.7	23.7	31.7
	Net Total	$ 200.9	$ 200.9	$ 267.3
(2)	Quantity	6FU	6FU	15FU
(3)	Unit Cost	$ 33.5	$ 33.5	$ 17.8

/1 This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purpose of this calculation.

13. ~~(U)~~ **Cost Variance Analysis:**

a. ~~(U)~~ Summary -- (Current (Then-year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	281.6	5744.1	--	6025.7
Previous Changes:				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	+20.0	+159.1	--	+179.1
Engineering	--	--	--	--
Estimating	+24.0	--	--	+24.0
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+44.0	+159.1	--	+203.1
Current Changes:				
Economic	+5.4	+603.8	--	+609.2
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-12.2	+3.6	--	-8.6
Other	--	--	--	--
Support	--	+5.8	--	+5.8
Subtotal	-6.8	+613.2	--	+606.4
Total Changes	+37.2	+772.3	--	+809.5
Current Estimate	318.8	6516.4	--	6835.2

13. (U) Cost Variance Analysis (cont.):

a. (U) Summary -- (cont.)

(FY89 (Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	277.9	4773.4	--	5051.3
Previous Changes:				
Quantity	--	--	--	--
Schedule	+19.0	+40.3	--	+59.3
Engineering	--	--	--	--
Estimating	+22.5	--	--	+22.5
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+41.5	+40.3	--	+81.8
Current Changes:				
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-9.3	-20.6	--	-29.9
Other	--	--	--	--
Support	--	-14.6	--	-14.6
Subtotal	-9.3	-35.2	--	-44.5
Total Changes	+32.2	+5.1	--	+37.3
Current Estimate	310.1	4778.5	--	5088.6

b. (U) Previous Change Explanations --

(1) RDT&E

Schedule	Additional funds received to extend IOT&E test program per directions of the Director of Operational Test and Evaluation.
Estimating	Revised estimate to include additional live fire test to meet congressional language.

(2) Procurement

Schedule	Near term funding reduction resulted in program stretchout and increased cost.

13. (U) Cost Variance Analysis (cont.):

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revise December 1989 economic escalation rates (Economic)	N/A	+5.4
Revised estimate (Estimating)	-9.3	-12.2
o Incorporate actual expenditures	(-2.2)	(-2.8)
o Reprogramming of funds		
- Revised Live Fire Test Dollars to match funding (dollars reduced represent unfunded requirement).	(-3.1)	(-4.1)
- Revised P3I requirements.	(-4.0)	(-5.3)
(2) Procurement		
Revised December 1989 economic escalation rates (Economic)	N/A	603.8
Reprogramming of funds (Estimating)	-20.6	+3.6
o Target procurements changed from live to drone	(-72.0)	(-81.1)
o Incorporated Manpower Estimating Report as directed by DA	(+98.4)	(+135.4)
o Reduction due to new trainer schedule	(-52.3)	(-61.9)
o Increase funding required for Op/Site Activation	(+3.6)	(+5.2)
o Additional funding required to support PVT	(+4.6)	(+6.8)
o Application of decreasing factors in Engineering Change Orders (ECO's) and Data	(-2.9)	(-0.8)
Revised initial spares requirement (Support)	-14.6	+5.8

14. (U) **Program Acquisition Unit Cost (PAUC) History**: (Current (Then-Year Dollars in Millions) /1

a. (U) Planning Estimate to Development Estimate --

PAUC* (Planning Est)	Changes								PAUC (Dev/Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
14.777	-.004	-4.820	--	--	-.098	--	+.867	-4.055	10.722

*First SAR reporting quantities (December 31, 1987)

b. (U) Development Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
10.722	+1.084	--	+0.319	--	+.027	--	+.010	+1.440	12.162

/1 This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purpose of this calculation.

15. (U) **Contract Information**: (Then-Year Dollars in Millions) /2

a. (U) RDT&E --

Martin Marietta Missile Systems, Orlando Fl
DAAH01-87-C-A049, FFP
Award: February 10, 1988
Definitized Date: February 10, 1988

Initial Contract Price		
Target	Ceiling	Qty
$100.4	N/A	4

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$161.0	N/A	4	$161.0	$161.0

b. (U) Procurement --

Martin Marietta Missile Systems, Orlando Fl
DAAH01-87-C-A049, FFP
Award: February 10, 1988
Definitized Date: February 10, 1988

Initial Contract Price		
Target	Ceiling	Qty
$27.2	N/A	5

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$124.3	N/A	6	$124.3	$124.3

c. (U) MILCON -- None

/2 No cost performance data is required under the provision of the competitively awarded FFP contract.

RDT&E $161.0M includes: $2.0M Basic Contract; S.9M Option 1; $158.1M Option 2.
Proc $124.3M includes: $32.9M Option 3 (Adv Proc); $21.2 Option 4 (Adv Proc); $70.2M Option 4 (Production).

16. [redacted] Program Funding Summary: (Cur Estimate in Millions of Dollars)

a. [redacted] Program Status --

(1) Percent Program Completed: 31.2% (5 Years/16 Years)
(2) Percent Program Cost Appropriated: 8.9% (609.6/6835.2)

b. [redacted] Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Prior Years (FY86-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-01)	Total
RDT&E	$203.1	$54.8	$9.0	$51.9	$318.8
Procurement	$142.8	$208.9	$271.8	$5892.9	$6516.4
MILCON	0.0	0.0	0.0	0.0	0.0
Total	$345.9	$263.7	$280.8	$5944.8	$6835.2

16. (U) **Program Funding Summary (cont):**

c. (U) Annual Summary --

Fiscal Year	Qty /1	Flyaway FY 89 Dollars Nonrec[2]	Flyaway FY 89 Dollars Rec	Total Base Year $	Total Then Year $ Program	Total Then Year $ Oblig	Total Then Year $ Expended	Escl Rate (%)
Appropriation: RDT&E								
1986				35.7	33.1	32.7	32.1	2.8
1987				24.0	22.8	22.7	21.6	2.7
1988				100.0	98.7	98.6	90.6	3.0
1989				47.2	48.5	47.5	35.9	4.2
1990				51.3	54.8	15.3	0.9	4.0
1991				8.1	9.0			4.2
1992				17.9	20.6			4.0
1993				17.4	20.8			3.7
1994				8.5	10.5			3.4
Subtotal	4/14			310.1	318.8	216.8	181.1	--
Appropriation: Procurement								
1988				32.4	33.5	33.5	33.5	3.0
1989	4/60			101.7	109.3	58.8	1.2	4.2
1990	6/110			186.9	208.9			4.0
1991	15/220			234.4	271.8			4.2
1992	17/317			264.1	316.9			4.0
1993	17/382			232.0	287.4			3.7
1994	19/422			227.5	290.6			3.4
1995	45/792			463.9	607.8			3.1
1996	84/1478			584.8	790.6			3.1
1997	84/1478			566.0	790.8			3.1
1998	84/1478			587.1	844.6			3.1
1999	84/1478			563.1	835.1			3.1
2000	84/1478			480.9	734.9			3.1
2001	19/385			253.7	394.2			3.1
Subtotal	562/10078			4778.5	6516.4	92.3	34.7	--
Total	566/10092			5088.6	6835.2	309.1	215.8	--

/1 The Amended FY91 President's Budget Excursion (developed from the validated December 1988 SCE) supports the following quantities (fire units/missiles) for Procurement: FY89 - 4/10; FY90 - 6/110; FY91 - 15/264; FY92 - 17/300; FY93 - 17/313; FY94 - 19/334. FY89 quantities are from the NTE awarded August 1989.

/2 Under the NDI acquisition strategy for this competitively awarded FFP contract, breakout of nonrecurring cost is not required.

17. (U) Production Rate Data:

a. (U) Annual Production Rates --

Missile

Fiscal Year	Production Rates (Quantity / Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1989	60	N/A	60	N/A
1990	424	N/A	110	N/A
1991	669	N/A	220	N/A
1992	806	N/A	317	N/A
1993	782	N/A	382	N/A
1994	688	N/A	422	N/A
1995		N/A	792	N/A
1996		N/A	1478	N/A
1997		N/A	1478	N/A
1998		N/A	1478	N/A
1999		N/A	1478	N/A
2000		N/A	1478	N/A
2001		N/A	1478	N/A

Fire Units

Fiscal Year	Production Rates (Quantity / Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1989	4	N/A	4	N/A
1990	18	N/A	6	N/A
1991	28	N/A	15	N/A
1992	43	N/A	17	N/A
1993	45	N/A	17	N/A
1994	42	N/A	17	N/A
1995		N/A	45	N/A
1996		N/A	84	N/A
1997		N/A	84	N/A
1998		N/A	84	N/A
1999		N/A	84	N/A
2000		N/A	84	N/A
2001		N/A	84	N/A

b. (U) Cost Variance -- Dollars in Millions (NOTE: Subject to Limitations on production rates above.)

Item		Production Estimate	Variance (CE vs PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY $)	N/A	N/A	4719.8	N/A	N/A
	(TY $)	N/A	N/A	6307.9	N/A	N/A
PAUC	(BY $)	N/A	N/A	8.4	N/A	N/A
	(TY $)	N/A	N/A	11.2	N/A	N/A

17. (U) **Production Rate Data (cont):**

c. (U) Schedule Variance -- (NOTE: Subject to Limitations on production rates above.)

	Production Estimate	Variance (CE vs PdE)	Current Estimate/1	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	3/89	N/A	N/A
Duration (in Months)	N/A	N/A	143	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	02/01	N/A	N/A

d. (U) Deliveries (Plan/Actual) --

Fire Units	To Date
RDT&E	4/4
Procurement	0/0

Missiles	To Date
RDT&E	14/14
Procurement	0/0

e. (U) Approved Design-to-Cost Goal -- N/A

18. (U) **Operating and Support Costs:**

a. (U) Assumptions and Ground Rules -- O&S costs are based on OPTEMPO of 960 miles/year, 20 year system life and 10 year missile shelf life then overhaul and CONUS first fielding. Personnel cost include both military personnel, civilian project management and system specific replenishment training. The POL cost are included under O&S Consumables. The depot cost is a summary cost which includes interim contractor support, missile overhaul, repair of components and modification installation. The sustaining investment includes replenishment spares and repair parts and the cost of modification kits. Other direct cost include field maintenance civilian, transportation and supply management operations. The permanent change of station costs are included in other indirect costs. Amended FY 91 President's Budget Excursion BCE (Development from validated BCE, September 1989).

b. (U) Costs --

(FY 1989 Constant (Base-Year) Dollars in Millions)

Cost Element	Unit Cost	Cost Per Antecedent
Personnel	6.4	
O&S Consumables	0.2	
Direct Depot Maintenance	3.6	
Sustaining Investment	2.7	
Other Direct Costs	0.8	
Indirect Costs	0.0	
Total	13.7	

/1 Schedule start/end dates are based on Production Option 3 to the initial R&D contract.

18. (U) **Operating and Support Costs (cont):**

c. (U) Contractor Support Costs /1 -- (Current (Then-Year) Dollars in Millions)

Funding	FY1989 & Prior	FY1990	FY1991	Balance to Complete	Total
O&M	0.5	--	--	108.4	108.9
Industrial Fund	--	--	--	--	--
Total	0.5	--	--	108.4	108.9

/1 Provides for knowledge transfer from the developer to: 1. TRADOC in order to establish a training base; 2. depot personnel to establish an organic depot capability; and 3. the units in the field, through the use of a new equipment training team.

(FSED) contract was awarded to AT&T Technologies on a Cost Plus Incentive Fee (CPIF) basis on 16 January 1990.

(U) Underwater Segment. -- The underwater segment successfully completed a Preliminary Design Review (PDR) in January 1989.

(U) Shore Segment. -- Two competitive design phase contracts for the Shore Signal Information Processing System (SSIPS) were awarded, one to GE and the other to IBM, in September 1989 on a Firm Fixed Price (FFP) basis.

c. (U) Change Since "As Of Date" -- None.

8. (U) Threshold Breaches: There are currently no DAE Baseline (Dated September 22, 1989) threshold breaches.

9. (U) Schedule:

	Planning Estimate	Dev Est/ Approved Program	Current Estimate	
a. (U) Milestones --				
Milestone I (DNSARC)	May 86	May 86	May 86	
Milestone II (DAB)	Mar 89	Sep 89	Sep 89	
SSIPS Design Contracts Award	N/A	Sep 89	Sep 89	
U/W FSD Contract Award	N/A	Jan 90	Jan 90	
Program Review	N/A	Sep 91	Jan 91	(Ch-1)
SSIPS FSD Contract Award	N/A	Dec 91	Dec 91	
SSIPS Critical Design Review	N/A	Mar 92	Mar 92	
(b)(1)				
Milestone IIIA	N/A	Mar 95	Mar 95	
(b)(1)				
Milestone IIIB	Nov 95	Jun 96	Jun 96	
Milestone IV	N/A	Jun 98	Jun 98	
Milestone VA	N/A	Mar 99	Mar 99	
Milestone VB	N/A	Mar 04	Mar 04	

b. (U) Previous Change Explanations -- Milestones updated according to approved DAE Baseline.

c. (U) Current Change Explanations --

(CH-1) The current estimate reflects a revised schedule for reviewing the SSIPS Design effort prior to contract award of the Shore Segment Full Scale Development contract.

d. (U) References --

Planning Estimate: NDCP dated May 13, 1986; TEMP No. 1009, FDS dated May 13, 1986.
Development Estimate: DCP dated May 15, 1989, Subj: "Fixed Distributed System (FDS)"; FY91 President's Budget.
Approved Program: DAE Baseline dated September 22, 1989.

18. (U) **Operating and Support Costs (cont):**

c. (U) Contractor Support Costs /1 -- (Current (Then-Year) Dollars in Millions)

Funding	FY1989 & Prior	FY1990	FY1991	Balance to Complete	Total
O&M	0.5	--	--	108.4	108.9
Industrial Fund	--	--	--	--	--
Total	0.5	--	--	108.4	108.9

/1 Provides for knowledge transfer from the developer to: 1. TRADOC in order to establish a training base; 2. depot personnel to establish an organic depot capability; and 3. the units in the field, through the use of a new equipment training team.

SAR-89-021

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FDS, December 31, 1989

N-17 FDS

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: FIXED DISTRIBUTED SYSTEM (FDS)

AS OF DATE: March 16, 1990

SUBJECT	INDEX	PAGE
Cover Sheet Information		1
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1. (U) Designation and Nomenclature: Fixed Distributed System (FDS)

2. (U) DOD Component: Department of the Navy

3. (U) Responsible Office and Telephone Number:

Undersea Warfare Program Director	RADM (sel) R.C. Witter, USN Assigned: January 23, 1986
FDS Program Manager Space and Naval Warfare Systems Command Washington, D.C. 20363-5100	CAPT K.E. Evans, USN AV 332-0041; COMM (703) 602-0041

4. (U) Program Elements/Procurement Line Items:

RDT&E,N: PE 0603784N Project X1312
PE 0604784N Project X1312
PE 0204311N Project X0766 (Shared funding; FY87 and Prior)
PROCUREMENT: PE 0204311N APPN 52WQ ICN 222500
MILCON: PE 0204311N
O&MN: PE 0204311N AG/SAG 52F8 (Shared funding; FY95 and Beyond)

5. (U) Related Programs: (b)(1) Surveillance Direction System (SDS), (b)(1)

~~CLASSIFIED BY OPNAVINST S5513.5A-10~~
~~DECLASSIFY BY OADR~~

AS AMENDED

MAR 21 1990

~~SECRET~~

(b)(1)

6. (U) Mission and Description:

a. (S) The Fixed Distributed System (FDS) is part of the Integrated Undersea Surveillance System (IUSS) that provides the (b)(1) (b)(1) (b)(1) FDS is a (b)(1) (b)(1)

b. (S) The FDS program will utilize a fiber optic based technology for fixed underwater hardware that (b)(1) (b)(1) The current SOSUS system will continue,however, to be operational.

7. (U) Program Highlights:

a. (S) Significant Historical Developments -- Fiber optic based surveillance systems were first explored in 1983 with the first underwater fiber-optic developments. The FDS program was initiated in 1985 with a Navy Decision Coordinating Paper (NDCP) (August 1985) and Milestone I (1986). The concept Demonstration and Validation (D&V) phase includes the development of (b)(1) (b)(1) distributed system test bed.

(b)(1) (b)(1) (b)(1) (b)(1) (b)(1)

b. (S) Significant Developments Since Last Report -- The FDS Program successfully completed the Milestone II Decision process (September 1989). A follow-on FDS underwater hardware development contract (b)(1) (b)(1) (b)(1) was awarded to AT&T Technologies on a Cost Plus Award Fee (CPAF) basis on 15 February 1989. An Underwater Full Scale Engineering Development

(FSED) contract was awarded to AT&T Technologies on a Cost Plus Incentive Fee (CPIF) basis on 16 January 1990.

(U) Underwater Segment. -- The underwater segment successfully completed a Preliminary Design Review (PDR) in January 1989.

(U) Shore Segment. -- Two competitive design phase contracts for the Shore Signal Information Processing System (SSIPS) were awarded, one to GE and the other to IBM, in September 1989 on a Firm Fixed Price (FFP) basis.

c. (U) Change Since "As Of Date" -- None.

8. (U) Threshold Breaches: There are currently no DAE Baseline (Dated September 22, 1989) threshold breaches.

9. (U) Schedule:

	Planning Estimate	Dev Est/ Approved Program	Current Estimate	
a. (U) Milestones --				
Milestone I (DNSARC)	May 86	May 86	May 86	
Milestone II (DAB)	Mar 89	Sep 89	Sep 89	
SSIPS Design Contracts Award	N/A	Sep 89	Sep 89	
U/W FSD Contract Award	N/A	Jan 90	Jan 90	
Program Review	N/A	Sep 91	Jan 91	(Ch-1)
SSIPS FSD Contract Award	N/A	Dec 91	Dec 91	
SSIPS Critical Design Review	N/A	Mar 92	Mar 92	
(b)(1)				
Milestone IIIA	N/A	Mar 95	Mar 95	
(b)(1)				
Milestone IIIB	Nov 95	Jun 96	Jun 96	
Milestone IV	N/A	Jun 98	Jun 98	
Milestone VA	N/A	Mar 99	Mar 99	
Milestone VB	N/A	Mar 04	Mar 04	

b. (U) Previous Change Explanations -- Milestones updated according to approved DAE Baseline.

c. (U) Current Change Explanations --

(CH-1) The current estimate reflects a revised schedule for reviewing the SSIPS Design effort prior to contract award of the Shore Segment Full Scale Development contract.

d. (U) References --

Planning Estimate: NDCP dated May 13, 1986; TEMP No. 1009, FDS dated May 13, 1986.
Development Estimate: DCP dated May 15, 1989, Subj: "Fixed Distributed System (FDS)"; FY91 President's Budget.
Approved Program: DAE Baseline dated September 22, 1989.

10. (U) Technical/Operational Characteristics:

a. (S) Technical --

	Plan Est	Dev Est/ Approved Prog Goals/ Threshold	Demon-strated Perf	Current Estimate
Operating Depth (M)	(b)(1)	(b)(1)		
Wet End Life (Yrs)				

b. (S) Operational --

(b)(1)

c. (U) Previous Change Explanations -- Techincal and Operation Characteristics updated according to approved DAE Baseline.

d. (U) Current Change Explanations -- None.

e. (U) References--

Planning Estimate: NDCP dated May 13, 1986; TEMP No. 1009, FDS dated May 13, 1986.
Development Estimate: DCP dated May 15, 1989, Subj: "Fixed Distributed System (FDS)"; FY91 President's Budget.
Approved Program: DAE Baseline dated September 22, 1989.

11. ([redacted]) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Planning Estimate	Dev Est/ Approved Program	Current Estimate
a. ([redacted]) Cost --			
Development (RDT&E,N)	674.7	1228.7	1236.7
Procurement (OPN)	TBD	3605.7	3605.7
Underwater Segment	TBD	(2083.6)	(2083.6)
Shore Segment	TBD	(712.2)	(712.2)
System Integration	TBD	(149.7)	(149.7)
Total Flyaway	TBD	(2945.5)	(2945.5)
Other System Costs	TBD	(476.7)	(476.7)
Initial Spares	TBD	(183.5)	(183.5)
Construction (MILCON)	TBD	71.6	71.6
Total FY86 Base-Year	674.7	4906.1	4914.0
*Adjustment FY86 BY to FY88 BY		284.4	284.9
Total Base Year FY88		5190.5	5198.9
Escalation	102.3	2656.8	2653.5
Development (RDT&E,N)	(102.3)	(304.1)	(300.8)
Procurement (OPN)	TBD	(2320.3)	(2320.3)
Construction (MILCON)	TBD	(32.4)	(32.4)
Total Then-Year	777.0	7847.3	7852.4

* Adjustment factors used to rebaseline from FY86 to FY88:

RDT&E -	1.058
PROCUREMENT -	1.058
MILCON -	1.058

b. ([redacted]) Quantities --			
Development (RDT&E,N)	1	1	1
Procurement (OPN)	TBD	11**	11**
Total	1	12	12

** The 11 procurement units represents a Nominal FDS Field (NFF) which is sized at one year's full rate production of underwater hardware and shore processing. Size, and also cost, of actual deployment fields will depend on the geographic area, environmental acoustics and mission, on a case by case basis. The NFF represents a typical mix of hardware and software components and support for a system with the mission and aproximate size of the first Engineering Development Model (EDM). The cost of a NFF will be used as a weight index for reporting purposes. The number 11 does not imply a total of 11 systems/units.

c. ([redacted]) Foreign Military Sales -- None

d. ([redacted]) Nuclear Costs -- None

e. (U) References --

Planning Estimate: NDCP dated May 13, 1986; TEMP No. 1009 dated May 13, 1986.
Development Estimate: DCP dated May 15, 1989, Subj: "Fixed Distributed System (FDS)"; FY91 President's Budget.
Approved Program: DAE Baseline dated September 22, 1989.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:

	Current Estimate (Dec 89 SAR)	Current Year UCR Baseline (Dec 89 SAR)	Budget Year UCR Baseline (Dec 89 SAR)
a. Program Aquisition			
(1) Cost	7852.4	7852.4	7852.4
(2) Quantity	12	12	12
(3) Unit Cost	654.4	654.4	654.4
b. Current Procurement	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	N/A	N/A	N/A
Less CY Adv Proc	N/A	N/A	N/A
Plus PY Adv Proc	N/A	N/A	N/A
Net Total	N/A	N/A	N/A
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

13. (U) Cost Variance Analysis:
a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
PLANNING ESTIMATE	777.0	0.0	0.0	777.0
Previous Changes				
Economic	- 2.5	- -	- -	- 2.5
Quantity	--	- -	- -	--
Schedule	--	- -	- -	--
Engineering	+ 61.7	- -	- -	+ 61.7
Estimating	+ 29.8	- -	- -	+ 29.8
Other	--	- -	- -	--
Support	+ 48.7	- -	- -	+ 48.7
Subtotal	+137.7	0.0	0.0	+ 137.7
Current Changes				
Economic	+ 17.2	--	--	+17.2
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	+ 113.5	--	--	+ 113.5
Estimating	+ 487.2	--	--	+ 487.2
Other	--	--	--	--
Support	+ 76.6	--	--	+ 76.6
Subtotal	+ 694.5	0.0	0.0	+ 694.5
Total Changes	+ 832.2	0.0	0.0	+ 832.2
Baseline Adjustment	--	+ 6135.1	+108.1	+ 6243.2
Current Estimate	1609.2	6135.1	108.1	7852.4

Procurement and MILCON added for the first time in accordance with DODINST 7000.3
Previous SAR was reported as RDT&E Only.

13. (U) Cost Variance Analysis: (Continued)
(FY 1986/1988 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
PLANNING ESTIMATE	674.7	0.0	0.0	674.7
Previous Changes				
Economic	--	- -	- -	--
Quantity	--	- -	- -	--
Schedule	--	- -	- -	--
Engineering	+ 49.7	- -	- -	+ 49.7
Estimating	+ 20.7	- -	- -	+ 20.7
Other	--	- -	- -	--
Support	+ 39.3	- -	- -	+ 39.3
Subtotal	+109.7	0.0	0.0	+109.7
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	+ 81.5	--	--	+ 81.5
Estimating	+ 300.6	--	--	+300.6
Other	--	--	--	--
Support	+ 70.2	--	--	+ 70.2
Subtotal	+ 452.3	0.0	0.0	+ 452.3
Total Changes	+ 562.0	0.0	0.0	+ 562.0
Baseline Adjustment	- -	+ 3605.7	+ 71.6	+3677.3
~~Develop~~/Current Estimate (FY86$)	1236.7	3605.7	71.6	4914.0
Adjustment FY86 to FY88	+ 71.7	+ 209.1	+ 4.1	+ 284.9
~~Development~~/Current Estimate (FY88$)	1308.4	3814.8	75.7	5198.9

b. (U) Previous Change Explanations --

RDT&E

Economic: Revised escalation indices.

Engineering: Reflected an increase in the size of hydrophone clusters and increased channel capacity required [(b)(1)] [(b)(1)]

Estimating: Included cost for the original core program in FY94-96 of which $97.1M was not part of the initial planning estimate in 1986 but would have been necessary to complete the May 1986 NDCP Program through MS-III; FY88 Budget adjustment of $6.0M and also included $67.5M core program cost growth in FY93/94 due to incomplete cost estimating for FY93/94 as reported in the December 1987 SAR.

Support: The inclusion of certain EDM installation related costs in FY91 and out were identified in the May 1986 NDCP but were not RDT&E,N funded.

c. (U) Current Change Explanations --

	(Dollars in Millions) FY86 Base-Year	Then-Year
RDT&E,N		
Revised Escalation Indices. (Economic)	N/A	+ 17.2
Shore processing updated to include broadband and CRT display systems based on Test Bed results. (Engineering)	+ 81.5	+ 113.5
Revised baseline estimates prior to Milestone II approval process.	+300.6	+ 487.2
Revised estimates for cable price per mile. (Estimating)	(+6.5)	(+7.5)
Revised estimates for FSED contract costs. (Estimating)	(+16.6)	(+22.5)
Revised estimates for system integration labor for FDS-1. (Estimating)	(+1.4)	(+1.4)
Revised estimates for program costs through year 2010. (Estimating)	(+276.1)	(+454.8)
Because of the change of shore site location and change in field location, certain EDM installation costs have increased. (Support)	+ 70.2	+ 76.6

14. (U) Program Unit Cost (PAUC) History: (Then-Year Dollars in Millions)

a. (U) Initial SAR/Development Estimate to Current Estimate --

Dev Est. PAUC (Int. SAR)	Changes								Current Est. PAUC
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
654.4	--	--	--	--	--	--	--	--	654.4

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E,N --

Underwater Segment:

Initial Contract Price

Target	Ceiling	QTY
99.9	N/A	0

AT&T Technologies Inc.
Guilford Center
Greensboro, NC 27420-0046
N00039-89-C-0083 (CPAF)
Definitized/ Award Date: 15 February 1989

Current Contract Price

Target	Ceiling	Qty
98.2	N/A	0

Estimated Price at Completion

Contractor	Program Manager
98.2	98.2

	Cost Variance	Schedule Variance
Previous Cumulative Variance	N/A	N/A
Cumulative Variance To Date	- 0.4	- 5.7
Net Change	N/A	N/A

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status --

(1) Percent Program Completed: 26% (7 years/27 years)
(2) Percent Program Cost Appropriated: 25% ($394.5/$1609.2)

b. (U) Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Prior Years (FY84-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-10)	Total
RDT&E,N	256.3	138.2	210.2	1004.5	1609.2
OPN	-	-	-	6135.1	6135.1
MILCON	-	18.9	1.6	87.6	108.1
TOTAL	256.3	157.1	211.8	7227.2	7852.4

c. (U) Annual Summary --

Fiscal Year	Qty	Flyaway FY88 Dollars		Total Base Year $	Total Then-Year $			Escl Rate %
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1984				15.5	14.0	14.0	14.0	3.8
1985				17.0	15.9	15.9	15.9	3.4
1986				24.5	23.5	23.5	23.2	2.8
1987				33.7	33.3	33.2	33.2	2.7
1988				69.0	70.6	70.6	66.4	3.0
1989				92.9	99.0	98.4	70.4	4.2
1990				124.7	138.2	123.9	12.4	4.0
1991				182.2	210.2			4.2
1992				190.2	227.9			4.0
1993				157.4	195.2			3.7
1994				113.7	145.7			3.4
1995				54.6	72.1			3.1
1996				10.9	14.8			3.1
1997				16.6	23.3			3.1
1998				5.4	7.8			3.1
1999				30.0	44.8			3.1
2000				40.0	61.5			3.1
2001				60.0	95.2			3.1
2002				40.1	65.6			3.1
2003				30.0	50.6			3.1
TOTAL				1308.4	1609.2	379.5	235.5	

c. [redacted] Annual Summary (Continued) --

Fiscal Year	Qty	Flyaway FY88 Dollars		Total Base Year $	Total Then-Year $			Escl Rate %
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: PROCUREMENT								
1995	1	158.5	283.3	441.8	609.6			3.1
1996	1	54.0	283.3	337.3	479.8			3.1
1997	1	54.0	283.3	337.3	494.7			3.1
1998	1	54.0	283.3	337.3	510.0			3.1
1999	1	54.0	283.3	337.3	525.8			3.1
2000	1	54.0	283.3	337.3	542.1			3.1
2001	1	54.0	283.3	337.3	558.9			3.1
2002	1	54.0	283.3	337.3	576.2			3.1
2003	1	54.0	283.3	337.3	594.1			3.1
2004	1	54.0	283.3	337.3	612.5			3.1
2005	1	54.0	283.3	337.3	631.5			3.1
Subtotal	11	698.5	3116.3	3814.8	6135.1			
Appropriation: MILCON								
1990				16.4	18.9			4.0
1991				1.3	1.6			4.2
1992				--	--			4.0
1993				--	--			3.7
1994				--	--			3.4
1995				10.0	13.6			3.1
1996				18.0	25.2			3.1
1997				--	--			3.1
1998				--	--			3.1
1999				--	--			3.1
2000				--	--			3.1
2001				30.0	48.9			3.1
Subtotal				75.7	108.1			

17. (U) Production Rate Data:

a. (U) Annualized Production Rates: N/A. Less than 6 units produces per year.

b. (U) Cost Variance: N/A

c. (U) Schedule Variance: N/A

d. (U) Deliveries (Plan/Actual):

	To Date
RDT&E,N	1/0
PROCUREMENT	11/0

e. (U) Approved Design-to-Cost Goal:

	(Average Unit Flyaway Cost) Development Estimate	Current Estimate	Latest Approved Threshold
@ Qty 11 - @ Peak Rate:	1/yr		
FY88 Base Year $	337.3	337.3	337.3
Then-Year $ (Avg unit)	474.6	474.6	474.6
@ Qty 3 (1st three years) - @ Peak Rate :	1/yr		
FY88 Base Year $	337.3	337.3	337.3
Then-Year $ (Avg unit)	473.8	473.8	473.8

18. (U) Operating and Support (O&S) Costs:

a. (U) Assumptions and Ground Rules -- The major technical, program, operating and cost assumptions underlying the independent cost assessment of the Fixed Distributed System Operating and Support (O&S) costs as of April 1989 are presented as follows:

(U) Technical Assumptions:

. (U) The detailed design of underwater electronic components will incorporate proven technology of SOSUS, SOSUS LUSC and TAT-8 systems to the maximum extent possible.
. (U) The AT&T/Simplex deep water and armor cable designs will incorporate proven technology and production processes of SOSUS List 1, 2, and 3 and TAT-8 cable to the maximum extent possible.
. (U) Reliability, maintainability and availability goals established for the program will be met.
. (U) The AT&T high reliability specifications will be applied fully to electro-optic components of the underwater segment.
. (U) The E-Systems Concept 1 architecture, which includes both Navy standard and commercial non-developmental hardware, is appropriate for estimating SSIPS O&S costs.

(U) Program Assumptions:

. (U) The FDS will have an operational life of (b)(1) years.
. (b)(1)
(b)(1)
(b)(1)
. (U) Each notional system will require 10 percent additional source lines of code over the amount required for the initial system (FDS-1).

(U) Operating Assumptions:

. (U) Each FDS shore segment will be housed in an existing Navy Facility (NAVFAC).
. (U) The FDS shore facility operates continuously, 24 hours per day, 7 days per week.
. (U) Operating personnel will be distributed into five section watches enabling implementation of a four section watch bill with sufficient personnel available to account for non-watch time.
. (U) Manning for maintenance of the processing suites and subsystems will also be a 24-hour per day operation.
. (U) The introduction of FDS into the Integrated Undersea Surveillance System (IUSS) will require additional manning at each FDS site.
. (U) Possible offsets in personnel requirements due to the incorporation of FDS advances in processing automation into other IUSS systems is not included in the baseline O&S cost estimate.
. (U) Possible reduction of FDS operating personnel requirements due to possible system augmentations such as increased levels of automation are not considered in the baseline analysis.
. (U) Maintenance of underwater segment electro-optic equipment will be through the AT&T Technologies sea/shore engineering contract.
. (U) Cable Repair and underwater segment equipment maintenance will be undertaken using Military Sealift Command (MSC) ships.
. (U) FDS-1 and subsequent FDS deployed notional sytems will require 30 days load and underway days each for Neptune and Zeus class ships each year to support underwater segment maintenance requirements.
. (U) SSIPS equipment organizational maintenance will be performed by enlisted personnel augmented by Contractor Engineering Technical Services (CETS) at the FDS sites.

. (U) Depot maintenance of SSIPS equipment will be performed at Navy Depots where they exist for military NDI or at the Contractors facilities for commercial NDI.

(U) Cost Assumptions:

. (U) OSD indices dated September 1988 are appropriate for estimating escalated and outlayed costs for the FDS program.
. (U) O&M,N costs for lease of MSC ships and funding of contract support for standard riders are applicable to an assessment of FDS operating and support costs.
. (U) Estimates are in constant FY88 dollars.
. (U) FDS hardware will have no residual value after the end of scheduled operations.

b. (U) Costs --(FY88 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per System (EMSP Arch)	Avg Annual Cost Per System (Com NDI Arch)
Personnel	2.7	2.7
O&S Consumables	1.3	1.3
Direct Depot Maintenance	0.6	0.6
Sustaining Investment	12.0	10.1
Other Direct Costs	4.1	4.1
Indirect Costs	4.9	3.7
Total	25.6	22.4
Shore Segment	20.4	17.2
Underwater Segment	5.2	5.2

c. (U) Contractor Support Costs --(Current (Then-Year) Dollars in Millions)

Funding	FY 1989 & Prior	FY 1990	FY 1991	Balance to Complete	Total
RDT&E,N	13.0	6.6	6.1	37.6	63.3
O&M,N	0.0	0.0	0.0	1786.0	1786.0
Industrial Fund	0.0	0.0	0.0	0.0	0.0
Total	13.0	6.6	6.1	7223.6	7249.3

SAR-89-101

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)
PROGRAM: SADARM

AS OF DATE: December 31, 1989

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1. ~~(U)~~ Designation and Nomenclature (Popular Name): Sense and Destroy Armor (SADARM)

2. ~~(U)~~ DoD Component: ARMY

3. ~~(U)~~ Responsible Office and Telephone Number:
Project Mgr Sense and Destroy Armor — COL Richard C. Williams
Building 172 — Assigned: July 2,1989
Picatinny Arsenal, NJ 07806-5000 — AV 880-2110 COMM (201) 724-2110

4. ~~(U)~~ Program Elements/Procurement Line Items:
RDT&E:
PE 64802D369
PE 64802D644 (Shared)
PE 64814D644
PROCUREMENT
APPN 2032 ICN C67900
APPN 2034 ICN E66300

(b)(1) [redacted]

5. ~~(U)~~ Related Programs: M270 Launcher; M109 Howitzer; M198 Howitzer; M109A3/E2 (HIP)

CLEARED AS AMENDED
FOR OPEN PUBLICATION
MAR 22 1990 21
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

~~Classified by: SADARM SCG 20 Aug 86~~
~~Declassify on: OADR~~

REGRADED UNCLASSIFIED WHEN SEPARATED FROM CLASSIFIED ENCLOSURES

OASD(PA) DFOISR 90 -T- 0703

6. (U) **Mission and Description**: The Sense and Destroy Armor (SADARM) munitions will provide enhanced counterbattery capability for the 155mm and the Multiple Launch Rocket System (MLRS). The Field Artillery requires a fire and forget, all weather, day or night capability to provide support against targets. (b)(1) (b)(1) The SADARM munition's design will be optimized to defeat counterfire target sets, which include both firing and nonfiring threat indirect fire systems. It will supply supplementary fire for close support, interdiction, and suppression of enemy air defense. SADARM munitions are a force multiplier reducing the Artillery's dependence on firing a high volume of conventional munitions, such as the M483 and the MLRS DPICM. Upon expulsion from the projectile or rocket each submunition is stabilized when a drag device is deployed to control the velocity and spin during descent. During this time the submunition processes information on potential targets, scanning the ground in a decreasing spiral pattern. When the sensor acquires the target, the lethal mechanism fires an explosively formed penetrator down into the target. If no target is acquired, the submunition self-destructs just before ground impact. SADARM munitions are not intended to replace any other systems.

7. (U) **Program Highlights**:

a. (U) Significant Historical Developments -- A Concept Demonstration Phase for SADARM was completed in May 1979 by demonstrating the primary functions of the submunition. Contracts with Honeywell Defense Systems Division and Aerojet Electro Systems were awarded in September 1980 for a competitive Demonstration and Validation (D&V) Program. The program activities culminated in April 1985 with all-up live firings of submunitions. In March 1986 the Required Operational Capability (ROC) for SADARM munitions (MLRS and 155mm) was approved and in September 1986, two competitive contracts were awarded to Aerojet and Honeywell for development of the submunitions. Following a November 1987 Army System Acquisition Review Council (ASARC) and a March 1988 Defense Acquisition Board (DAB), a May 1988 Acquisition Decision Memorandum (ADM) from the Secretary of Defense directed that the SADARM program proceed through Milestone IIB to develop SADARM submunitions for the 155mm Howitzer and MLRS applications. A contract for development of a warhead dispenser and MLRS integration was awarded to LTV in September 1988. Technically, four captive flight test series have been conducted with the sensors in various environments amounting to over 40,000 target encounters, over 80 submunition lethal mechanism tests have been conducted, and the MLRS warhead and 155mm thin wall concepts have been verified through test. In order to align the program with May 88 DAB guidance, extensive contract modifications for both the submunition effort and integration were made.

b. (U) Significant Developments Since Last Report -- The Congressional Demonstration tests utilizing modified Advanced Development (AD) submunition designs fired in 8 inch projectiles were completed in July 1989. While the original SADARM program had a potential end item for the 8 inch howitzer, the current approved program does not include one. Congressional language in the FY86 Appropriations Bill prevented spending money on FSD hardware until the completion of these tests, resulting in a slip of approximately three months. Since June 1989, lethal mechanism tests successfully demonstrated penetrator

capability to meet perforation requirements, and wind tunnel tests on the 155mm submunition were performed to finalize designs of the Deceleration, Despin, Orientation and Stabilization system. Aerojet demonstrated ballistic similitude of the 155mm SADARM to the M483 projectile. Both contractors successfully ejected submunitions from a MLRS warhead section and collected data on spin, tumble, and speed. Three six-bay MLRS dispenser tests were completed.

The SADARM munitions are expected to satisfy the mission requirement.

c. (U) Changes Since As of Date -- None

8. (U) Threshold Breaches: There are currently schedule milestone breaches to the 25 July 89 DAE Baseline. A Program Deviation Report was submitted 30 November 1989 to the Secretary of the Army in accordance with section 2435 (b) of Title 10 USC projecting a schedule slippage exceeding 6 months.

9. (U) Schedule:

a. (U) Milestones --

	Development Estimate	Approved Program	Current Estimate
Generic SADARM Submunition Development Approved by AMC	NOV 84	NOV 84	NOV 84
Congressional Direction for FSD and Production Plan	DEC 85	DEC 85	DEC 85
DA Approval - MLRS/155mm SADARM ROC	MAR 86	MAR 86	MAR 86
DA IPR for Submunition FSD	SEP 86	SEP 86	SEP 86
Competitive Submunition FSD Contract Awards	SEP 86	SEP 86	SEP 86
MLRS Initial Integration Contract Award	DEC 86	DEC 86	DEC 86
Milestone II ASARC	NOV 87	NOV 87	NOV 87
Milestone II DAB	MAR 88	MAR 88	MAR 88
MLRS FSD Contract Award	SEP 88	SEP 88	SEP 88
Congressional Demonstration			
Start	JAN 89	JAN 89	JAN 89
End	APR 89	APR 89	JUL 89
Projectile Tech Tests - Start	MAY 90	MAY 90	AUG 91 (Ch-1)
Projectile Tech Tests - End	JUL 91	JUL 91	OCT 92 (Ch-1)
Projectile IOTE (Start)	JUL 91	JUL 91	JUL 93 (Ch-1)
MLRS Tech Tests - Start	JUL 91	JUL 91	SEP 92 (Ch-1)
Projectile IOTE - End	DEC 91	DEC 91	DEC 93 (Ch-1)
MLRS Tech Tests - End	DEC 91	DEC 91	DEC 92 (Ch-1)
Submunition Design Select	JAN 92	JAN 92	JAN 93 (Ch-1)
Type Classification LP - MLRS	JAN 92	JAN 92	N/A (Ch-2)
Type Classification - Projectiles	JAN 92	JAN 92	MAY 94 (Ch-2)
Milestone III ASARC	JAN 92	JAN 92	MAY 94 (Ch-1)
Milestone III DAB	APR 92	APR 92	JUL 94 (Ch-1)
MLRS LRIP Contract Award	APR 92	APR 92	N/A (Ch-2)

SADARM, December 31, 1989

9. Schedule: 1/

a. Milestones (Cont'd) --

	Development Estimate	Approved Program	Current Estimate
Submunition and Projectile FSP Award	MAY 92	MAY 92	JUL 94 (Ch-1)
MLRS IOTE - Start	NOV 92	NOV 92	APR 93 (Ch-1)
MLRS IOTE - End	JUL 93	JUL 93	JAN 94 (Ch-1)
First Unit Equipped - Projectile	JUL 93	JUL 93	JAN 94 (Ch-1)
Type Classification - MLRS	SEP 93	SEP 93	MAY 94 (Ch-2)
Milestone Decision Review	SEP 93	SEP 93	N/A (Ch-2)
MLRS FSP Contract Award	APR 94	APR 94	JUL 94 (Ch-1)
First Unit Equipped - MLRS	MAY 94	MAY 94	DEC 95 (Ch-1)

b. Previous Change Explanations --
The Congressional Demonstration End was rescheduled from APR 89 to JUL 89 because of a longer than expected test, fix, and retest process.

c. Current Change Explanations --
(Ch-1) A Program Deviation Report was submitted on 30 Nov 89 reflecting program slips in excess of six months. The program was determined to have excessive schedule risk. A Management Review Panel, chaired by the DUSA(OR) confirmed the PM's determinations that the program was not executable and recommended in a report dated 27 Dec 89 that development be extended by 12 months. The report recommendations are reflected in the changed milestones. All milestone changes are from the approved program milestones to those shown as the current estimate.
(Ch-2) Type Classification LP-MLRS will no longer be required. MLRS will be fully type classified prior to production.

d. References --
Development Estimate: Army Approved Program Baseline, February 1989.

Approved Program: DAE Approved Baseline, 25 July 1989.

1/ There will be a new milestone for 155mm Projectile type classification LP in Apr 93 added to milestones.

10. Technical/Operational Characteristics:

a. Technical --	Dev Est	Approved Program Goal/Threshold	Demon-Strated Perf	Current Estimate
MLRS Rocket Carrier Reliability	0.90	.90/.90	.90	0.90
155mm Carrier Reliability	0.90	.90/.90	.90	0.90
Submunition Reliability MLRS	0.80	.80/.80	.80	0.80
Submunition Reliability 155mm	0.80	.80/.80	.80	0.80

10. (U) Technical/Operational Characteristics (Cont'd):

b. (U) Operational--	Dev Est	Approved Program Goal/Threshold	Demon-Strated Perf	Current Estimate
(b)(1)				
Storage Life (All SADARM Munitions) (yr)	10	10/10	10	10

c. (U) Previous Change Explanations -- None

d. (U) Current Change Explanations -- None

e. (U) References --
Development Estimate: Army Approved Program Baseline, February 1989.

Approved Program: DAE Approved Baseline, 25 July 1989.

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. (U) Cost --			
Development (RDT&E)	$654.1	681.8	659.4
Procurement	951.6	4408.1	4365.1
MLRS Rocket Total	(703.6)	(3545.5)	(3502.6)
Flyaway	(699.2)	(3530.2)	(3502.6)
Other Wpn Sys Cost	(4.4)	(15.3)	
155mm Projectile Total	(248.0)	(862.6)	(862.5)
Flyaway	(248.0)	(862.6)	(862.5)
Total FY 89 Base-Year $	1605.7	5089.9	5024.5
Escalation	181.1	1108.7	1746.8
Development (RDT&E)	(19.1)	(21.5)	(28.3)
Procurement	(162.0)	(1087.2)	(1718.5)
MLRS Rocket	(120.8)	(885.9)	(1402.6)
155mm Projectile	(41.2)	(201.4)	(315.9)
Total Then-Year $	1786.8	6198.2	6771.3
b. (U) Quantities --			
Development (RDT&E)			
MLRS Rocket	260	260	260
155mm Projectile	652	652	652
Procurement			
MLRS Rocket	TBD	59110	59110
155mm Projectile	10156	63386	63386
Total			
MLRS Rocket	260	59370	59370
155mm Projectile	10808	64038	64038

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References --

Development Estimate: FY90/91 President's Budget, January 89.

Approved Program: DAE Approved Baseline, 25 July 89.

[redacted]

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

155mm SADARM Projectile

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. (U) Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1) (U) Cost			
MLRS Rocket [1]	5343.0	4880.4	5343.0
155mm Projectile	1428.3	529.3	1428.3
(2) (U) Quantity [2]			
MLRS Rocket	59110	59110	59110
155mm Projectile	63386	10156	63386
(3) (U) Unit Cost			
MRLS Rocket	.090	.083	.090
155mm Projectile	.023	.052	.023

Notes:
1. Current Year UCR Baseline for MLRS Rocket is Jun 89 SAR. MLRS Rocket was not included in Dec 88 SAR.
2. These values have been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation.

b. (U) Current Procurement	(FY 1990)	(FY 1990)	(FY 1991)
(1) (U) Cost			
MLRS Rocket	N/A	N/A	N/A
Less CY Adv Proc	N/A	N/A	N/A
Plus PY Adv Proc	N/A	N/A	N/A
Net Total	N/A	N/A	N/A
155mm Projectile	N/A	N/A	N/A
Less CY Adv Proc	N/A	N/A	N/A
Plus PY Adv Proc	N/A	N/A	N/A
Net Total	N/A	N/A	N/A
(2) (U) Quantity			
MLRS Rocket	N/A	N/A	N/A
155mm Projectile	N/A	N/A	N/A

13. (U) COST VARIANCE ANALYSIS:

A. (U) SUMMARY -- (CURRENT [THEN-YEAR] DOLLARS IN MILLIONS)

	RDT&E	PROC	MILCON	TOTAL
DEVELOPMENT ESTIMATE	673.2	1113.6	0.0	1786.8
PREVIOUS CHANGES:				
ECONOMIC	-	-	-	-
QUANTITY	-	+4370.8	-	+4370.8
SCHEDULE	-	+15.6	-	+15.6
ENGINEERING	-	-	-	-
ESTIMATING	+32.3	-4.7	-	+27.6
OTHER	-	-	-	-
SUPPORT	-	-		-
SUBTOTAL	+32.3	+4381.7	-	+4414.0
CURRENT CHANGES:				
ECONOMIC	+7.6	+660.9	-	+668.5
QUANTITY	-	-15.9	-	-15.9
SCHEDULE	-	-5.5	-	-5.5
ENGINEERING	-	-	-	-
ESTIMATING	-25.4	-51.2	-	-76.6
OTHER	-	-	-	-
SUPPORT	-	-	-	-
SUBTOTAL	-17.8	+588.3	-	+570.5
TOTAL CHANGES	+14.5	+4970.0	-	+4984.5
CURRENT ESTIMATE	687.7	6083.6	-	6771.3

(FY 1989 CONSTANT [BASE-YEAR] DOLLARS IN MILLIONS)

	RDT&E	PROC	MILCON	TOTAL
DEVELOPMENT ESTIMATE	654.1	951.6	0.0	1605.7
PREVIOUS CHANGES:				
QUANTITY	-	+3447.8	-	+3447.8
SCHEDULE	-	+12.8	-	+12.8
ENGINEERING	-	-	-	-
ESTIMATING	+29.9	-4.1	-	+25.8
OTHER	-	-	-	-
SUPPORT	-	-	-	-
SUBTOTAL	+29.9	+3456.5	-	+3486.4
CURRENT CHANGES:				
QUANTITY	-	-14.4	-	-14.4
SCHEDULE	-	-7.7	-	-7.7
ENGINEERING	-	-	-	-
ESTIMATING	-24.6	-20.9	-	-45.5
OTHER	-	-	-	-
SUPPORT	-	-	-	-
SUBTOTAL	-24.6	-43.0	-	-67.6
TOTAL CHANGES	+5.3	+3413.5	-	+3418.8
CURRENT ESTIMATE	659.4	4365.1	-	5024.5

13. (U) Cost Variance Analysis (Cont'd):

b. (U) Previous Change Explanations --

RDT&E
Estimating: Increased costs due to program restructure.

PROCUREMENT
Quantity: Addition of FY95-FY02 quantities.

Schedule: Schedule adjustment related to FY90/91 ABS.
Estimating: Revised submunition costs.

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Escalation Rates (Economic)	N/A	+7.8
FY90 & FY91 Program Decrements (Estimating)	-24.6	-25.4
(2) PROCUREMENT		
Revised Escalation Rates (Economic)	N/A	+660.9
Reduced 155mm quantities by 737. (Quantity)	-14.4	-15.9
Schedule change to 155mm to accommodate funding available in the FY92-FY94 budget (Schedule)	-7.7	-5.5
Revision of program estimate (Estimating)	-20.9	-51.2

14. (U) Program Acquisition Unit Cost (PAUC) HISTORY: (Then-Year Dollars in Millions)

155mm SADARM Projectile

a. (U) Initial SAR Estimate to Current Baseline Estimate --

PAUC (INITIAL SAR EST)	CHANGES								PAUC (DEV EST)
	ECON	QTY	SCH	ENG	EST	OTHER	SPT	TOTAL	
—	—	+0.049	—	—	—	—	—	+0.049	0.049

b. (U) Current Baseline Estimate to Current Estimate

PAUC (DEV EST)	CHANGES								PAUC (CURRENT EST)
	ECON	QTY	SCH	ENG	EST	OTHER	SPT	TOTAL	
0.049	+0.011	-0.036	+0.000	—	-0.001	—	—	-0.026	0.023

MLRS SADARM Rocket

a. (U) Initial SAR Estimate to Current Baseline Estimate --

PAUC (INITIAL SAR EST)	CHANGES								PAUC (DEV EST)
	ECON	QTY	SCH	ENG	EST	OTHER	SPT	TOTAL	
—	—	—	—	—	—	—	—	—	—

b. (U) Current Baseline Estimate to Current Estimate

PAUC (DEV EST)	CHANGES								PAUC (CURRENT EST)
	ECON	QTY	SCH	ENG	EST	OTHER	SPT	TOTAL	
0.000	+0.009	+0.082	—	—	-0.001	—	—	0.090	0.090

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E	Initial Contract Price Target	Ceiling	Qty
Honeywell, Inc. Minnetonka, MN DAAA21-86-C-0308, CPIF Award: September 1, 1986 Definitized: September 1, 1986	$ 95.4	N/A	0.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$149.9	N/A	0.0	$179.8	$214.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-28.1	$-26.4
Cumulative Variances To Date (12/31/89)	$-31.5	$-16.0
Net Change	$-3.4	$10.4

Explanation of Change: Cost Variance is due to restructure of program to two different size submunitions. Schedule variance is due to restructure of program after Milestone II. Major contract modifications have been negotiated recently extending the period of performance and significantly changing the requirements.

	Initial Contract Price Target	Ceiling	Qty
Aerojet Electrosystems Azusa, CA DAAA21-86-C-0309, CPIF Award: September 1, 1986 Definitized: September 1, 1986	$ 87.2	N/A	0.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$156.8	N/A	0.0	$190.6	$227.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-20.6	$-35.2
Cumulative Variances To Date (12/31/89)	$-15.0	$-8.5
Net Change	$5.6	$26.7

Explanation of Change: Cost Variance is due to restructure of program to two different size submunitions. Schedule variance is due to restructure of program after Milestone II. Major contract modifications have been negotiated in May 1989 extending the period of performance and significantly changing the requirements.

15. (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

	Initial Contract Price		
	Target	Ceiling	Qty
LTV Missiles and Electronics Grand Prairie, TX DAAH01-88-C-0716, CPIF Award: September 1, 1988 Definitized: September 1, 1988	$ 70.7	N/A	0.0

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 70.7	N/A	0.0	$ 70.7	$ 88.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances To Date (12/19/89)	$-0.4	$-2.0
Net Change	$-0.4	$-2.0

Explanation of Change: The cost and schedule variances are not considered significant at this time.

16. (U) Program Funding Summary:

a. (U) Program Status --

(1) Percent Program Completed: 29.4% (5 yrs/17 yrs)

(2) Percent Program Appropriated: 7.3% (494.6 /$6771.3)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY86-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-02)	Total
RDT&E	351.8	142.8	105.5	87.6	687.7
Procurement	-	-	-	6083.6	6083.6
MILCON	-	-	-	-	-
O&M	-	-	-	-	-
Total	351.8	142.8	105.5	6171.2	6771.3

C. ~~(U)~~ ANNUAL SUMMARY

FISCAL YEAR	QTY	FLYAWAY FY89 DOLLARS		TOTAL BASE YEAR $	TOTAL THEN-YEAR $			ESCL. RATE (%)
		NONREC	REC		PRO-GRAM	OBLI-GATED	EX-PENDED	
APPROPRIATION: RDT&E (MLRS & 155MM)								
86	N/A			38.6	35.8	34.2	34.2	2.8
87	N/A			75.5	72.0	71.7	70.6	2.7
88	N/A			101.4	100.1	100.1	95.3	3.0
89	N/A			140.2	143.9	143.9	82.1	4.2
90	N/A			133.7	142.8	37.4	0.6	4.0
91	N/A			94.9	105.5			4.2
92	N/A			53.0	61.1			4.0
93	N/A			19.9	23.8			3.7
94	N/A			2.2	2.7			3.4
SUBTOTAL	260/652			659.4	687.7	387.2	282.8	
APPROPRIATION: PROCUREMENT (MLRS & 155MM)								
92	N/A	40.6	90.4	131.1	159.3			4.0
93	N/A	102.8	235.8	338.5	423.8			3.7
94	N/A	112.9	284.9	397.8	512.0			3.4
95	N/A	44.4	590.7	635.1	829.3			3.1
96	N/A	29.8	504.4	534.2	718.9			3.1
97	N/A	26.9	466.2	493.1	684.1			3.1
98	N/A	24.7	442.4	467.0	668.2			3.1
99	N/A	24.0	424.7	448.7	662.0			3.1
00	N/A	23.4	410.8	434.2	660.5			3.1
01	N/A	22.4	384.0	406.4	637.5			3.1
02	N/A	9.3	69.7	79.0	128.0			3.1
SUBTOTAL	N/A	461.2	3904.0	4365.1	6083.6			
TOTAL	N/A	461.2	3904.0	5024.5	6771.3	387.2	282.8	

FISCAL YEAR	QTY	FLYAWAY FY89 DOLLARS		TOTAL BASE YEAR $	TOTAL THEN-YEAR $			ESCL. RATE (%)
		NONREC	REC		PRO-GRAM	OBLI-GATED	EX-PENDED	
MLRS ROCKETS APPROPRIATION: PROCUREMENT								
92	552	30.1	74.6	104.7	128.2			4.0
93	1830	78.0	181.0	258.9	326.6			3.7
94	2594	78.1	202.4	280.5	364.2			3.4
95	7500	39.5	474.6	514.1	672.1			3.1
96	7500	25.7	406.4	432.1	582.2			3.1
97	7500	23.0	375.6	398.6	553.6			3.1
98	7500	20.8	356.8	377.6	540.9			3.1
99	7500	20.2	342.9	363.1	536.3			3.1
00	7500	19.7	331.9	351.6	535.5			3.1
01	7500	19.4	323.0	342.4	537.6			3.1
02	1634	9.3	69.7	79.0	128.0			3.1
SUBTOTAL	59110	363.8	3138.9	3502.6	4905.2			3.1
155MM PROJECTILES APPROPRIATION: PROCUREMENT								
92	485	10.5	15.8	26.4	31.1			4.0
93	2300	24.8	54.8	79.6	97.2			3.7
94	4600	34.8	82.5	117.3	147.8			3.4
95	8240	4.9	116.1	121.0	157.2			3.1
96	8240	4.1	98.0	102.1	136.7			3.1
97	8240	3.9	90.6	94.5	130.5			3.1
98	8240	3.9	85.6	89.4	127.3			3.1
99	8240	3.8	81.8	85.6	125.7			3.1
00	8240	3.7	78.9	82.6	125.0			3.1
01	6561	3.0	61.0	64.0	99.9			3.1
SUBTOTAL	63386	97.4	765.1	862.5	1178.4			

17. (U) Production Rate Data

a. (U) Annual Production Rates --

MLRS ROCKETS

FISCAL YEAR	PRODUCTION RATES (QUANTITY/YEAR)			
	DEVELOPMENT ESTIMATE	PRODUCTION ESTIMATE	CURRENT ESTIMATE	MAXIMUM ECONOMIC
1992	552	N/A	552	N/A
1993	1830	N/A	1830	N/A
1994	2594	N/A	2594	N/A
1995	7500	N/A	7500	N/A
1996	7500	N/A	7500	N/A
1997	7500	N/A	7500	N/A
1998	7500	N/A	7500	N/A
1999	7500	N/A	7500	N/A
2000	7500	N/A	7500	N/A
2001	7500	N/A	7500	N/A
2002	1634	N/A	1634	N/A

155MM PROJECTILE

FISCAL YEAR	PRODUCTION RATES (QUANTITY/YEAR)			
	DEVELOPMENT ESTIMATE	PRODUCTION ESTIMATE	CURRENT ESTIMATE	MAXIMUM ECONOMIC
1992	560	N/A	485	N/A
1993	2664	N/A	2300	N/A
1994	5409	N/A	4600	N/A
1995	8240	N/A	8240	N/A
1996	8240	N/A	8240	N/A
1997	8240	N/A	8240	N/A
1998	8240	N/A	8240	N/A
1999	8240	N/A	8240	N/A
2000	8240	N/A	8240	N/A
2001	6050	N/A	6561	N/A

17. (U) Production Rate Data: (continued)

b. (U) Cost Variance -- Dollars in Millions

MLRS ROCKETS

ITEM	PRODUCTION ESTIMATE	VARIANCE (CE LESS PdE)	CURRENT ESTIMATE	VARIANCE (CE LESS MAX)	MAXIMUM ECONOMIC
PROG ACQ COST (89 $)	N/A	N/A	3922.4	N/A	N/A
(TY $)	N/A	N/A	5343.0	N/A	N/A
PAUC (89 $)	N/A	N/A	0.066	N/A	N/A
(TY $)	N/A	N/A	0.090	N/A	N/A

155MM PROJECTILES

ITEM	PRODUCTION ESTIMATE	VARIANCE (CE LESS PdE)	CURRENT ESTIMATE	VARIANCE (CE LESS MAX)	MAXIMUM ECONOMIC
PROG ACQ COST (89 $)	N/A	N/A	1102.1	N/A	N/A
(TY $)	N/A	N/A	1428.3	N/A	N/A
PAUC (89 $)	N/A	N/A	0.017	N/A	N/A
(TY $)	N/A	N/A	0.023	N/A	N/A

c. (U) Schedule Variance --

MLRS ROCKETS

ITEM	PRODUCTION ESTIMATE	VARIANCE (CE LESS PdE)	CURRENT ESTIMATE	VARIANCE (CE LESS MAX)	MAXIMUM ESTIMATE
START DATE (MO/YR)	N/A	N/A	JUL 94	N/A	N/A
DURATION (IN MONTHS)	N/A	N/A	98	N/A	N/A
END DATE (MO/YR)	N/A	N/A	SEP 02	N/A	N/A

155MM PROJECTILES

ITEM	PRODUCTION ESTIMATE	VARIANCE (CE LESS PdE)	CURRENT ESTIMATE	VARIANCE (CE LESS MAX)	MAXIMUM ESTIMATE
START DATE (MO/YR)	N/A	N/A	APR 93	N/A	N/A
DURATION (IN MONTHS)	N/A	N/A	104	N/A	N/A
END DATE (MO/YR)	N/A	N/A	DEC 01	N/A	N/A

17. (U) Production Rate Data (Cont'd):

d. (U) Deliveries (Plan/Actual)

MLRS Rocket	To Date
RDT&E	0/0
Procurement	0/0
MILCON	0/0
O&M	0/0

155mm Projectile	To Date
RDT&E	0/0
Procurement	0/0
MILCON	0/0
O&M	0/0

e. (U) Approved Design-to-Cost Goal —
N/A DTC Goals in contract are on a submunition basis, not end item.

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules --

Both of the SADARM munitions are considered wooden rounds. The only support costs are for depot storage, stockpile reliability testing and teardown testing. Source for operating and support costs is 19 Sep 89 Baseline Cost Estimate.

b. (U) Costs -- (FY 1989 Constant (Base-Year) Dollars in Millions)

COST ELEMENT	AVG ANNUAL COST PER YEAR	AVG ANNUAL COST PER YEAR (ANTECEDENT)
O & S - 155MM	1.4	0.0
O & S - MLRS	3.5	0.0
TOTAL	4.9	0.0

c. (U) Contractor Support Costs -- None

N-2 AN/BSY-2 (1)

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SAR-89-006

SELECTED ACQUISITION REPORT (RCS DD-COMP) (Q)B23 (7700)
PROGRAM: AN/BSY-2 SUBMARINE COMBAT SYSTEM
AS OF DATE: December 31, 1989

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1. (U) Designation/Nomenclature (Popular Name): AN/BSY-2 Submarine Combat System (AN/BSY-2 SCS) and Passive Sonar Receiving Set (AN/BQG-5)

2. (U) DoD Component: U.S. Navy

3. (U) Responsible Office and Telephone Number:

New Attack Submarine System
Program Management Office
AN/BSY-2 SCS Program Manager
PMS418 Naval Sea Systems Command
Washington, D.C. 20362

PM: CAPT Scott L. Sears, USN
Assigned: March 29, 1989
Area Code 703/602-0056
AUTOVON 332-0056

4. (U) Program Elements:

RDT&E:
PE0604524N - S1347 AN/BSY-1 (FY85 and prior) (shared funding)
PE0604524N - S1941 AN/BSY-2 SCS (shared funding)
PE0604520N - S0198 Wide Aperture Array (FY86 and prior)
PE0603504N - S0222 Wide Aperture Array (FY87 and prior) (shared funding)

90-1665

(b)(1)

OPN:
BA2 PE 24281N, Line Item 332217
BA7 PE 84731N, Line Item 338026
BA8 PE 84731N

O&M,N:
BA8 PE 78017N, LINE ITEM P2PU

CLASSIFIED BY: OPNAVINST 5513.5B
REVIEW ON: OADR

AS AMENDED

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OASD(PA) DFOISR 90-T-0691/7

5. (U) Related Programs:

Submarine Tactical Warfare System, Anti-Submarine Warface Standoff Weapon, Mk 48 Advanced Capabilities Torpedo, TOMAHAWK, Submarine Launched Mobile Mine, Submarine Sonar Development, Enhanced Modular Signal Processor, Navigation Systems, Submarine Surveillance Equipment, Over-the-Horizon Targeting, Submarine Hull Array Development, Submarine Communications, AN/BSY-1 Submarine Combat System, HARPOON

6. (U) Mission and Description:

a. Mission. The AN/BYS-2 Submarine Combat System supports the SSN mission to conduct prompt and sustained combat operations. The warfare tasks supporting this mission are: Anti-Submarine Warfare (ASW); Anti-Surface Warfare; Strike Warfare; Special Warfare; Ocean Surveillance; Intelligence/Reconnaissance; Command, Control, and Communication (C3); Electronic Warfare and Mine Warfare.

b. Description. The AN/BYS-2 Submarine Combat System will improve upon existing combat systems to meet the expanded operational requirements of attack submarines in countering the 1990's threat. The AN/BYS-2 Submarine Combat System will provide combat control and acoustic functions to support the ship characteristics of the SSN 21. In addition, Stand-Alone Wide Aperture Array AN/BQG-5 capability can be provided for SSN 688 class ships. It shall meet the following needs:

(1) (U) Detect, classify, localize and track targets, platforms and weapons by means of onboard active and passive sensors and by target information from other platforms and external detection systems.

(2) (U) Direct and control placement of weapons on designated targets and deploy countermeasure devices.

(3) (U) Utilize own ship data through appropriate interfaces and data transmission networks to orient and direct sensors and weapons control systems.

(4) (U) Display tactical data and other information to the Commanding Officer and provide internal distribution to the combat control party.

(5) (U) Perform Command, Control, Communications and Intelligence-related (C3I) functions to facilitate the decision process.

7. (U) Program Highlights:

a. The original program SUBACS was initiated in 1981, with Concept Definition in March 1982. In June 1982 the program was structured into three phases. Full Scale Development began in December 1983. Technological problems caused restructuring of the program, and in June 1985 the program split into two discreet segments: AN/BSY-1 and the FY89 Submarine Combat

System (subsequently renamed AN/BSY-2). Development of the AN/BSY-2 Submarine Combat System began in early 1986 with the award of fixed-price System Design Definition (SDD) contracts to the Missile and Surface Radar Division of RCA (subsequently acquired by General Electric Company) and Federal Systems Division of IBM. Program Milestone I approval was granted in October 1986. Issuance of a Request for Proposals on 18 February 1987; proposals received from both SDD contractors on 6 July 1987; A Sustaining Engineering contract was awarded to General Electric Company on 11 December 1987. The Program Baseline Document dated 9 Feb 88 was approved on 7 March 1988. Milestone II approval was granted by the Acquisition Decision Memorandum (ADM) signed 9 March 1988. The contract for Full Scale Development was awarded to General Electric Company on 31 March 1988. Limited Production options for the first AN/BSY-2 Submarine Combat System and 2 AN/BQG-5 Standalone Wide Aperture Arrays were exercised December 1988.

b. Significant highlights subsequent to the last Selected Acquisition Report dated 31 December 1988 include: Software Specifications Review (SSR) and Preliminary Design Review (PDR) have been conducted to verify AN/BSY-2 will meet all performance requirements, and commenced with Critical Design Review (CDR). Critical Item testing successfully demonstrated acoustic performance of the Wide Aperture Array (WAA). Superior performance of beamformer micro-electronics was also demonstrated. Progress in combat system hardware and computer software development continued as planned. The AN/BSY-2 Submarine Combat System will meet all the mission requirements.

c. Changes since "as of" date: None

8. Threshold Breaches:

There are currently no DAE baseline (dated 31 December 1988) breaches.

9. Schedule:

	Development Estimate	Approved Program	Current Estimate
a. Milestones			
System Design Definition Contract Award			
RCA Corporation	Jan 86	Jan 86	Jan 86
IBM Corporation	Mar 86	Mar 86	Mar 86
Milestone I (JRMB)	Jun 86	Jun 86	Jun 86
Milestone II (DAB)	Nov 87	Feb 88	Feb 88
FSD Contract Award	Jan 88	Mar 88	Mar 88
Authorization for Limited Production (DAB)	1st Q FY90	1st Q FY90	1st Q FY90
Authorization for Limited Production (DAB)	1st Q FY92	1st Q FY92	1st Q FY92
Material Support Date (AN/BQG-5)	Nov 92	Nov 92	Nov 92
AN/BQG-5 TECHEVAL	Aug 93	Aug 93	Aug 93

9. (U) Schedule: (Cont'd)

	Development Estimate	Approved Program	Current Estimate
a. (U) Milestones			
(U) Material Support Date (AN/BSY-2)	Nov 93	Nov 93	Nov 93
(U) Authorization for Limited Production (DAB)	1st Q FY94	1st Q FY94	1st Q FY94
(U) AN/BQG-5 OPEVAL	Mar 94	Mar 94	Mar 94
(U) Initial Operational Capability (AN/BQG-5)	Apr 94	Apr 94	Apr 94
(U) AN/BSY-2 TECHEVAL (DT IIE)	Dec 94	Jan 95	Jan 95
(U) Complete TECHEVAL (DT III)	Dec 94	Jun 95	Jun 95
(U) AN/BSY-2 OPEVAL (OT IIC)	Jun 95	Jun 95	Jun 95
(U) Complete OPEVAL (OT III)	Jun 95	Dec 95	Dec 95
(U) Initial Operational Capability (AN/BSY-2)	Jul 95	Jul 95	May 95
(U) Authorization for Full Production (Milestone III)	1st Q FY96	1st Q FY96	3rd Q FY96
(U) Navy Support Date AN/BSY-2	Jul 96	Jul 96	Jul 96

b. (U) Previous Change Explanation:

- The Defense Acquisition Board Milestone II was delayed three months to complete source selection prior to the Milestone II decision.
- The FSD option was delayed two months to allow DOD Milestone II decision.
- Shipbuilding schedule change.

c. (U) Current Change Explanation:

None

d. (U) References:

(U) Development Estimate: SDDM dated October 9, 1986, subject "Fiscal Year 1989 Submarine Combat System Milestone I Decision Memorandum"

(U) Approved Program: DAE Baseline dated 31 December 1988.

10. (U) Technical/Operational Characteristics:

	Dev. Est.	Approved Program Threshold	Demon. Perf	Current Estimate	Note
(b)(1)					

10. (~~S~~) Technical/Operational Characteristics: (Cont'd)

	Dev. Est.	Approved Program Threshold	Demon. Perf.	Current Estimate	Notes
(b)(1)					

10. (U) Technical/Operational Characteristics: (Cont'd)

	Dev. Est.	Approved Program Threshold	Demon. Perf.	Current Estimate	Notes
(b)(1)					

10. (C) Technical/Operational Characteristics: (Cont'd)

	Dev. Est.	Approved Program Threshold	Demon. Perf.	Current Estimate	Notes
(b)(1)					

10. (U) Technical/Operational Characteristics: (Cont'd)

	Dev. Est.	Approved Program Threshold	Demon. Perf.	Current Estimate	Notes
(b)(1)					

10. (U) Technical/Operational Characteristics: (Cont'd)

	Dev. Est.	Approved Program Threshold	Demon. Perf.	Current Estimate	Notes
(b)(1)					

10. (~~S~~) Technical/Operational Characteristics: (Cont'd)

	Dev. Est.	Approved Program Threshold	Demon. Perf.	Current Estimate	Notes
(b)(1)					

10. Technical/Operational Characteristics: (Cont'd)

	Dev. Est.	Approved Program Threshold	Demon. Perf.	Current Estimate	Note:
(b)(1)					

10. (U) Technical/Operational Characteristics: (Cont'd)

	Dev. Est.	Approved Program Threshold	Demon. Perf.	Current Estimate	Notes
(b)(1)					

(U) The following notes are based on environmental and threat parameters provided in the following:

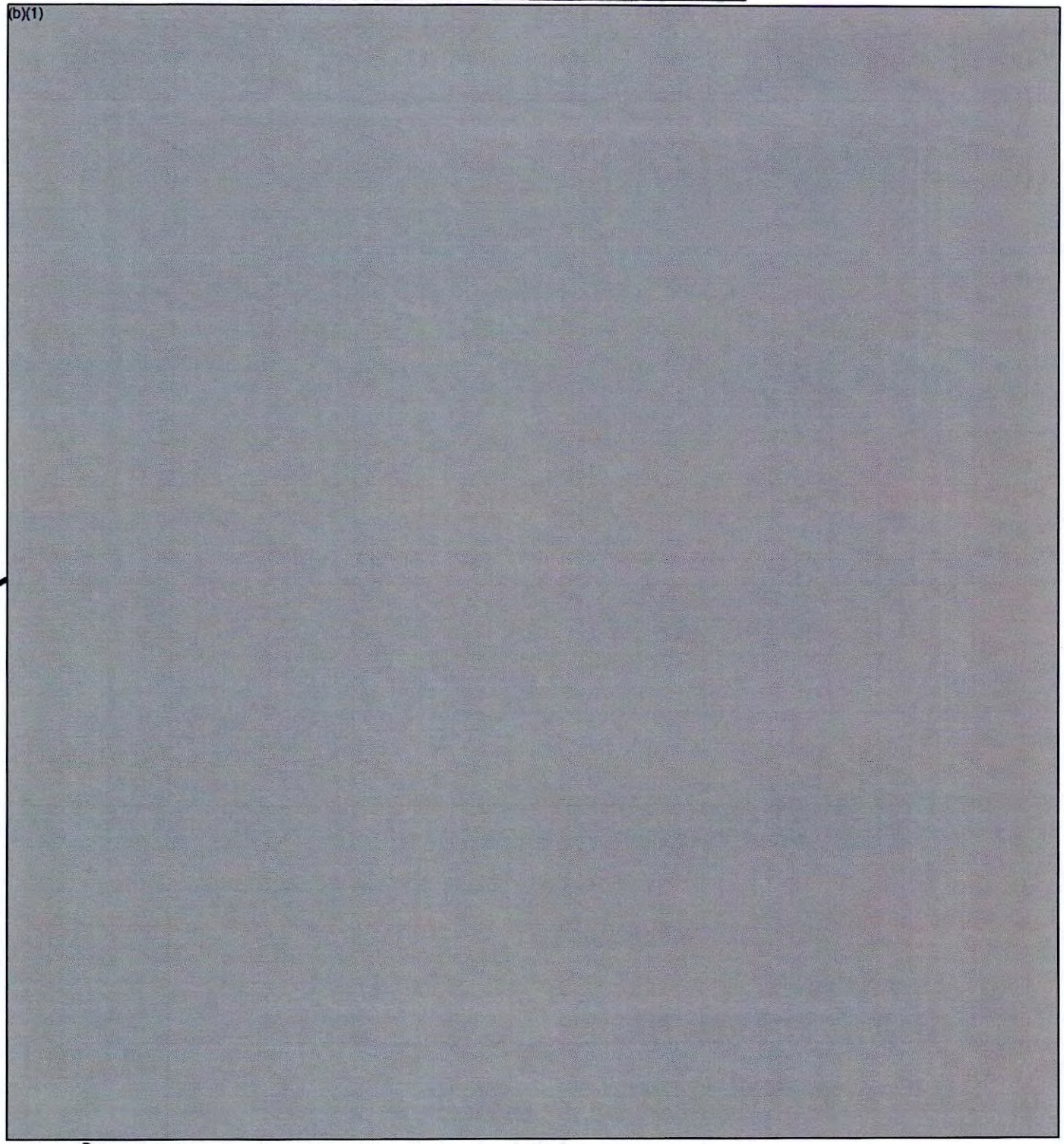
Reference A: The Attack Submarine Analysis Data Book, Volume III.

Reference B: Naval Intelligence Support Center (NISC) Soviet Threat Assessment Report (STAR), Submarine Systems, Volume 1, NISC Ltr S/N 21/S2118 dtd 8 Apr 86 updated with NISC Ltr

(b)(1)

(U) Notes for Technical/Operational Characteristics (Cont'd)

(b)(1)



9. (U) The FOM is based on tracker acquisition.

(U) Notes for Technical/Operational Characteristics (Cont'd)

(b)(1)

11. (U) The threshold is calculated using classification LOFAR gram.

12. (U) Tested at sea using a 10% modulated high signal level source.

(b)(1)

14. (U) The array wander contribution to the threshold is dominant over all other mechanisms over all arrival paths except severe mountainous bottoms.

(b)(1)

16. (U) Ranging accuracies are a function of SVP and bottom slope. The stated threshold represents averaged results over several scenarios.

(b)(1)

20. (U) The actual system capacity is for 2000 tracks. This system requirement will be verified by design review. The threshold of 500 tracks will be demonstrated during land-based testing.

21. (U) Mean Time Between Failure (MTBF) is the sum of critical, major, and minor failures as defined in MIL-STD-721C. Interim assessments of MTBF will be estimated through the use of computer modeling for the September 1991 and September 1993 Program Reviews. Thresholds for these reviews are 14 hours and 23 hours, respectively. See MTBCF note for failure definitions.

(U) Notes for Technical/Operational Characteristics (Cont'd)

22. (U) Mission Time Between Critical Failures (MTBCF) defines the system mission reliability. MTBCF is equal to Mission Time divided by the total number of critical and major failures which occur during a series of specified missions. Critical, major and minor failures are defined as follows:

a. (U) A critical failure prevents the ship from performing its mission.

b. (U) A major failure causes the ship to lose some operational capability and degrades mission accomplishment.

c. (U) A minor failure affects performance but can be worked around to avoid mission impact.

(U) The full-up and self-protect configurations are defined in the FY89 Submarine Combat System Top-Level Requirements (TLR)

(b)(1)

23. (U) An interim assessment of MTTR will be made prior to the September 1993 Program Review. The threshold for the interim review is 28 minutes.

24. (U) Fault localization shall be capable of being on-line with system operation without further degradation of system capabilities. Maximum fault group sizes are defined as follows:

a. (U) Non-memory faults
   8 - Format D or 5x5 modules
   16 - Format B modules
   4 - New LRU's

b. (U) Memory faults
   2 - New LRU's
   4 - Retained LRU's

c. (U) 85% of all non-memory faults on new equipment will be localized to one LRU. 90% of all memory faults on new equipment will be localized to one LRU.

25. (U) MTBE is defined in terms of Cold Starts (down loading, and initialization of software programs and data without restoration of historical data) and Warm Starts (down loading and initialization of software programs and data including restoration of historical data). Historical data includes all data except that lost during the interval between the error and the completion of the recovery action. Mode remembered on checkpoint data is also included in the historical data.

(U) Notes for Technical/Operational Characteristics (Cont'd)

26. (U) The Tiger simulation model (Version 8) will be used to provide predictions of RMA parameters. Inputs to the computer model will include system functional requirements; most realistic, predicted and historical hardware failure rates, hardware restoration time, software error rates, software restoration time; planned logistic and repairs policies; and anticipated level of training. As technical and operation test results become available actual system data will be entered in the model.

27. (U) COMOPTEVFOR will observe FOM determination during developmental testing and comment on whether the system satisfies the FOM thresholds. The system characteristics used operationally by the fleet to predict detection ranges will be used during OT to calculate in-situ FOMs and associated detection ranges against the target. Sonar detection effectiveness will be evaluated by comparing actual performance with the ranges derived from in-situ measurements and calculation of FOMs. In addition, sonar performance will be related to the capability of the test platform to accomplish its ASW mission through the resolution of Critical Operational Effectiveness Issues.

(b)(1) (b)(1)

29. (U) Full-up and Self-protect are defined in the FY 89 Submarine Combat System Top-Level Requirements (TLR).

30. (U) MTBCF is equal to total mission operating time divided by the total number of critical and major failures which occur during a series of specified missions. Failures are defined as follows:

(a) (U) Critical. Prevents the ship from performing its mission.

(b) (U) Major. Causes the ship to lose some operational capability and and degrades mission accomplishment. If detected before the mission, it it would probably be mission aborting.

31. (U) MTBE is defined in terms of Cold Starts (downloading and initialization of software programs without restoration of historical data) and Warm Starts (downloading and initialization of software programs with restoration of historical data).

32. (U) Based on the SSN 21 90-day mission scenario provided in the TLR.

$$A_O = \frac{\text{Uptime}}{\text{Uptime + Downtime}}$$

33. (U) The threshold represents averaged results over several scenarios. Actual values are dependent upon signal-to-noise ratio, SVP, scenario geometry, bottom slope and state of training. At least two own-ship legs are required. solution accuracies required are Range $\pm$ 955 yds, Bearing $\pm$ 2.7°, course $\pm$10°, and speed $\pm$ 2 kts. Measurement of the threshold begins with tracker initialization and ends when the required solution accuracy is achieved.

(U) Notes for Technical/Operational Characteristics (Cont'd)

34. (U) Solution recognition time is measured from the time when the required solution is achieved to the time when the Fire Control Coordinator recognizes an adequate firing solution.

35. (U) Based on the actual time target contact is maintained, excluding time during which target contact is lost.

c. (U) Previous change explanation: The changes shown differed from the previous SAR due to Milestone II revised baseline of Technical/Operational Characteristics. Current values reflect the baseline of Naval Intelligence Support Center (NISC) Soviet Threat Assessment Report of 1986 (STAR 86) which reported a significant change in threat of record projected characteristics compared to NISC STAR 85.

d. (U) Current change explanation: None.

e. (U) References:

A. Development Estimate: AN/BSY-2 Submarine Combat System Program Milestone II Decision Memorandum dated 9 March 1988 approved the program as described in Decision Coordinating Paper, Revision I, dated 10 September 1987.

f. (U) Approved Progam:

DAE Baseline dated 31 December 1988.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

BASE YEAR: FY1988

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	$ 1642.6	1748.8	$ 1818.6
Procurement			
Support System Costs (including SSF, Trainers, Trainer Unique Equipment, MS/RFs, IMAs, I&C Spares and MAMs)	893.9	797.7	742.3
	(893.9)	(797.7)	(742.3)
Construction (MILCON)	-	-	-
Total FY88 Base Year $	2536.5	2546.5	2560.9
Escalation	319.3	318.3	443.8
Development (RDT&E)	(120.3)	(145.9)	(211.8)
Procurement	(199.0)	(172.4)	(232.0)
Construction (MILCON)	-	-	-
Total Then Year $	2855.8	2864.8	3004.7
b. Quantities --			
Development	2	2	2
Procurement	N/A	N/A	N/A

Note: Procurement units for new construction ships are procured under SCN appropriation and are included as portions of the SSN 21 and SSN 688 SARs. The non-add SCN funding and system quantities are shown in Section 16c.

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Development Estimate: ADM, dated 9 March 1988, subject "AN/BSY-2 Submarine Combat System Program Milestone II Decision Memorandum".

Approved Program: DAE baseline dated 31 December 1988

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est	UCR Baseline	UCR Baseline
a. Program Acquisition	Dec 89 SAR	Dec 88 SAR	Dec 89 SAR
(1) Cost	3004.7	2864.8	3004.7
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

b. Current Procurement -- None

13. (U) Cost Variance Analysis:

a. Summary -- (Current (Then Year) Dollars in Millions)

Development Estimate	RDT&E 1762.9	PROC 1092.9	MILCON -	TOTAL 2855.8
Previous Changes:				
Economic	+ 5.6	- 9.8		- 4.2
Quantity	-	-16.7		-16.7
Schedule	-	-		-
Engineering	+86.9	-		+86.9
Estimating	-15.3	-42.8		-58.1
Other	-	-		-
Support	+54.6	-53.5		+1.1
Subtotal	+131.8	-122.8		+9.0
Current Changes:				
Economic	+43.9	+78.2		+122.1
Quantity	-	-		-
Schedule	-	-		-
Engineering	+57.9	-		+57.9
Estimating	+33.9	-14.3		+19.6
Other	-	-		-
Support	-	-59.7		-59.7
Subtotal	+135.7	- 4.2		+139.9
Total Changes	+267.5	-118.6		+148.9
Current Estimate	2030.4	974.3	-	3004.7

(FY 1988 Constant Dollars in Millions)

Development Estimate	RDT&E 1642.6	PROC 893.9	MILCON -	TOTAL 2536.5
Previous Changes:				
Economic	-	-		-
Quantity	-	-13.9		-13.9
Schedule	-	-		-
Engineering	+72.5	-		+72.5
Estimating	-14.6	-36.3		-50.9
Other	-	-		-
Support	+48.3	-46.0		+2.3
Subtotal	+106.2	-96.2		+10.0
Current Changes:				
Economic	-	-		-
Quantity	-	-		-
Schedule	-	-		-
Engineering	+45.4	-		+45.4
Estimating	+24.4	-11.0		+13.4
Other	-	-		-
Support	-	-44.4		-44.4
Subtotal	+69.8	-55.4		+14.4
Total Changes	+176.0	-151.6		+24.4
Current Estimate	1818.6	742.3	-	2560.9

13. Cost Variance Analysis: (Cont'd)

b. Previous Change Explanations --

RDT&E
- Economic: revised escalation rates
- Engineering: Block Upgrade program added
- Estimating: reduced lab tasking
- Support: AN/BSY-2 Team Trainer tactical equipment reprogrammed from FY91 OPN; LSA conversion reprogrammed from FY91 O&M,N

Procurement
- Economic: revised escalation rates
- Quantity: two AN/BQG-5 Team Trainers deleted
- Estimating: reduced SSF configuration and upgrades; reduced TUE for FY93 and FY94 AN/BSY-2 Team Trainers.
- Support: FY91 AN/BSY-2 Team Trainer reprogrammed to RDT&E

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
o Revised Jan 90 escalation rates (economic)	-	+43.9
o Cost estimate for transitioning from EMSP Standard Electronic Module (SEM) format B to SEM format E (Engineering)	+45.4	+57.9
o Partial funding for OPEVAL Missile procurements (estimating)	+24.4	+33.9
(2) Procurement		
o Revised Jan 90 escalation rates (economic)	-	+78.2
o Revised test equipment and spares estimates (estimating)	-11.0	-14.3
o Revised cost estimates for Maintenance Trainers, Team Trainer Tactical and Trainer Unique Equipment, and associated spares (support)	-44.4	-59.7

14. Program Acquisition Unit Cost (PAUC) History:*

* Not Applicable. Procurement units for new construction ships are included in the SSN 21 and SSN 688 SARs.

15. ➡ Contract Information: (Then-Year Dollars in Millions)

a. RDT&E --

AN/BSY-2 FSD:	Initial Contract Price Target	Ceiling	Qty
General Electric Co., Syracuse, NY	$965.5	$1097.7	2 EDMs
N00024-88-C-6150, FPIF			
Award: December 11, 1987			
Definitized: December 11, 1987			

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$974.1	$1107.6	2 EDMs	$1018.9	$1028.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+1.1	$-7.1
Cumulative Variances To Date (10/01/89)	$-8.1	$-22.4
Net Change	$-9.2	-15.3

Explanation of Change: The General Electric Company's unfavorable cost variance is due to additional GE Syracuse systems engineering requirements and analysis effort for final requirements allocation, spec reviews and PIDS updates; additional common hardware design effort for GE ESD firmware, Librascope display and weapons hardware, Martin Marietta arrays and GE Syracuse subsystem and SEM modules; and additional fabrication effort for Martin Marietta flow noise arrays. The unfavorable schedule variance is due to delays in Librascope display and weapons hardware design; delays in GE ESD CSS, C&D and SIM/STIM software development; delays in GE ESD firmware design and documentation; and delays in fabrication of Martin Marietta acoustic and shock arrays. The program manager's estimate at completion is higher than the contractor's due to schedule delays, but it is below ceiling.

b. Procurement --

AN/BSY-2 FY89 LP:	Initial Contract Price Target	Ceiling	Qty
General Electric Co., Syracuse, NY	$ 45.1	$ 45.1	N/A
N00024-88-C-6150, FPIF			N/A
Award: December 11, 1987			
Definitized: December 23, 1988			

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$147.2	$149.8	1 AN/BSY-2	$216.6	$216.6
$ 69.5	$ 70.7	2 AN/BQG-5		

	Cost Variance	Schedule Variance
Previous Cumulative Variances		
Cumulative Variances To Date (10/01/89)	N/A	N/A
Net Change		

Explanation of Change: N/A - GE is in the process of allocating budgets and establishing the baseline.

c. MILCON -- N/A

Note: RDT&E Option Items 0039, 0001-0018 and 0031 and Procurement Option Items 0032, 0033, 0019 and 0020 have been exercised and are included in the current contract price.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed:* 50.0% (10 yrs/20 yrs)
(2) Percent Program Cost Appropriated: 39.2% (1178.0/3004.7)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current and Prior Yrs (FY81-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-00)	Total
RDT&E	710.7	316.9	344.6	658.2	2030.4
Procurement	-	150.4	141.9	682.0	974.3
MILCON	-	-	-	-	-
Total	710.7	467.3	486.5	1340.2	3004.7

* FY86 was the first year in which the AN/BSY-2 Submarine Combat System Program was funded. Funding for years prior to FY86 was for SUBACS A, SUBACS B, and Wide Aperture Array (WAA) programs.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars) (Cont'd)..

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY88 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1981		19.1		19.1	15.2	15.2	15.2	10.61
1982		28.3		28.3	23.7	23.7	23.7	7.6
1983		27.6		27.6	24.1	24.1	24.1	4.9
1984		24.7		24.7	22.4	22.4	22.4	3.8
1985		28.4		28.4	26.5	26.5	26.3	3.4
1986		39.7		39.7	38.2	38.2	37.3	2.8
1987		95.1		95.1	94.1	94.0	92.7	2.7
1988		182.6		182.6	186.8	186.2	173.5	3.0
1989		262.6		262.6	279.7	279.0	119.5	4.2
1990		285.9		285.9	316.9	90.0	5.2	4.0
1991		298.7		298.7	344.6	-	-	4.2
1992		209.4		209.4	250.8	-	-	4.0
1993		114.3		114.3	141.8	-	-	3.7
1994		91.1		91.1	116.7	-	-	3.4
1995		67.7		67.7	89.4	-	-	3.1
1996		33.9		33.9	46.2	-	-	3.1
1997		9.5		9.5	13.3	-	-	3.1
Subtotal		1818.6		1818.6	2030.4	799.3	539.9	-

Fiscal Year	Qty	Sailaway FY88 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: OPN*								
1990			128.4	128.4	150.4	-	-	4.0
1991			116.8	116.8	141.9	-	-	4.2
1992			40.7	40.7	51.1	-	-	4.0
1993			168.3	168.3	218.4	-	-	3.7
1994			67.1	67.1	89.9	-	-	3.4
1995			29.3	29.3	40.5	-	-	3.1
1996			83.1	83.1	118.3	-	-	3.1
1997			15.1	15.1	22.2	-	-	3.1
1998			91.1	91.1	137.8	-	-	3.1
1999			1.2	1.2	1.9	-	-	3.1
2000			1.2	1.2	1.9	-	-	3.1
Subtotal			742.3	742.3	974.3	-	-	-
Total		1818.6	742.3	2560.9	3004.7	-	-	-

NOTE: Prior year Then-year dollars reflect actuals.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars) (Cont'd)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY88 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: SCN for SSN 21*								
1989	1	3.6	153.9	183.5	206.8	146.0	1.4	4.2
1990	0	0.0	0.0	0.0	0.0	-	-	4.0
1991	2	22.9	245.3	317.5	385.7	-	-	4.2
1992	3	13.1	363.0	412.7	518.6	-	-	4.0
1993	3	17.8	364.2	414.5	537.8	-	-	3.7
1994	3	38.5	340.6	408.3	546.4	-	-	3.4
1995	3	18.2	416.8	466.2	643.2	-	-	3.1
1996	4	65.0	395.2	496.1	705.6	-	-	3.1
1997	3	5.6	333.0	365.8	536.5	-	-	3.1
1998	3	5.6	329.3	361.6	608.2	-	-	3.1
1999	4	6.9	444.5	486.2	851.5	-	-	3.1
Subtotal	29	197.2	3385.8	3912.4	5540.7	146.0	1.4	
Appropriation: SCN for SSN 688*								
1989	2	0.0	58.9	61.6	69.5	69.5	6.4	4.2
Subtotal	2	0.0	58.9	61.6	69.5	69.5	6.4	

*These are non-add quantities and funding for AN/BSY-2 and AN/BQG-5 is included in the host platform SARs (SSN 21 and SSN 688) respectively.

17. (U) Production Rate Data:

a. Annualized Production Rates --N/A

b. Cost Variance -- N/A

c. Schedule Variance -- N/A

d. Deliveries (Plan/Actual) -- N/A

	To Date
RDT&E	0/0
Procurement	0/0

e. Approved Design to Cost Goal -- (Average Unit Sailaway Cost)

	Dev Estimate/ DAE Baseline	Current Estimate	Latest Approved Threshold
AN/BSY-2			
@ Qty: 28			
@ Peak Rate: 4/yr			
FY86 Base-Year $	130.1	131.4	146.2
Then-Year FY92 $	171.2	172.9	192.4

NOTE: Design to Cost program estimating baseline in FY86.

18. (U) Operating and Support Costs:

a. Assumptions and Ground Rules -- Each ship system operates for the 30 year life of the submarine. The thrust of the maintenance concept is to maintain a stable, highly reliable condition of material readiness for the Combat System. Therefore, the maintenance concept emphasizes reliability centered maintenance and a "replace instead of repair" philosophy, with the major objective being reducing maintenance at sea. Manpower requirements are driven by watch station requirements.

The personnel costs are to support military and civilian personnel and to operate the AN/BSY-2 Submarine Combat System. Direct intermediate maintenance includes the requirements and funding for accomplishing repairs at intermediate levels of maintenance. The direct depot maintenance cost is summary cost which includes a major modernization of the system, and the resource requirements to accomplish depot repair of equipment, assemblies and subassemblies. The sustaining investment consists primarily of replenishment spares and repair parts, software maintenance, and technical development of ECPs. Indirect costs are for the development of changes to training courses and for upgrading of Navy training plans.

b. Costs --

(FY 1986 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per AN/BSY-2 SCS	Avg Annual Cost Per AN/BSY-1 SCS Antecedent
Personnel	2.2	Cost Not Available
O&S Consumables	0.0	
Direct Depot Maint	2.8	
Sustaining Invest	2.8	
Other Direct Costs		
Indirect Costs	0.0	
Total	7.8	

NOTE: Program cost estimating is in FY86 dollars.

c. Contractor Support Costs -- N/A

A-13 FMTV

SAR-89-098

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: FMTV

AS OF DATE: December 31, 1989

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CLEARED
FOR OPEN PUBLICATION
MAR 22 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

1. **Designation and Nomenclature (Popular Name):** Family of Medium Tactical Vechicles (FMTV)

2. **DoD Component:** ARMY

Responsible Office and Telephone Number:
Program Manager, Medium Tactical Veh COL LAWRENCE W DAY
WARREN, MI 48397-5000 Assigned: January 21,1989
AV 786-8665 COMM (313) 574-8665

4. **Program Elements/Procurement Line Items:**
RDT&E:
PE 64604 Project DH07
PROCUREMENT:
APPN 2035 ICN SSN D15500 (Army)
APPN 2035 ICN SSN DA035A (Army)

(b)(1)

5. **Related Programs:** None.

6. **Mission and Description:** The Family of Medium Tactical Vehicles (FMTV) Program consists of a 2-1/2 ton light medium tactical vehicle (LMTV) configured as van or cargo, and a 5 ton medium tactical vehicle (MTV) with nine (9) different configurations (cargo, wrecker, tanker, etc), plus complementary trailers. This family of vehicles will be characterized by incorporation of state-of-the-art technology, maximum commonality of components, various body styles to accommodate special mission applications, and suited to a variety of multi-purpose missions. The FMTV will perform line haul, local haul, unit mobility, unit resupply and other required missions in combat, combat support and combat service

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OASD(PA) DFOISR 90-T-0703/1

6. **Mission and Description** (Cont'd):

support units. Vehicle operations will include around-the-clock, all weather use in the climatic design types hot, basic and cold as defined in AR 700-38. Vehicles will operate worldwide on primary and secondary roads and trails. The FMTV will supplement existing and aging 2-1/2 T trucks and provide a follow-on to the current 5 T truck to initially fill 5 T truck shortages.

7. **Program Highlights:**

a. Significant Historical Developments -- The Family of Medium Tactical Vehicles (FMTV) Program, Operational and Organizational Plan was approved in September 1984. The User Requirement Document (JSOR) was established on 1 May 1986, and subsequently, the Army COEA justified the program initiation on 4 Jun 1987. The FMTV Army Systems Acquisition Review Council (ASARC) approval was obtained on 5 Aug 1987, with further program approval from the Defense Acquisition Board (DAB) on 23 May 1988. Congress approved FY88 prototype funding, and prototype contracts were awarded on 21 Oct 1988. The Army conducted a 2-1/2 T Truck Feasibility Study which validated the requirement for a 2-1/2 T truck variant.

b. Significant Developments Since Last Report -- The FMTV program was cut by $240 million in April 1989, drastically reducing the first five years of trailer production. In July 1989, as a result of the 2 1/2 Ton Truck Study, the LMTV (i.e. 2 1/2 ton variant) was restored in the first year of the production contract. In October, 1989, the PM initiated action to reduce the number of test vehicles to be tested at Yuma Proving Grounds due to decrements to the RDT&E funding line. The Dec 88 SAR represented a procurement program of 15 years. The Current Estimate represents a 30 year procurement program as identified in the Army approved Tactical Wheeled Vehicle Modernization Plan (TWVMP) report to Congress dated 12 April 1989.

The FMTV System is expected to satisfy the mission requirement.

c. Changes Since As Of Date -- None.

8. **Threshold Breaches:** There are currently no baseline (March 1990) breaches.

9. **Schedule:**

a. Milestones --

	Development Estimate	Approved Program	Current Estimate
Milestone I	AUG 87	AUG 87	AUG 87
JSOR Approval	NOV 87	NOV 87	NOV 87
Milestone II	MAY 88	MAY 88	MAY 88
Prototype Contract Award	OCT 88	OCT 88	OCT 88
First Prototype Delivery	DEC 89	JAN 90	JAN 90(Ch-1)
FSD DT Testing Start	DEC 89	JAN 90	JAN 90(Ch-1)

a. Milestones -- Continued	Development Estimate	Approved Program	Current Estimate
Complete	OCT 90	DEC 90	DEC 90 (Ch-1)
EUT&E Testing			
Start	N/A	MAY 90	MAY 90 (Ch-2)
Complete	N/A	OCT 90	OCT 90 (Ch-2)
ASARC III	JAN 91	N/A	N/A (Ch-3)
Milestone III/DAB	JAN 91	N/A	N/A (Ch-3)
ASARC IIIA	N/A	MAR 91	MAR 91 (Ch-3)
Production Contract Award	JAN 91	APR 91	APR 91 (Ch-1)
Call Up 2nd Year of MYP	N/A	NOV 91	NOV 91 (Ch-4)
Call Up 3rd Year of MYP	N/A	NOV 92	NOV 92 (Ch-4)
Call Up 4th Year of MYP	N/A	NOV 93	NOV 93 (Ch-4)
Call Up 5th Year of MYP	N/A	NOV 94	NOV 94 (Ch-4)
First Production Delivery	MAR 92	APR 92	APR 92 (Ch-1)
Initial Production Test			
Start	MAR 92	MAY 92	MAY 92 (Ch-1)
Complete	OCT 92	FEB 93	FEB 93 (Ch-1)
IOT&E			
Start	MAY 90	JUL 92	JUL 92 (Ch-2)
Complete	OCT 90	FEB 93	FEB 93 (Ch-2)
First Unit Equipped/Initial Operational Capability-MTV	DEC 92	N/A	N/A (Ch-5)
First Unit Equipped/Initial Operational Capability-LMTV	DEC 93	N/A	N/A (Ch-5)
ASARC IIIB	N/A	MAR 93	MAR 93 (Ch-3)
First Unit Equipped/Initial Operational Capability-FMTV	N/A	APR 93	APR 93 (Ch-5)

b. Previous Change Explanations -- None.

c. Current Change Explanations --

(Ch-1) First prototype vehicle delivery was delayed from Dec 89 to Jan 90. Consequently, FSD DT start has been rescheduled from Dec 89 to Jan 90; subsequent test-dependent milestones have slipped from one to three months as a result.

(Ch-2) To ensure more accuracy in the test terminology, the user test formerly called "IOT&E", scheduled to occur May 90 through Oct 90, has been renamed EUT&E (Early User Test and Evaluation). The test program has been restructured to support the revised decision points. The previous IOT&E test is now called "EUT&E". This test supports the LRIP decision at ASARC IIIA. As part of the Initial Production Test is an IOT&E test, which supports the ASARC IIIB Full Rate production decision.

(Ch-3) As a result of PL 101-189, 29 Nov 89, "Low Rate Initial Production" the FMTV has been restructured into a two-step decision process to support Low Rate Initial Production (LRIP) and Full Rate

9. **Schedule (Cont'd):**

Production. At ASARC IIIB, full rate production will be certified. Per OUSD(A) letter dated 9 Feb 90, the FMTV program LRIP and Full Rate decisions will be made by means of an ASARC review in lieu of the previously established DAB.

(Ch-4) Individual annual call ups of the 2nd, 3rd, 4th and 5th year of the Multiyear Procurement have been added to clarify the contractual schedule.

(Ch-5) The joint FUE/IOC for FMTV is Apr 93. Individual FUE/IOC for MTV and LMTV are no longer applicable with the completion of the 2 1/2 Ton Truck Feasibility Study which validated the requirement for 2 1/2 Ton (i.e. LMTV) variant. The individual FUE/IOC for MTV and LMTV will be deleted from the 31 Mar 90 SAR.

d. References --

Development Estimate: DAE Program Baseline, Mar 1989; SDDM decision, 7 Oct 1988.

Approved Program: AAE Approved Program Baseline dated March, 1990.

10. **Technical/Operational Characteristics:**

a. Technical --	Dev Est	Approved Program Goal/Threshold		Demonstrated Perf	Current Estimate
Hwy Sp on 2% Grade at GVW (MPH)	55	55	55		55
Hwy Sp on 3% Grade at GVW (MPH)	45	45	45		45
Hwy Sp on 2% Grade at GVW (MPH)	40	40	40		40
Hwy Sp on 3% Grade at GVW (MPH)	30	30	30		30
b. Operational --					
LMTV Payload (Ton)	2.5	2.5	2.5		2.5
MTV Payload (Ton)	5	5	5		5
LMTV Towed Load (Lbs)	7500	7500	7500		7500
MTV Towed Load (Lbs)	20000	20000	20000		20000
Longitudinal Grade Op (Percentage)	60	60	60		60

3. **Technical/Operational Characteristics (Cont'd):**

b. Operational --	Dev Est	Approved Program Goal/Threshold		Demonstrated Perf	Current Estimate
Side Slope Op (Percentage)	30	30	30		30
Fording Without Kit (Inches)	30	30	30		30
Fording With Kit (Inches)	60	60	60		60
Operating Range on Integral Fuel at GCW (Miles)	300	300	300		300
RELIABILITY-Mean Miles Between Hardware Mission Failure					
Truck, Cargo (LMTV)	2140	2140	2140		2140
Truck, Cargo (MTV)	1600	1600	1600		1600
Tractor	3300	3300	3300		3300
Wrecker	2300	2300	2300		2300
Trailer (LMTV)	2800	2800	2800		2800
Trailer (MTV)	2600	2600	2600		2600
RELIABILITY-Mean Miles Between Operational Mission Failure					
Truck, Cargo (LMTV)	1605	1605	1605		1605
Truck, Cargo (MTV)	1200	1200	1200		1200
Tractor	2500	2500	2500		2500
Wrecker	1900	1900	1900		1900
Trailer (LMTV)	2100	2100	2100		2100
Trailer (MTV)	1900	1900	1900		1900
MAINTENANCE RATIO Maintenance Manhours/ Operating Mile					
Truck, Cargo (LMTV)	.011/.011	.011/.011	.011/.011		.011/.011
Truck, Cargo (MTV)	.012/.012	.012/.012	.012/.012		.012/.012
Tractor	.0135/.0135	.0135/.0135	.0135/.0135		.0135/.0135
Wrecker	.017/.017	.017/.017	.017/.017		.017/.017
Trailer (LMTV)	.004/.002	.004/.002	.004/.002		.004/.002
Trailer (MTV)	.004/.002	.004/.002	.004/.002		.004/.002

10. **Technical/Operational Characteristics (Cont'd):**

b. Operational --	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
MOBILITY				
VEHICLE CONE INDEX				
Truck, Cargo	25	25	25	25
Truck & Trailer Combination	35	35	35	35
TRANSPORTABILITY				
Surface Transport Highway, Ship, Rail	HSR	HSR	HSR	HSR
Air Transport C-141	C-141	C-141	C-141	C-141

c. Previous Change Explanations -- None.

d. Current Change Explanations -- None.

e. References --

Development Estimate: DAE Program Baseline, Mar 1989; SDDM decision, 7 Oct 1988.

Approved Program: AAE Approved Program Baseline dated March, 1990.

11. **Program Acquisition Cost (Current Estimate in Millions of Dollars)** 1/

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	57.9	144.7	144.7
Procurement	6567.4	8099.1	8099.1
Procurement	(6089.0)	(7418.0)	(7418.0)
Total Rollaway	(6089.0)	(7418.0)	(7418.0)
Other Wpn Sys Cost	(239.3)	(380.5)	(380.5)
Peculiar Support	(0.0)	(0.0)	(0.0)
Initial Spares	(239.1)	(300.6)	(300.6)
Construction	0.0	0.0	0.0
Ops. and Maint. (O&M)	0.0	0.0	0.0
Total FY 89 Base-Year $	6625.3	8243.8	8243.8

a. Cost -- (Cont'd)	Development Estimate	Approved Program	Current Estimate
Escalation	1943.3	7849.3	7849.3
Development (RDT&E)	(2.0)	(60.4)	(60.4)
Procurement	(1941.3)	(7788.9)	(7788.9)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Ops. and Maint. (O&M)	(0.0)	(0.0)	(0.0)
Total Then-Year $	8568.6	16093.1	16093.1
b. Quantities --			
Development (RDT&E)	60	147	147
Procurement	118935	119542	119542
Construction (MILCON)	0	0	0
Ops. and Maint. (O&M)	0	0	0
Total	118995	119689	119689

c. Foreign Military Sales -- None.

d. Nuclear Costs -- None.

e. References --

Development Estimate: DAE Program Baseline, Mar 1989; SDDM decision 7 Oct 1988.

Approved Program: AAE Approved Program Baseline dated March, 1990.

The Development Estimate represents the previous DAE approved 15 year program, updated to a 30 year program in the Current Estimate and Approved Program.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1) Cost	16093.1 1/	8568.6 1/	16093.1 1/
(2) Quantity	119542 2/	118935 2/	119542 2/
(3) Unit Cost	0.135 3/	0.072 3/	0.135 3/
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	0.0	0.0	56.3
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	0.0	0.0	56.3
(2) Quantity	0.0	0.0	630.0
(3) Unit Cost	-	-	0.089

12. **Program Acquisition/Current Procurement Unit Cost Summary (Cont'd):**

Paragraph 12 Comments:

1/ Costs represent a composite unit cost for 11 different truck variants (ranging in unit hardware cost [FY89 Base Year $] from $49.7K to $149.4K) and 2 trailer variants (ranging in unit cost from $14.3K to $16.9K).

2/ These values have been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purpose of these calculations.

3/ A Nunn-McCurdy breach has occurred and reporting required under Title 10, Section 2433, United States Code will be submitted as required in the 31 March 1990 Exception SAR. The Secretary of the Army notified Congress that a breach had occurred on 27 February 1990.

13. **Cost Variance Analysis:**

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	59.9	8508.7	0.0	8568.6
Previous Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes:				
Economic	+0.4	+1297.5	-	+1297.9
Quantity	+141.1	+3896.8	-	+4037.9
Schedule	-	+1480.2	-	+1480.2
Engineering	-	-	-	-
Estimating	+3.7	-	-	+3.7
Other	-	-	-	-
Support	-	+704.8	-	+704.8
Subtotal	+145.2	+7379.3	-	+7524.5
Total Changes	+145.2	+7379.3	-	+7524.5
Current Estimate	205.1	15888.0	-	16093.1

3. **Cost Variance Analysis (Cont'd):**

(FY 1989 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	57.9	6567.4	0.0	6625.3
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes:				
Quantity	+83.6	+1282.5	-	+1366.1
Schedule	-	+21.4	-	+21.4
Engineering	-	-	-	-
Estimating	+3.2	-	-	+3.2
Other	-	-	-	-
Support	-	+227.8	-	+227.8
Subtotal	+86.8	+1531.7	-	+1618.5
Total Changes	+86.8	+1531.7	-	+1618.5
Current Estimate	144.7	8099.1	-	8243.8

b. Previous Change Explanations -- None.

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised escalation indices (Economic)	N/A	+0.4
Additional R&D quantities due to change from 15 to 30 year program (Quantity)	+83.6	+141.1
Increase in cost of testing (Estimating)	+3.2	+3.7

c. Current Change Explanations -- (Cont'd)

	(Dollars in Millions) Base-Year	Then-Year
(2) PROCUREMENT		
Revised escalation indices (Economic)	N/A	+1297.5
Implementation of Army approved Tactical Wheeled Vehicle Modernization plan extends procurement program from 15 to 30 years and increases truck quantity from 79,157 to 102,322 based on affordability (Quantity)	+1657.5	+4269.5
Decrease in trailer quantity from 39,778 to 17,220 (Quantity)	-375.0	-372.7
Increase in average truck cost due to model mix change and truck purchase in later years (Schedule)	+21.4	+1480.2
Additional support and testing required for extension of program and additional contracts (Support)	+25.1	+66.7
Additional contracts for data, training, System Technical Support and Federal Excise Tax due to extension of program (Support)	+141.2	+378.6
Additional spares for the additional quantities in the extended program (Support)	+61.5	+259.5

4. **Program Acquisition Unit Cost (PAUC) History:** (Then-Year Dollars in Millions)

a. Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
0.072	--	--	--	--	--	--	--	--	0.072

b. Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
0.072	+0.011	+0.034	+0.013	--	--	--	+0.005	+0.063	0.135

15. **Contract Information:** (Then-Year Dollars in Millions)

a. **RDT&E**

Prototype:

Stewart & Stevenson

DAAE07-89-C-R004, FFP
Award: October 21, 1988
Definitized: N/A

Initial Contract Price		
Target	Ceiling	Qty
$17.2	$0.0	20.0

Current Contract Price		
Target	Ceiling	Qty
$17.2	$0.0	20.0

Estimated Price At Completion	
Contractor	Program Manager
$17.2	$17.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: None. For FFP contracts, cost and schedule variance information is not required.

15. **Contract Information (Cont'd):** (Then-Year Dollars in Millions)

	Initial Contract Price		
	Target	Ceiling	Qty
Tactical Truck Corp.			
	$14.5	$0.0	20.0

DAAE07-89-C-R002, FFP
Award: October 21, 1988
Definitized: N/A

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$14.5	$0.0	20.0	$14.5	$14.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: None. For FFP contracts, cost and schedule variance information is not required.

Prototype:

	Initial Contract Price		
	Target	Ceiling	Qty
Teledyne Continental			
	$13.5	$0.0	20.0

AE07-89-C-R001, FFP
ard: October 21, 1988
Definitized: N/A

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$13.5	$0.0	20.0	$13.5	$13.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: None. For FFP contracts, cost and schedule variance information is not required.

16. **Program Funding Summary:**

a. Program Status --

(1) Percent Program Completed: 8.8% (3 yrs/34 yrs)

(2) Percent Program Cost Appropriated: 0.3% ($52.7 / $16093.1)

5. **Program Funding Summary (Cont'd):** (Current Estimate in Millions Dollars

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY88-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-21)	Total
RDT&E	34.6	18.1	7.0	145.4	205.1
Procurement	-	-	56.3	15831.7	15888.0
MILCON	-	-	-	-	-
O&M	-	-	-	-	-
Total	34.6	18.1	63.3	15977.1	16093.1

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY89 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: 2040 Research, Development, Test & Eval, Army								
1988				9.9	9.8	9.2	2.4	3.0
1989				24.2	24.8	24.0	6.0	4.2
1990				16.9	18.1			4.0
1991				6.3	7.0			4.2
1992				2.8	3.2			4.0
1993				1.0	1.2			3.7
1994								3.4
1995								3.1
1996								3.1

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY89 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2040 Research, Development, Test & Eval, Army (Cont'd)								
1997								3.1
1998								3.1
1999				9.2	13.2			3.1
2000				21.9	32.4			3.1
2001				20.4	31.1			3.1
2002				3.0	4.7			3.1
2003								3.1
2004								3.1
2005								3.1
2006								3.1
2007								3.1
2008								3.1
2009								3.1
2010				12.0	24.0			3.1
2011				14.0	29.0			3.1
2012				3.1	6.6			3.1
Subtot	147			144.7	205.1	33.2	8.4	

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY89 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2035 Other Procurement, Army								
1991	630	7.6	28.7	48.3	56.3			4.2
1992	3069	4.6	200.7	211.3	254.6			4.0
1993	4378	1.1	296.3	311.6	387.6			3.7
1994	6043	1.1	416.5	441.1	565.9			3.4
1995	6196	1.1	425.9	467.8	618.7			3.1
1996	5295	1.1	353.3	391.0	533.2			3.1
1997	4165	1.1	243.6	271.3	381.4			3.1
1998				10.3	14.9			3.1
1999								3.1
2000								3.1
2001								3.1
2002	2207	7.8	140.4	163.6	267.9			3.1
2003	4240	1.1	279.1	296.9	501.3			3.1
2004	4538	1.1	290.4	325.7	567.0			3.1
2005	5292	1.1	337.1	368.4	661.2			3.1
2006	5292	1.1	337.1	370.3	685.2			3.1
2007	3132	7.8	194.6	233.6	445.7			3.1
2008	3721	1.1	241.3	257.2	505.9			3.1
2009	3722	1.1	241.4	276.0	559.7			3.1

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY89 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2035 Other Procurement, Army (Cont'd)								
2010	7391	1.1	451.1	482.0	1007.8			3.1
2011	6704	1.1	403.4	441.1	950.8			3.1
2012	2886	7.8	151.2	188.3	418.4			3.1
2013	4467	1.1	248.6	260.3	596.3			3.1
2014	4782	1.1	297.8	331.2	782.3			3.1
2015	7273	1.1	409.8	437.9	1066.3			3.1
2016	6179	1.1	347.5	378.8	950.8			3.1
2017	2451	7.8	127.2	161.4	417.7			3.1
2018	4611	1.1	250.0	260.9	696.1			3.1
2019	5396	1.1	298.9	327.1	899.9			3.1
2020	5482	1.1	340.7	371.2	1052.7			3.1
2021				14.5	42.4			3.1
Subtot	119542	65.4	7352.6	8099.1	15888.0			
Total	119689	65.4	7352.6	8243.8	16093.1	33.2	8.4	

. **Production Rate Data:** 1/
a. Annualized Production Rates --

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1991	2117	N/A	1512	N/A
1992	4850	N/A	3348	N/A
1993	8443	N/A	4378	N/A
1994	9772	N/A	6043	N/A
1995	5420	N/A	6196	N/A
1996	8117	N/A	5295	N/A
1997	9834	N/A	4165	N/A
1998	9838	N/A	0	N/A
1999	9867	N/A	0	N/A
2000	6948	N/A	0	N/A
2001	8115	N/A	0	N/A
2002	9827	N/A	5297	N/A
2003	9833	N/A	4240	N/A
2004	9537	N/A	4538	N/A
2005	6288	N/A	5292	N/A
2006	0	N/A	5292	N/A
2007	0	N/A	3132	N/A
2008	0	N/A	3721	N/A
2009	0	N/A	3722	N/A
2010	0	N/A	7391	N/A

1/ The annualized production rates reflected above are based on the llowing funded delivery periods:

FY91 - 5 months for TR, TRL
FY92 - 11 months for TR, TRL
FY02 - 5 months for TR, TRL

. **Production Rate Data (Cont'd):**

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
2011	0	N/A	6704	N/A
2012	0	N/A	2886	N/A
2013	0	N/A	4467	N/A
2014	0	N/A	4782	N/A
2015	0	N/A	7273	N/A
2016	0	N/A	6179	N/A
2017	0	N/A	2451	N/A
2018	0	N/A	4611	N/A
2019	0	N/A	5396	N/A
2020	0	N/A	5482	N/A

b. Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Acq. Cost (BY $)	N/A	N/A	8243.8	N/A	N/A
(TY $)	N/A	N/A	16093.1	N/A	N/A
PAUC Cost (BY $)	N/A	N/A	0.069	N/A	N/A
(TY $)	N/A	N/A	0.134	N/A	N/A

c. Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	APR 91	N/A	N/A
Duration (in mon)	N/A	N/A	+63	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	JUL 96	N/A	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	60/60
Procurement	0/0
MILCON	0/0
O & M	0/0

e. Approved Design-to-Cost Goal -- None.

18. Operating and Support Costs:

a. Assumptions and Ground Rules --

The average miles/vehicle/year for the LMTV truck is 8,206 miles; the MTV truck is 6,052 miles; the LMTV trailer is 10,400 miles; the MTV trailer is 6,000 miles. The theatre distribution is estimated at 50% of vehicles in CONUS and 50% in Europe. The average years of operation (useful life) is 20 years. The dedicated crew/vehicle/year for LMTV trucks is .1 manyears/vehicle/year; for MTV trucks is .25 manyears/vehicle/year. Dedicated crew is not applicable for trailers. The current Baseline Cost Estimate dated July 1988 was used to develop the costs in section 18 b.

b. Costs -- (FY 1989 Constant (Base-Year) Dollars in Thousands)

Cost Element	Avg Annual Cost Per LMTV	Avg Annual Cost Per (Antecedent)
Personnel	7.3	0.0
O&S Consumables	5.2	0.0
Direct Depot Maint	0.5	0.0
Sustaining Investment	0.1	0.0
Other Direct Costs	0.1	0.0
Indirect Costs	0.6	0.0
Total	13.8	0.0

c. Contractor Support Costs -- None.

Paragraph 18 Comments:

18. b. Costs--

(FY89 Constant [Base-Year] Dollars in Thousands)

Cost Element	Avg Annual Cost/MTV	Avg Annual Cost/LMTVTR	Avg Annual Cost/MTVTR
Personnel	13.259	1.546	2.672
O&S Consumables	5.796	.520	.360
Direct Depot Maint	.765	.000	.000
Sustaining Investment	.074	.014	.017
Other Direct Costs	.046	.000	.000
Indirect Costs	1.087	.108	.163
Total	21.027	2.188	3.212

SAR-89-099

A-12 FHTV

~~UNCLASSIFIED~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: FHTV

AS OF DATE: December 31, 1989

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CLEARED
FOR OPEN PUBLICATION
MAR 22 1990
21
DIRECTORATE FOR FREEDOM OF INFORMATION
AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

1. **Designation and Nomenclature (Popular Name):** Family of Heavy Tactical Vehicles (FHTV)/Palletized Load System (PLS)

DoD Component: ARMY

3. **Responsible Office and Telephone Number:**
PM, HEAVY TACTICAL VEHICLES
AMCPM-TVH
WARREN, MI 48397-5000

COL WILLIAM J. STODDART
Assigned: June 5,1989
AV 786-5800 COMM (313) 574-5800

4. **Program Elements/Procurement Line Items:**
RDT&E:
PE 64622PROJECT D659
PROCUREMENT:
APPN 2035 ICN SSN D16500 (Army)
APPN 2035 ICN SSN DA035A (Army)

(b)(1)

5. **Related Programs:** None.

6. **Mission and Description:** The Palletized Load System (PLS) program is a 16.5 ton tactical vehicle, composed of a prime mover with integral self-load/unload capability, 16.5 ton trailer and flatracks (demountable cargo beds). Model variances include with and without Materiel Handling Equipment (MHE)crane, with and without winch. The PLS will perform line haul, local haul, unit resupply, and other required missions in support of modernized, highly mobile organizations. The PLS prime movers with associated trailers will selectively replace or augment, as established by individual proponent doctrine, the standard tactical non-PLS cargo vehicles currently authorized in units such as Field Artillery and

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6. **Mission and Description** (Cont'd):

Transportation.

The objectives of the PLS program are to be interoperable with the United Kingdom and Germany, increase efficiency of ammunition distribution, reduce operating and support costs, and correct deficiencies in the current heavy vehicle fleet.

7. **Program Highlights:**

a. Significant Historical Developments -- The Palletized Load System (PLS) Program conducted an Organizational/Operational conceptual evaluation at Ft. Lewis, WA in 1984. Following this successful evaluation, the Force Development Test and Experimentation was conducted at Ft. Hood, TX, October through November, 1986. The Army Systems Acquisition Review Council (ASARC) approval for the PLS Program was received on 17 May 1988. Congressional guidance was received in the National Defense Authorization Act of 1988/1989, which stipulated that the PLS Program receive Nondevelopmental Item (NDI) determination; the manufacture and assembly of the PLS would be in the U.S.A.; and authority for source selection would be vested in the Department of the Navy. The Request for Proposal (RFP) was released to the three competing contractors on 21 Nov 89.

b. Significant Developments Since Last Report -- Three contracts were awarded on 18 Jan 1989 for the prototype phase of the PLS Program. The contractors receiving awards were GM-MVO, Oshkosh Truck Corporation and PACCAR Government Group. The PLS start of work meetings began with the three prototype contractors in February 1989. In March, the Test & Evaluation Master Plan (TEMP) and Source Selection Plan were prepared and staffed. The Tactical Wheeled Vehicle Modernization Plan (TWVMP) report to Congress dated 12 Apr 1989 strategy for PLS is reflected in this SAR. The formal request was made to Congress in July 89, for an extension from the original Dec 89 deadline for selection of production contractors to Jun 90. This extension was approved in the FY90/91 Defense Authorization Act. The first prototype vehicle was delivered in Aug 89, and testing has proceeded on schedule.

The PLS system is expected to satisfy the mission requirement.

c. Changes Since As Of Date -- None.

8. **Threshold Breaches:** There are currently no breaches to the DAE approved 2 Mar 1989 Program Baseline.

FHTV, December 31, 1989

Schedule:

a. Milestones --

	Development Estimate	Approved Program	Current Estimate
ASARC I/II	MAY 87	MAY 87	MAY 87
ROC Approval	NOV 87	NOV 87	NOV 87
DAB Review	MAY 88	MAY 88	MAY 88
Prototype Contract Award	JAN 89	JAN 89	JAN 89
First Prototype Delivery	AUG 89	AUG 89	AUG 89
FSD DT Testing			
Start	SEP 89	SEP 89	SEP 89
Complete	JAN 90	JAN 90	MAR 90(Ch-1)
EUT&E Testing			
Start	N/A	N/A	JAN 90(Ch-2)
Complete	N/A	N/A	MAR 90(Ch-2)
ASARC IIIA	APR 90	APR 90	APR 90(Ch-3)
DAB Review (MS IIIA)	N/A	N/A	MAY 90(Ch-3)
Production Contract Award	APR 90	APR 90	JUN 90(Ch-1)
First Production Delivery	JAN 91	JAN 91	MAY 91(Ch-1)
Initial Production Test			
Start	JAN 91	JAN 91	MAY 91(Ch-1)
Complete	AUG 91	AUG 91	DEC 91(Ch-1)
IOT&E			
Start	DEC 89	DEC 89	JUL 91(Ch-2)
Complete	FEB 90	FEB 90	DEC 91(Ch-2)
Milestone IIIB	N/A	MAR 92	MAR 92(Ch-3)
First Unit Equipped/Initial Operational Capability	JAN 92	JAN 92	APR 92(Ch-1)

b. Previous Change Explanations -- None.

c. Current Change Explanations --

(Ch-1) As a result of the delay in designation of Source Selection Authority, FSD DT test complete date slipped from Jan 90 to Mar 90, with additional dates slipping as follows: production contract award from Apr 90 to Jun 90; first production delivery from Jan 91 to May 91; IPT start from Jan 91 to May 91; IPT complete from Aug 91 to Dec 91 and FUE/IOC from Jan 92 to Apr 92.

(Ch-2) To ensure more accuracy in terminology, the user test called "IOT&E", scheduled to occur Dec 89 through Feb 90, has been renamed "EUT&E" (Early User Test and Evaluation). A new IOT&E has been incorporated due to the test program being restructured in support of the revised production decision points, which supports the full rate production decision, to ensure full operational capability prior to full scale production.

(Ch-3) As a result of PL 101-189, 29 Nov 89, "Low Rate Initial

9. **Schedule (Cont'd):**

Production" the PLS program has been restructured into a two-step decision process. A Low Rate Initial Production (LRIP) decision at ASARC IIIA/Milestone IIIA is required and production at the low rate will continue through the Initial Production Test period. The DAB Review (MSIIIA) date changed from Apr 90 to May 90 to reflect the actual scheduled date for the review. At Milestone IIIB, full rate production will be certified.

d. References --

Development Estimate: DAE Program Baseline, Mar 1989; SDDM decision 7 Oct 1988.

Approved Program: DAE Approved Program Baseline, 2 Mar 1989.

10. **Technical/Operational Characteristics:**

a. Technical --	Dev Est	Approved Program Goal/Threshold		Demon-strated Perf	Current Estimate
Hwy Sp on 2% Grade at GVW (MPH)	50	50	50		50
Hwy Sp on 2% Grade at GCW (MPH)	35	35	35		35
Longitudinal Grade Op	30%	30%	30%		30%
Side Slope Op	30%	30%	30%		30%
b. Operational --					
PLS Truck Payload (T)	16.5	16.5	16.5		16.5
PLS Trailer Payload (T)	16.5	16.5	16.5		16.5
Fording Capability (IN)	30	30	30		30
Operating Range on Integral Fuel at GCW (MI)	225	225	225		225
RELIABILITY-Mean Miles Between Hardware Mission Failure					
Truck	1600	1600	1200		2250 (Ch-1)
Trailer	2280	2280	1900		2280
RELIABILITY-Mean Miles Between Operational Mission Failure					

Technical/Operational Characteristics (Cont'd):

b. Operational --	Dev Est	Approved Program Goal/Threshold		Demon-strated Perf	Current Estimate
Truck	1200	N/A	N/A		1500 (Ch-1)
Trailer	1900	N/A	N/A		1900
RELIABILITY-Mean Miles Between Hardware Mission Failure-Mat'l Handling Crane	225/150	225/150	225/150		225/150
MAINTENANCE RATIO-Maintenance Manhours/ Operating Mile					
Truck	.016/018	.016/.018	.016/.018		.015/013 (Ch-1)
Trailer	.004/005	.004/.005	.004/.005		.004/005
MHC (MMH/OH)	.083/100	.083/.100	.083/.100		.083/100
TRANSPORTABILITY					
Surface Transport-ation - Highway, Ship & Rail (HSR)	HSR	HSR	HSR		HSR
Air Transportation (C-141)	C-141	C-141	C-141		C-141
MOBILITY					
Vehicle Cone Index					
Truck w/MHC	39	39/39	39		39
Truck w/o MHC	37	37/37	37		37
Truck & Trailer Combination	43	43/43	43		50 (Ch-2)

c. Previous Change Explanations -- None.

d. Current Change Explanations --

(Ch-1) The current estimate for truck Mean Miles Between Hardware Mission Failure has been changed from 1,600 miles to 2,250 miles. The current estimate for truck Mean Miles Between Operational Mission Failure has changed from 1,200 miles to 1,500 miles. And, the technical/operational Maintenance Ratios for the truck have changed from .016/.018 to .015/.013. These changes reflected in the current estimate are the more stringent production parameters which will take effect upon Milestone IIIA approval.

(Ch-2) Vehicle Cone Index, Truck & Trailer Combination current estimate is changed from 43 to 50, which corrects a miscalculation made by Waterways Experiment Station, Army Corps of Engineers. The error was made when index was initially developed and was not immediately discovered. The previous VCI of 43 reflected the

lower (8T) PLS vehicle concept, which is no longer part of the program. When the VCI was corrected to include the 16.5T load on the trailer, the revised VCI of 50 was generated.

e. References --

Development Estimate: DAE Program Baseline, Mar 1989; SDDM decision 7 Oct 1988.

Approved Program: DAE Approved Program Baseline, 2 Mar 1989.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	38.2	38.2	37.3
Procurement	1666.1	1666.1	1634.3
Recurring Production	(1517.3)	(1517.3)	(1517.2)
Non-recurring Prod.	(9.7)	(9.7)	(8.3)
Total Rollaway	(1527.0)	(1527.0)	(1525.5)
Other Wpn Sys Cost	(77.3)	(77.3)	(78.9)
Peculiar Support	(0.0)	(0.0)	(0.0)
Initial Spares	(61.8)	(61.8)	(29.9)
Construction	0.0	0.0	0.0
Ops. and Maint. (O&M)	0.0	0.0	0.0
Total FY 89 Base-Year $	1704.3	1704.3	1671.6
Escalation	292.6	292.6	435.7
Development (RDT&E)	(0.8)	(0.8)	(0.9)
Procurement	(291.8)	(291.8)	(434.8)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Ops. and Maint. (O&M)	(0.0)	(0.0)	(0.0)
Total Then-Year $	1996.9	1996.9	2107.3
b. Quantities --			
Development (RDT&E)	27	27	27
Procurement	4333	4333	4333
Construction (MILCON)	0	0	0
Ops. and Maint. (O&M)	0	0	0
Total	4360	4360	4360

11. **Program Acquisition Cost (Cont'd)**

The above values (11b) are for Trucks, the corresponding values for Trailers and Flatracks are as follows:

	Development Estimate	Approved Program	Current Estimate
Quantities			
Development (RDT&E)			
Trailers	18	18	18
Flatracks	90	90	90
Procurement			
Trailers	1915	1915	1915
Flatracks	103000	103000	103000

c. Foreign Military Sales -- None.

d. Nuclear Costs -- None.

e. References --

Development Estimate: DAE Program Baseline, Mar 1989; SDDM decision 7 Oct 1988.

Approved Program: DAE Approved Program Baseline, 2 Mar 1989.

12. **Program Acquisition/Current Procurement Unit Cost Summary:**
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1) Cost	1372.4	1321.7	1372.4
(2) Quantity	4333.0	4333.0	4333.0
(3) Unit Cost	0.317	0.305	0.317
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	42.6	42.6	134.1
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	42.6	42.6	134.1
(2) Quantity	102.0	105.0	476.0
(3) Unit Cost	0.418	0.406	0.282

Program Acquisition/Current Procurement Unit Cost Summary (Cont'd):

Paragraph 12 Comments:

		Current Estimate (Dec 89 SAR)	Current Year UCR Baseline (Dec 88 SAR)	Current Year UCR Baseline (Dec 89 SAR)
	Trailers			
12 a.	Program Acquisition			
	(1) Cost	42.2	40.6	42.2
	(2) Quantity	1915	1915	1915
	(3) Unit Cost	.022	.021	.022
12 b.	Current Procurement	(FY1990)	(FY1990 APPN)	(FY 1991)
	(1) Cost	1.6	1.6	4.3
	Less CY Adv Proc	0	0	0
	Plus PY Adv Proc	0	0	0
	Net Total	1.6	1.6	4.3
	(2) Quantity	80	83	208
	(3) Unit Cost	.020	.019	.021

		Current Estimate (Dec 89 SAR)	Current Year UCR Baseline (Dec 88 SAR)	Budget Year UCR Baseline (Dec 89 SAR)
	Flatracks			
12 a.	Program Acquisition			
	(1) Cost	692.7	634.6	692.7
	(2) Quantity	103,000	103,000	103,000
	(3) Unit Cost	.0067	.0062	.0067
12 b.	Current Procurement	(FY1990)	(FY1990 APPN)	(FY1991)
	(1) Cost	3.1	3.1	12.2
	Less CY Adv Proc	0	0	0
	Plus PY Adv Proc	0	0	0
	Net Total	3.1	3.1	12.2
	(2) Quantity	545	565	2053
	(3) Unit Cost	0.0057	0.0055	0.0059

Program acquisition values have been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purpose of these calculations.

. **Cost Variance Analysis:**

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	39.0	1957.9	0.0	1996.9
Previous Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes:				
Economic	+0.1	+143.0	-	+143.1
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-0.9	-	-	-0.9
Other	-	-	-	-
Support	-	-31.8	-	-31.8
Subtotal	-0.8	+111.2	-	+110.4
Total Changes	-0.8	+111.2	-	+110.4
Current Estimate	38.2	2069.1	-	2107.3

Cost Variance Analysis (Cont'd):

(FY 1989 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	38.2	1666.1	0.0	1704.3
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-0.9	-	-	-0.9
Other	-	-	-	-
Support	-	-31.8	-	-31.8
Subtotal	-0.9	-31.8	-	-32.7
Total Changes	-0.9	-31.8	-	-32.7
Current Estimate	37.3	1634.3	-	1671.6

b. Previous Change Explanations -- None.

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised escalation indices (Economic)	N/A	+0.1
Reductions to fund Small Business Innovative Research (SBIR), travel reductions and bill payers. (Estimating)	-0.9	-0.9
(2) PROCUREMENT		
Revised escalation indices (Economic)	N/A	+143.0

c. Current Change Explanations -- (Cont'd)

	(Dollars in Millions) Base-Year	Then-Year
Reduction in Initial Spares (Support)	-31.9	-33.3
Increase in System Technical Support and Data (Support)	+1.2	+2.5
Revised estimate of in-house engineering and quality support (Support)	-1.1	-1.0

(3) MILCON
None.

(4) O & M
None.

14. Program Acquisition Unit Cost (PAUC) History: (Then-Year Dollars in Millions)

a. Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
0.305	--	--	--	--	--	--	--	--	0.305

b. Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
0.305	+.0189	--	--	--	-.0004	--	-.0073	+0.012	0.317

Paragraph 14 Comments:

The values above are for trucks only. Corresponding values for Trailers and Flatracks are as follows:

14. Program Acquisition Unit Cost (PAUC) History (Cont'd):

TRAILERS:

	Changes								
PAUC Init SAR Est	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC Dev Est
.021	---	---	---	---	---	---	---	---	.021

PAUC DEV ESTIMATE	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC Current Est
0.021	+0.001							+0.001	0.022

FLATRACKS:

	Changes								
PAUC Init SAR Est	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC Dev Est
0.0062	---	---	---	---	---	---	---	---	0.0062

PAUC Dev Est	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC Current Est
0.0062	+0.0005	---	---	---	---	---	---	+0.0005	0.0067

15. Contract Information: None.

16. Program Funding Summary:

a. Program Status --

(1) Percent Program Completed: 33.3% (3 yrs/9 yrs)

(2) Percent Program Cost Appropriated: 4.1% ($85.5 / $2107.3)

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Program Funding Summary (Cont'd): (Current Estimate in Millions Dollars

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY88-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-96)	Total
RDT&E	32.9	5.3	-	-	38.2
Procurement	-	47.3	150.6	1871.2	2069.1
MILCON	-	-	-	-	-
O&M	-	-	-	-	-
Total	32.9	52.6	150.6	1871.2	2107.3

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY89 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2040 Research, Development, Test & Eval, Army								
1988				5.0	4.9	4.9	0.8	3.0
1989				27.3	28.0	27.7	3.0	4.2
1990				5.0	5.3	0.3		4.0
Subtot	27			37.3	38.2	32.9	3.8	
Appropriation: 2035 Other Procurement, Army								
1990	102	4.2	26.7	42.2	47.3			4.0
1991	476	0.8	119.3	129.2	150.6			4.2
1992	1033	0.8	257.6	275.2	331.4			4.0

c. Annual Summary -- (Cont'd)

Fiscal Year	Qty -	Flyaway FY89 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 2035 Other Procurement, Army (Cont'd)								
1993	1073	0.8	267.6	292.4	363.7			3.7
1994	1087	0.8	357.5	384.1	492.8			3.4
1995	562	0.9	316.2	335.0	443.1			3.1
1996			172.3	176.2	240.2			3.1
Subtot	4333	8.3	1517.2	1634.3	2069.1			
Total	4360	8.3	1517.2	1671.6	2107.3	32.9	3.8	

Paragraph 16 Comments:
The Funding Annual Summary quantities are shown for Trucks, the corresponding data for Trailers and Flatracks are as follows:

RDT&E

Quantities for Trailers:		Quantities for Flatracks:	
	18		90

Procurement

Quantities for Trailers:		Quantities for Flatracks:	
FY 90	80	FY 90	545
91	208	91	2053
92	412	92	4350
93	428	93	4520
94	434	94	21485
95	353	95	36370
96	0	96	33677
Subtotal	1915	Subtotal	103000

Production Rate Data:

a. Annualized Production Rates -- 1/

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1990	140	N/A	153	N/A
1991	784	N/A	816	N/A
1992	967	N/A	1033	N/A
1993	948	N/A	1073	N/A
1994	922	N/A	1087	N/A
1995	487	N/A	963	N/A

b. Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Acq. Cost (BY $)	N/A	N/A	1110.8	N/A	N/A
(TY $)	N/A	N/A	1372.4	N/A	N/A
PAUC Cost (BY $)	N/A	N/A	0.255	N/A	N/A
(TY $)	N/A	N/A	0.315	N/A	N/A

1/ The annualized production rates reflected above are based on the following funded delivery periods:

FY90 - 8 months for TR, TRL, FR
FY91 - 7 months for TR, TRL, FR
FY95 - 7 months for TR, TRL

c. Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	JUN 90	N/A	N/A
Duration (in mon)	N/A	N/A	+65	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	NOV 95	N/A	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	135/135
Procurement	0/0
MILCON	0/0
O & M	0/0

e. Approved Design-to-Cost Goal -- None.

Paragraph 17 Comments:
The Quantities shown in 17a are for Trucks, the corresponding data for Trailers and Flatracks are as follows:

Trailers:

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Max Economic
90	111	N/A	120	N/A
91	342	N/A	357	N/A
92	386	N/A	412	N/A
93	378	N/A	428	N/A
94	368	N/A	434	N/A
95	286	N/A	605	N/A

17. Production Rate Data (Cont'd):

Flatracks:

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Max Economic
90	753	N/A	818	N/A
91	3379	N/A	3519	N/A
92	4076	N/A	4350	N/A
93	3992	N/A	4520	N/A
94	22148	N/A	21485	N/A
95	34420	N/A	36370	N/A
96	34420	N/A	33677	N/A

The annualized production rates reflected above are based on the following funded delivery periods:

FY90 - 8 months for TR, TRL, FR
FY91 - 7 months for TR, TRL, FR
FY95 - 7 months for TR, TRL

18. Operating and Support Costs:

a. Assumptions and Ground Rules --

The average miles per vehicle year for the PLS with crane with winch is 11,000 miles; the PLS with crane without winch is 3,000 miles; the PLS without crane without winch is 4,900 miles; the trailer is 4,900 miles. The theatre distribution is 50% of the vehicles in CONUS and 50% in Europe. The average Years of Operation (Useful Life) is 20 years. The dedicated Crew/Vehicle/Year for PLS trucks is 1 manyear/vehicle/year. There are no separately estimated Operating and Support Costs for flatracks. The Baseline Cost Estimate dated July, 1988 is the source of the costs in section 18 b.

b. Costs -- (FY 1989 Constant (Base-Year) Dollars in Thousands)

Cost Element	Avg Annual Cost Per Truck	Avg Annual Cost Per Trailer (Antecedent)
Personnel	42.5	4.6
O&S Consumables	6.8	0.6
Direct Depot Maint	0.3	0.0

b. Costs (Cont'd) -- (FY 1989 Constant Dollars in Thousands)

Cost Element	Avg Annual Cost Per Truck	Avg Annual Cost Per Trailer (Antecedent)
Sustaining Investment	0.2	0.0
Other Direct Costs	0.3	0.4
Indirect Costs	2.9	0.0
	0.0	0.0
	0.0	0.0
	0.0	0.0
	0.0	0.0
Total	53.0	5.6

c. Contractor Support Costs -- None.

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~~UNCLASSIFIED~~ NATO Anti-Air Warfare System, December 31, 1989

CLEARED
MAR 21 1990

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
RDT&E-Only SAR

PROGRAM NAME: NATO ANTI-AIR WARFARE SYSTEM

AS OF DATE: 31 DECEMBER 1989

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1. Designation and Nomenclature: NAAWS/NATO ANTI-AIR WARFARE SYSTEM

2. DoD Component: Navy

3. Responsible Office and Telephone Number:
PMS 419 Captain H.V. Maixner, USN
NAVSEASYSCOM Assigned: 1 August 1987
WASHINGTON D.C.20362-5101 703-553-7220

4. Program Elements/Procurement Line Items:
RDT&E: PE 63790D (FY87/88 Nunn Amendment, Program Start-Up)
PE 63319N (Shared Funding)

5. Related Programs: The following activities are closely coordinated to prevent duplication of effort. Conventional Fuze/Warhead Package; Air-to-Air Missile Systems Engineering; Close-In Weapon System (PHALANX); NATO SEASPARROW; 5-Inch Rolling Airframe Missile (RAM); Radar Surveillance Equipment; Surface Electro-Optic Systems; Vertical Launch System (VLS); AEGIS Combat System Engineering; and, STANDARD/SPARROW Missile Homing Improvement Program.

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6. Mission and Description:

a. Background. The NATO Anti-Air Warfare System (NAAWS) Program is a Nunn Amendment sponsored collaborative development governed by a Memorandum of Understanding (MOU) specific to the present phase, Concept Exploration (CE). The CE Phase MOU and its supporting international requirements document (NATO Staff Target, mutually agreed upon in August 1987) provide programmatic direction, scheduling and funding. The present MOU, signed for the U.S. by Deputy Under Secretary of Defense for International Programs and Technology and approved by Congress, forms the baseline for ongoing negotiations to conclude a MOU to govern the Demonstration and Validation (D&V) Phase. A draft MOU and associated NATO Staff Requirement (NSR) for D&V have been prepared and staffed, but not yet approved. Accordingly, this SAR does not project beyond that direction which is currently in place.

b. Mission/Description. NAAWS is a top-down system engineering development, encompassing detection through engagement capability, optimized to meet the anti-ship cruise missile threat of the year 2000. This approach is built upon the AEGIS systems engineering approach and captures emerging technologies to implement next-generation AAW architecture. CE Phase results validate the feasibility of incorporating forward-looking concepts within a flexible embedded doctrinal logic to provide for integration and adaptive control of dissimilar sensors, signature expansion (non-cooperative target recognition) and integration of hardkill and softkill engagement resources. This system is being designed for implementation in frigate-sized and larger ships. The Ships Characteristics Board is reviewing U.S. ship classes for backfit; eight other classes have been identified in the U.S. Operational Requirement (OR), including application as a secondary battery for AEGIS ships. NAAWS will be the super-set for U.S. short range AAW, and will converge with NATO SEASPARROW, CIWS and RAM, providing selected detection, reaction, integration, and/or kinematic upgrades.

7. Program Highlights:

a. Significant Historical Developments. Collaborative development of an AAW System (Local Area Missile and Multi-function Radar) for the NFR-90 was instituted by NATO Project Group 33 (PG/33). This NATO group, which has become dormant, was unable to accommodate the diverse and competing interests in

program conceptualization. The requirement, however, was formally established within the U.S. Navy by the Tentative Operational Requirement (September 1986) for an Advanced Short Range AAW Combat System. Subsequently it was authorized as a Major New Systems Start. Recognizing the close compatibility with the PG/33 effort and the applicability of the Nunn Amendment, the Secretary of Defense invited the eight nations participating in the NFR-90 program to join the U.S. effort. After brief negotiations, the Ministers of Defense of six nations (CA, GE, NL, SP, UK and US) concluded the CE phase MOU on 17 October 1987. NAAWS was upgraded to major program status, PMS-419, by COMNAVSEASYSCOM on 1 March 1988. On 26 May 1988, NAVSEA awarded $3 million Concept Evaluation Contracts (of ten month duration) to each of two international consortia headed by GE/RCA and Westinghouse (UNISAMS). Based on the results of these studies and critical experiments conducted under the Government Program of Work, NAAWS is expected to satisfy the mission requirement.

b. Significant Developments Since Last Report. Approval of the D&V MOU had been scheduled for December 1989. At that time, however, both UK and GE provided notification that they would not continue in D&V. The international D&V MOU and the associated NSR are being revised. In the U.S., the OR, SCP, and Test and Evaluation Master Plan (TEMP), were all awaiting final approval and, along with associated program Cost and Operational Effectiveness Analysis (COEA) and Independent Cost Estimate (ICE) submissions, will also require revision. The U.S. Integrated Logistic Support Plan (ILSP) had already been promulgated on 20 September 1989, following successful Logistic Review on 23-25 May 1989.

c. Significant Developments (Since As Of Date). The international Steering Committee has approved, in principal, a restructure of the program to achieve, within the levels of international funding which might be expected to be available, architectural convergence with the NATO SEASPARROW Weapons System. Utilization of existing air-to-air missile elements to achive accelerated system capability has also been approved, in principal. Both SPARROW and its successor, AMRAAM, missile baselines are being reviewed. ASN(RE&S) has conducted formal a Program Review and the DAB process is being reinitiated.

8. Threshold Breaches: DAE Baseline has not been established.

9. Schedule: a. Milestones.	Planning Estimate	Approved Program	Current Estimate
Milestone 0	Note 1	N/A	Oct 87
CE Contract award	"	"	May 88
Milestone I (DAB)	"	"	TBD (CH-1)
Milestone II (DAB)	"	"	"
FSD Contract Award	"	"	"
Preliminary Design Review	"	"	"
Critical Design Review	"	"	"
Milestone III(a), Low Rate Production	"	"	"
First Production Delivery	"	"	"
Milestone III(b), Full Rate Production	"	"	"
IOC	"	"	"

Note 1. Each phase of this International Program will be governed by a phase-specific MOU. MOU negotiations are now ongoing for D&V. Changes in international composition of the program require revised international agreements and program restructure prior to U.S. DAB review and associated Milestone I release. DAE baseline has not been established.

b. Previous Change Explanations. No previous changes.

c. Current Change Explanations.

(CH-1) DAB schedule impacted by program restructure. Revised schedule not yet established.

d. References:

(1) Planning Estimate. DAE baseline has not been established.

(2) Approved Program. N/A.

10. Technical/Operational Characteristics:

	Planning Est.	Approved Program Goal/ Threshold	Demon-strated Perf.	Current Estimate
a. Technical.	Note 2	N/A	Note 2	TBD
b. Operational.	Note 2	N/A	Note 2	TBD

Note 2. NAAWS program Planning Estimate (PE), together with DAE approved goals and thresholds and associated OR/SCP/TEMP baseline/demonstration requirements will be established upon the U.S. DAB Milestone I approval.

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c. Previous Change Explanations. None.

d. Current Change Explanations. None.

e. References:

(1) Planning Estimate: DAE baseline has not been established.

(2) Approved Program. N/A.

11. Program Acquisition Cost: (Current Estimate in Millions of $)

	Planning Estimate	Approved Program	Current Estimate
a. Cost			
Development (RDT&E,N)	Note 3	N/A	200.6
Procurement (OPN)	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total, FY88 Base-Year	Note 3	N/A	200.6
Escalation	Note 3	N/A	42.8
Development (RDT&E,N)	Note 3	N/A	(42.8)
Procurement (OPN)	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total, Then-Year	Note 3	N/A	243.4
b. Quantities			
Development (RDT&E,N)	TBD	N/A	TBD
Procurement (OPN)	TBD	N/A	TBD
Total	TBD	N/A	TBD
c. Foreign Military Sales	TBD	N/A	TBD
d. Nuclear Costs	None	N/A	None

Note 3. The DAE baseline has not yet been established. Development costs in this RDT&E-Only SAR include only the U.S. share of the international cost of NAAWS development, encompassing only the NAAWS portion of the shared RDT&E,N line through the end of the planned 6-nation D&V, FY94.

e. References

(1) Planning Estimate. DAE baseline has not been established.

(2) Approved Program. N/A.

12. Program Acquisition/Current Procurement Unit Cost Summary: N/A, RDT&E,N program only.

13. Cost Variance Analysis:

a. Summary.

(1) Current (Then-Year) Dollars in Millions

	RDT&E	PROC	MILCON	TOTAL
PLANNING ESTIMATE	94.1	-	-	94.1
Previous Changes				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes				
Economic	2.1	-	-	2.1
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	147.2	-	-	147.2
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Total Changes	-	-	-	-
Current Estimate	243.4	-	-	243.4

(2) FY 1988 Constant (Base-Year) Dollars in Millions

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	83.2	-	-	83,2
Previous Changes				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering (1)	-	-	-	-
Estimating (2)	117.4	-	-	117,4
Other	-	-	-	-
Support (3)	-	-	-	-
Subtotal	-	-	-	-
Total Changes	-	-	-	-
Current Estimate	200.6	-	-	200.6

b. Previous Change Explanations. None.

c. Current Change Explanations.

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Jan 90 economic escalation rates. (Economic)	N/A	+2.1
Addition of D&V Phase; initial (unapproved) estimates based on 6-nation program per prior international discussions. (Estimating)	+117.4	+147.2

14. Program Acquisition Unit Cost (PAUC) History: None. (RDT&E-Only SAR).

15. Contract Information. N/A.

16. Program Funding Summary: (Current Estimate in Millions of $)

a. Program Status. In accordance with the international agreement that a new Memorandum of Understanding is required for each new phase of this program, these estimates reflect ONLY the U.S. portion of development through D&V (through U.S. FY94) on a 6-nation basis as previously reviewed internationally during preparations regarding a D&V MOU.

(1) Percent Program Completed: 50.0% (4yr/8yr)

(2) Percent Program Cost Appropriated: 12.4% ($30.2M/$243.4M)

b. Appropriation Summary

Appropriation	Prior Years (FY87-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-94)	Total (FY87-94)
RDT&E,N	16.5	13.7	17.1	196.1	243.4

c. Annual Summary (Note 4)

Fiscal Year	Qty	Flyaway FY88 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1987				4.9	4.9	4.9	4.9	2.7
1988				4.9	5.0	5.0	5.0	3.0
1989				6.2	6.6	6.6	5.8	4.2
1990				12.4	13.7	12.1		4.0
1991				14.8	17.1			4.2
1992				40.8	48.9			4.0
1993				54.8	68.0			3.7
1994				61.8	79.2			3.4
Subtotal				200.6	243.4	28.6	15.7	-

Note 4. MOU II, which is currently being negotiated by the international participants, will specify the total program costs for the D&V Phase and each country's share of these costs. During the CE Phase, the U.S. share was 47.5%.

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17. Production Rate Data: N/A.

18. Operating and Support Costs:

a. Assumptions and Ground Rules. N/A.

b. Costs. N/A.

c. Contractor Support Costs. N/A.

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AF-28 TACIT RAINBOW

SAR-89-090

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

(U) PROGRAM: AGM-136A (Tacit Rainbow)

AS OF DATE: December 31, 1989

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FEB 28 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

1. (U) Designation and Nomenclature (Popular Name): AGM-136A/Tacit Rainbow (TR)

2. (U) DoD Component: U.S. Air Force (Lead Service)/U.S. Navy

3. (U) Responsible Office and Telephone Number:

Joint Tactical Autonomous Weapons SPO Aeronautical Systems Division Wright-Patterson AFB, OH 45433	Col F. Grosso Assigned: May 18, 1987 AV 986-3102 COMM (513) 476-3102
USN Program Manager PMA-242 NAVAIR SYSCOM	Capt L. D. Pfitzenmaier Assigned: March 18,.1989 AV 202-7657 COMM (202) 692-7657

4. (U) Program Elements/Procurement Line Items:

RDT&E: PE 0207316F, 0207316N

PROCUREMENT: APPN 3010 ICN 20RAIN
APPN 3020 ICN 20RAIN , APPN 1570

MILCON: PE 0207316F

SAF/PAS
90-099 -T
#02

5. (U) Related Programs: Seek Spinner

CLASSIFIED BY: TACIT RAINBOW SCG, REV 1, 01 OCT 86
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6. (U) Mission and Description: The TR system is a low cost, programmable before launch, loitering, attack missile system capable of searching out and attacking enemy radar targets in the mission area of Defense Suppression. The TR vehicle is carried externally on the Navy A-6E and internally on the Air Force B-52G. It does not replace any existing missile system.

7. (U) Program Highlights:

a. (U) Significant Historical Developments - The Tacit Rainbow program was initiated as a directed sole source program to Northrop Corporation Aircraft Division, Ventura Unit (NVU) in July 1981 to conduct a Full Scale Development (FSD) of a low-cost, modular, autonomous missile capable of searching out and attacking enemy air defense radars. A Cost Plus Incentive Fee (CPIF) contract was awarded to NVU in October 1981 with a period of performance through July 1984. Cost, schedule and technical problems led the Tri-Service Assistant Secretaries of the Air Force, Army and Navy to direct a six month intensive risk closure period from July 1985 to January 1986. After correction of the technical problems, the System Program Office (SPO) was given direction from the Tri-Service Assistant Secretaries in March 1986 to proceed with the completion of FSD and to cap the existing CPIF contract. This was done in June 1986. Preliminary Design Review and Critical Design Review of the redesigned missile system (Block I) were conducted in July and October 1986, respectively. Upon completion of the Phase I airworthiness and environmental tests of the missile system, the vehicle entered Contractor Development Flight Testing (CDT) in March 1987. After an initial free flight failure in November 1987, the SPO stopped the test program and initiated a program with the contractor to improve the quality and build processes of the FSD vehicles. Testing was restarted in March 1988. During CDT, the contractor flew three jettisons, one captive carry and one free flight (a partial success) off the B-52, and flew five captive carry and three CDT free flights (one of the three was successful) off the A-6E. CDT testing was completed 10 Jan 89. The government entered DT&E/IOT&E on 30 March 89. The Navy gained approval from the Defense Resources Board in April 89 to withdraw from the program. A major change in program direction was issued with PMD 1093(4) - 27316F, dated 21 July 1987. It required second sourcing at the missile system level and redirected the mission planning effort. The SPO awarded contracts for a weapons trades study in March 1988 to three contractor teams. In addition to tradeoffs on ground launch design, the studies included approaches to second sourcing and maximizing commonality among the air launch prime, second source, and the ground launch variants. The contractor teams were to prepare proposals for use in a Phase II down selection between the three teams. The analysis portion of the studies was completed on schedule. On 15 December 1988, a program review was presented to the Defense Acquisition Board (DAB). As a result of this meeting, the TR air launch program was rebaselined to take into account slips in the FSD program. As a result of delays in FSD, the FY89 production buy was restructured. On 10 March 1989, the government released RFPs initiating Phase II Down selection for TR Ground Launch and Air Launch Second Source.

7. (U) Program Highlights: (Cont'd)

b. (U) Significant Developments Since Last Report -

1. (U) On 17 August 1989, the government completed Phase II source selection for TR Ground Launch and Air Launch Second Source.
2. (U) The government awarded a contract on 30 September 1989 to Northrop for the final phase of the production nonrecurring program.
3. (U) Successfully completed Electromagnetic Interference Qualification testing in October 1989 and Navy Shipboard Compatibility and catapult/arrested landing (CAT/TRAP) testing in August 1989.
4. (U) Received DAB approval Nov 1989 to proceed with Air Launch Second Source Technical Transfer, but deferred a decision on GLTR pending receipt of additional documentation.
5. (U) By December 1989, Tacit Rainbow completed six more DT&E/IOT&E flights (9 of 25 DT&E/IOT&E flights completed to date.)

c. (U) Changes since as of date -- None

8. (U) Threshold Breaches: There are currently no DAE baseline breaches. The Approved Program is the DAE Baseline dated December 1988. Since then, the Tacit Rainbow program was briefed to the DAB in December 1988 and November 1989. The program was rebaselined to account for slips in the FSD program and the withdrawal of the Navy from production beyond FY89. (The Service Acquisition Executive signed an updated Acquisition Program Baseline on 21 Jun 1989.)

(U) Schedule:

a. (U) Milestones --	Development Estimate	Approved Program	Current Estimate
(U) Preproduction Verification (PPV) Contract Award	NA	Sep 89	Jun 90 (Ch-1)
(U) DT&E/IOT&E Complete	NA	Jun 88	Sep 90 (Ch-2)
(U) DAB IIIA	Jun 88	Dec 88	Nov 90 (Ch-3)
(U) Complete full scale development	Sep 88	Dec 88	Sep 90
(U) First Production delivery (PPV)	Aug 89	May 90	Mar 92 (Ch-1)
(U) Initial Operational Capability (IOC)	(b)(1)		
(USAF)	NA	NA	NA
(USN)			

b. (U) Previous Change Explanations --

(U) The completion of FSD changed from Sep 88 to Jun 89 to reflect a slip in DT&E and IOT&E as a result of test problems during contractor development testing. In addition, the DAB IIIA decision (from n 88 to Jun 89), first production delivery (from Aug 89 to Jul 90), and C (b)(1) changed due to new direction requiring a second urce capability be developed within total obligation authority and test problems during contractor development testing.

(U) Added Preproduction Verification Contract Award as a new milestone due to slips in the FSD program (from N/A to Sep 89). In December 1988 the following milestones were slipped due to workmanship and test problems during CDT: DT&E/IOT&E complete - from Jun 89 to Jun 90, DAB IIIA - from Jun 89 to Aug 90, comlete FSD - from Jun 89 to Jul 90, first production delivery (PPV) - from Jul 90 to Jun 91, IOC (USAF) - (b)(1) Added (b)(1) (USN) to further define this milestone.

(U) In June of 1989 the following milestones were slipped to the dates indicated due to the Navy withdrawal from the production program after FY89: PPV award - from Sep 89 to Jan 90, DAB IIIA - from Aug 90 to Sep 90, Complete Full Scale Development - from Jul 90 to Sep 90, First PPV delivery - from Jun 91 to Oct 91, IOC (USAF) - from (b)(1) IOC (USN) - from (b)(1)

c. (U) Current Change Explanations --

(U) (Ch-1) The PPV contract award and thus the resulting deliveries have slipped due to Northrop submitting the proposal later than expected.

(U) (Ch-2) Current estimate reflects the effect of not testing at the rate envisioned in June 89 due to vehicle availability, test site limitations and aircraft limitations/availability.

9. (U) Schedule: (Cont'd)

c. (U) Current Change Explanations --

(U) (Ch-3) Current estimate reflects a change in the length of time it will take to compile and complete all the analysis to support the DAB IIIA decision brief.

d. (U) References --

(U) Development Estimate: FY88/89 President's Budget

(U) Approved Program: DAE Baseline, Dated 31 Dec 1988.

10. (U) Technical/Operational Characteristics:

a. (U) Technical --	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
(U) Reliability				
(U) Mission X 1/	(b)(1)			
(U) Pre-launch X 2/				
(U) Weight (lb)	440	440/ NA	N/A	440

b. (U) Operational --

(U) Speed (KTAS) (b)(1)

(U) Altitude (ft)
Bomber

(U) Fighter

(U) Terminal Accuracy (ft) (Circular Error Probability)

(U) 1. Engage above 7500 ft MSL (b)(1)

(U) 2. Engage below 7500 ft MSL

(U) Endurance (min) (after 200 Km Ingress)

1/ (U) Mission Reliability, after pre-launch, includes all aspects of carriage through to warhead function.

2/ (U) Defined as passing go/no-go checks and accepting preflight mission programming.

3/ (U) (b)(1) (b)(1)

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(U) Technical/Operational Characteristics: (Cont'd)

c. (U) Previous Change Explanations --

(U) Initial SAR submission reflected errors in the maximum speed of (b)(1) and the range. Endurance was substituted as a more accurate representation of the operational requirement. The pre-launch reliability of (b)(1) provided in the Development Estimate was in error. The values should have been (b)(1) and (b)(1) (February 88 DAE baseline.) The value for maximum continuous speed was added.

d. (U) Current Change Explanations -- None

e. (U) References --

(U) Development Estimate: FY88/89 President's Budget

(U) Approved Program: DAE Baseline, Dated 9 February 1988.

11. (U) Program Acquisition Cost: (Combined USAF & USN)
(Current Estimate in Millions of Dollars)

a. (U) Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	126.7	143.9	151.0
Procurement	2653.7	2257.2	2567.5
Total Flyaway	(2289.7)	(2128.4)	(2347.7)
Peculiar Support	(147.0)	(18.8)	(63.4)
Other Weapon System Cost	(151.6)	(89.8)	(150.9)
Initial Spares	(65.4)	(20.2)	(5.5)
Construction (MILCON)	6.1	9.1	7.8
Total FY85 Base Year $	2786.5	2410.2	2726.3
Escalation	867.5	877.7	1397.5
Development (RDT&E)	(17.8)	(21.3)	(22.6)
Procurement	(848.5)	(854.4)	(1373.1)
Construction (MILCON)	(1.2)	(2.0)	(1.8)
Total Then Year $	3654.0	3287.9	4123.8

b. (U) Quantities--

(U) Development (RDT&E)	40	40	40
(U) Procurement	(b)(1)		
(U) Total			

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11. (U) Program Acquisition Cost:
(Current Estimate in Millions of Dollars) (Cont'd)

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References:

Development Estimate: FY88/89 President's Budget

Approved Program: 31 December 1988 Selected Acquisition Report (SAR).

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Est (Dec 89 SAR)	Current Year UCR Baseline (May 89 UCER)	Budget Year UCR-Baseline (Dec 89 SAR)
a. (U) Program Acquisition --			
(1) (U) Cost	$4123.8	$3287.9	$4123.8
(2) (U) Quantity *	(b)(1)		
(3) (U) Unit cost			
b. (U) Current Procurement --	(FY 1990)	(FY 1990)** APPN	(FY 1991)
(1) (U) Cost	0	0	260.6
Less CY Adv Proc	0	0	0
Plus PY Adv Proc	0	0	0
Net Total	0	0	260.6
(2) (U) Quantity	0	0	(b)(1)
(3) (U) Unit Cost	0	0	

* (U) This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purpose of this calculation.

** (U) Adjusted to reflect FY 90 Appropriations Act in accordance with congressional change to SAR law.

13. (U) Cost Variance Analysis:

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC*	MILCON	TOTAL
Development Estimate	144.5	3502.2	7.3	3654.0
Previous Changes:				
Economic	-0.2	-5.5	-	-5.7
Quantity	-	-999.4	-	-999.4
Schedule	-	+291.0	+0.1	+291.1
Engineering	-	+175.0	-	+175.0
Estimating	+20.9	+436.8	+3.7	+461.4
Other	-	-	-	-
Support	-	-288.5	-	-288.5
Subtotal	+20.7	-390.6	+3.8	-366.1
Current Changes:				
Economic	+0.2	+339.6	+0.2	+340.0
Quantity	-	+295.1	-	+295.1
Schedule	-	+20.5	-	+20.5
Engineering	-	-	-	-
Estimating	+8.2	+31.9	-1.7	+38.4
Other	-	-	-	-
Support	-	+141.9	-	+141.9
Subtotal	+8.4	+829.0	-1.5	+835.9
Total Changes	+29.1	+438.4	+2.3	+469.8
Current Estimate	173.6	3940.6	9.6	4123.8

*Includes 3010 and 3020 appropriations

12. (U) Cost Variance Analysis (Cont'd):

(U) (FY85 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC*	MILCON	TOTAL
Development Estimate	126.7	2653.7	6.1	2786.5
Previous Changes:				
Quantity	-	-666.5	-	-666.5
Schedule	-	+28.3	-	+28.3
Engineering	-	+128.0	-	+128.0
Estimating	+17.2	+348.9	+3.0	+369.1
Other	-	-	-	-
Support	-	-235.2	-	-235.2
Subtotal	+17.2	-396.5	+3.0	-376.3
Current Changes:				
Quantity	-	+166.6	-	+166.6
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+7.1	+52.7	-1.3	+58.5
Other	-	-	-	-
Support	-	+91.0	-	+91.0
Subtotal	+7.1	+310.3	-1.3	+316.1
Total Changes	+24.3	-86.2	+1.7	-60.2
Current Estimate	151.0	2567.5	7.8	2726.3

*Includes 3010 and 3020 appropriations

b. (U) Previous Change Explanations --

RDT&E

(U) Economic: Revised escalation indices

(U) Estimating: Increased IOT&E requirement. Revised mission planning software assumptions. Added targets to test against. Adjusted for current & prior year escalation. Deleted USN unique test and evaluation and USN unique mission support system for FY90 and beyond.

Procurement

(U) Economic: Revised escalation indices

(U) Quantity: Net increase of (b)(1) Decrease for USN withdrawal from the production program for FY90 and beyond (b)(1)

b. (U) Previous Change Explanations -- (cont'd) :

Procurement

(U) Schedule: One year production delay due to second sourcing and contractor development testing problems. Delayed missile and launcher production to coincide with a slip in LRIP. Increased cost for delay of missiles and launchers for FY91-99 due to USN withdraval. Dropped FY2000 missile production lot decreasing fixed expenses.

(S) Engineering: Navigation/guidance enhancements for seeker processing and temperature specs. Adding Mil-Spec to the doppler. Additional product testing for reliability and acceptance testing. Reduction for USN engineering changes applicable to (b)(1) USN missiles.

(S) Estimating: Revised 3020 nonrecurring estimate to support prime contractor and facilitization for second sourcing. Changes applicable to (b)(1) added missiles since baseline. Revised missile recurring and nonrecurring due to second sourcing. Revised for components changing from GFE to CFE. Added ILS and SE/PM tasks. Refined the scope of the warranty. Adjustment for current & prior year escalation. Reduced for estimating changes applicable to (b)(1) USN missiles. Increased cost for delayed competition and high rate production due to USN withdraval from the program. Increased nonrecurring cost associated with second source. Decreased doppler and container cost changing fron CFE to GFE. Decreased ECO for revised estimate.

(U) Support: One year production delay due to second sourcing and refinement of spares, peculiar support, and launcher nonrecurring estimates. Revised peculiar support and spares estimates to reflect changes in the scope of the warranty. Refinement of launcher flyaway estimate. Decrease due to deletion of USN peculiar support equipment, data and training. Deleted USN engineering and fleet requirements.

MILCON

(U) Schedule: Delay of USAF storage facility to coincide with the missile schedule.

(U) Estimating: Revised storage facility upgrade costs. USN construction and modification of weapons storage facilities. Deleted modification and construction of USN storage facilities at weapon stations.

13. ~~(U)~~ Cost Variance Analysis (Cont'd):

c. ~~(S)~~ Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
(U) Revised economic escalation indices (Economic)	N/A	+0.2
(U) Adjustment for prior and current year escalation (Estimating)	0	0
(U) USN FY90 requirements reinstated (Estimating)	+3.2	+3.8
(U) - USN unique system test and evaluation requirements for FY90 (Estimating)	(+2.1)	(+2.5)
(U) - USN unique mission support requirements in FY90 (Estimating)	(+1.1)	(+1.3)
~~(U)~~ Increased USAF test support (Estimating)	+3.9	+4.4
(2) Procurement		
(U) Revised economic escalation indices (Economic)	N/A	+339.6
(S) USAF missile increase (b)(1) to meet JROC (Quantity)	+166.6	+295.1
(U) Estimating increase on JROC quantity (b)(1) (Estimating)	+6.1	+12.0
(U) Missile production delayed to accommodate test slips (Schedule)	N/A	+20.5
(U) Increase in Air vehicle estimate resulting from independent analysis (Estimating)	+196.6	+271.3
(U) Increase in nonrecurring production estimates for USAF (Estimating)	(+75.2)	(+127.7)
(U) Increase in nonrecurring production estimates for USN (Estimating)	(+7.6)	(+9.2)
(U) Increase in recurring flyaway production estimate (Estimating)	(+113.8)	(+134.4)
~~(U)~~ Adjustment for current and prior escalation (Estimating)	-1.2	-1.5

13. (U) Cost Variance Analysis (Cont'd):
c. (U) Current Change Explanations --

(2) Procurement (Cont'd)

(U)	Reduced estimate to absorb increases resulting from Jan 90 economic escalation indices. (Estimating)	-157.1	-260.2
(U)	Increase in USN Flyaway (Estimating)	+8.3	+10.3
(U)	Revised launcher production schedule to coincide with missile production. (Support)	N/A	+3.4
(U)	Revised launcher peculiar support estimate (Support)	+9.9	+14.1
(U)	Revised spares estimate for funding policy change (Support)	-14.7	-20.5
(U)	Revised launcher flyaway complexity assumptions (Support)	+59.5	+82.0
(U)	Revised data, training and peculiar support equipment for ICA (Support)	+44.6	+73.2
(U)	Revised USN peculiar support (Support)	-8.3	-10.3

(3) MILCON

(U)	Revised economic escalation indices (Economic)	N/A	+0.2
(U)	Adjustment for current and prior year escalation (Estimating)	-0.1	-0.1
(U)	Correct previous SAR error (Estimating)	-1.2	-1.6

14. (U) Program Acquisition Unit Cost (PAUC) History: (Then-Year Dollars in Millions)

(U) Initial SAR Estimate to Current Baseline Estimate --

PAUC * (Initial SAR Dev Est)	Changes: Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC (Current Est)
(b)(1)	+.016	+.016	+.015	+.009	+.024	-	-.007	+.073	(b)(1)

* The PAUC has been revised to exclude R&D units that are not planned to be a part of the inventory objective. Such R&D units are not considered fully-configured end items for the purpose of this calculation.

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E --

	Initial Contract Price		
	Target	Ceiling	Qty
Northrop Aircraft Division, Ventura Newbury Park CA F33657-81-C-2123, CPIF/FPP/FPLOE/CPFF Award: 29 Sep 1981 Definitized: 15 Nov 1982	$121.5M	139.0M	40

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$381.5M	$381.5	40	$381.9M	$381.9M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ N/A	$ N/A
Cumulative Variances To Date	$ -68.3M	$ -12.2M
Net Change	$ N/A	$ N/A

Cumulative variance change percentage: N/A N/A

Explanation of change:

- All values reported in Format 15A do not include $26.1M of additional CPFF, FPLOE, and FFP effort for which there is no cost reporting.
- The current cost and schedule variances are the result of manufacturing quality assurance problems and flight test difficulties during contractor development test and DT&E flight test.
- The Program Managers estimated cost at completion for the contract is $481M with the government liability of the CPIF effort capped at $371.5M. The CPFF (mission planning) work on this contract on which we receive cost reporting is estimated at $10.4M. The Northrop contribution to the capped contract is estimated at $99.1M. The contractor has committed to complete the contract.
- This is the first time this contract has been reported.

	Initial Contract Price		
	Target	Ceiling	Qty
Boeing Military Airplane Co. Wichita Kansas F33657-85-C-2097, FFP* Award: May 86 Definitized: May 86	$11.4M	N/A	1

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$83.3M	$83.3M	1	$83.3M	$83.3M

*NOTE: No CPR required for FFP contracts.

15. (U) Contract Information: (Then-Year Dollars in Millions) (Cont'd)

b. (U) Procurement -

	Initial Contract Price		
	Target	Ceiling	Qty
Northrop Aircraft Division, Ventura Newbury Park CA F33657-87-C-0166, PPIF & FFP Award: 30 Sep 1987 Definitized: 30 Sep 1987	$43.9M	$46.4M	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$137.4M	$156.4M	0	$141.4M	$141.4M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date	$ -8.2M	$ -5.4M
Net Change	N/A	N/A
Cumulative variance change percentage:	N/A	N/A

Explanation of Change:

- The source for the contractor information is the CSSR dated 24 Nov 89. The current contract price includes Phase III non-recurring effort added to the Phase II contract. The contract does not include $5.4M of FFP effort and $2.5M of award fee pending for Phase II & III. The contract overrun is the result of higher than projected overhead rates and a schedule slip for acceptance of seeker ST & STE. There is no impact on current Preproduction Verification (PPV) contract award.

- This is the first time this contract has been reported.

c. (U) MILCON - N/A

(U) Program Funding Summary: (Current Estimate in Millions of Dollars):

a. (U) Program Status --

(1) (U) Percent Program Completed: 23.1% (3 yrs/13 yrs)

(2) (U) Percent Program Cost Appropriated: 9.9% ($406.6/$4123.8)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY88-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-00)	Total
RDT&E	138.0	24.9	9.8	0.9	173.6
Aircraft Procurement	24.5	0.0	29.3	106.8	160.6
Missile Procurement	215.0	0.0	231.3	3333.7	3780.0
MILCON	5.6	2.5	1.5	0	9.6
Total	383.1	27.4	271.9	3441.4	4123.8

16. (U) Program Funding Summary--COMBINED (Cont'd): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary -- (Combined)

Fiscal Year	(U) Qty	Flyaway FY85 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	* Obligated	* Expended	
Appropriation: RDT&E								
1988	-	-	-	83.4	93.1	92.1	86.2	3.1
1989	-	-	-	38.6	44.9	37.1	11.1	4.3
1990	-	-	-	20.5	24.9	1.6	0.1	4.0
1991	-	-	-	7.8	9.8	-	-	4.2
1992	-	-	-	0.7	0.9	-	-	4.0
Subtotal:	40	-	-	151.0	173.6	130.8	97.5	
* Reflects program office records as of Dec 1989.								
Appropriation: Aircraft Procurement								
1989	-	19.9	0.0	19.9	24.5	-	-	4.2
1990	-	-	-	-	-	-	-	4.0
1991	6	2.0	17.3	22.1	29.3	-	-	4.2
1992	13	4.4	30.0	49.4	67.8	-	-	4.0
1993	12	0.0	24.8	27.5	39.0	-	-	3.7
Subtotal:	(31)*:	(26.3)**:	(72.1):	118.9	160.6	-	-	

* Non-add launchers for B-52 carriage. Launcher quantities are unclassified.
** Non-add 3010 funding to nonrecurring and recurring flyaway.

16. (U) Program Funding Summary--COMBINED (Cont'd): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary -- (Combined)

Fiscal Year	(U) Qty	Flyaway FY85 Dollars Nonrec	Flyaway FY85 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated *	Total Then-Year $ Expended *	Escl Rate (%)
Appropriation: Missile Procurement								
1988	(b)(1)	46.9	-	46.9	55.1	53.1	-	3.1
1989		26.0	71.6	129.3	159.9	-	-	4.2
1990		-	-	-	-	-	-	4.0
1991		44.7	117.6	173.6	231.3	-	-	4.2
1992		7.1	101.8	114.9	158.2	-	-	4.0
1993		4.4	125.5	136.6	194.1	-	-	3.7
1994		7.9	123.6	133.9	196.3	-	-	3.4
1995		80.8	193.3	277.6	419.4	-	-	3.1
1996		-	303.8	310.3	483.4	-	-	3.1
1997		33.0	272.8	313.1	502.9	-	-	3.1
1998		-	322.9	331.9	549.6	-	-	3.1
1999		-	289.5	299.1	510.6	-	-	3.1
2000		-	174.5	181.4	319.2	-	-	3.1
Subtotal		250.8	2096.9	2448.6	3780.0	53.1	-	
Appropriation: MILCON								
1989	-	-	-	4.6	5.6	-	-	4.0
1990	-	-	-	2.0	2.5	-	-	3.6
1991	-	-	-	1.2	1.5	-	-	3.3
Subtotal	-	-	-	7.8	9.6	-	-	
Total**	(b)(1)	250.8	2096.9	2726.3	4123.8	183.9	97.5	

*Reflects Program Office records as of Dec 1989.
**Quantity does not include 31 launchers (Aircraft Procurement). Total funding includes aircraft procurement funding.

16 (U) Program Funding Summary--USAF only (Cont'd): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary --

Fiscal Year	(U) Qty	Flyaway FY85 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1988	-	-	-	76.8	85.7	84.7	79.3	3.1
1989	-	-	-	33.6	39.1	32.4	7.0	4.3
1990	-	-	-	17.3	21.0	1.6	0.1	4.0
1991	-	-	-	7.8	9.8	-	-	4.2
1992	-	-	-	0.7	0.9	-	-	4.0
Subtotal:	40***:	-	-	136.2	156.5	118.7	86.4	
*Reflects Program Office records as of Dec 1989. ***RDT&E quantities are unclassified.								
Appropriation: Aircraft Procurement								
1989	-	19.9	-	19.9	24.5	-	-	4.2
1990	-	-	-	-	-	-	-	4.0
1991	6	2.0	17.3	22.1	29.3	-	-	4.2
1992	13	4.4	30.0	49.4	67.8	-	-	4.0
1993	12	-	24.8	27.5	39.0	-	-	3.7
Subtotal:	(31)*:	(26.3)**:	(72.1)	118.9	160.6	-	-	

* Non-add launchers for B-52 carriage. Quantity is unclassified.
** Non-add 3010 funding to nonrecurring and recurring flyaway.

16. (U) Program Funding Summary--USAF only (Cont'd): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary

Fiscal Year	(U) Qty	Flyaway FY85 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	* Obligated	* Expended	
Appropriation: Missile Procurement								
1988	(b)(1)	46.9	-	46.9	55.1	53.1	-	3.1
1989		5.3	51.8	57.0	70.5	-	-	4.2
1990		-	-	-	-	-	-	4.0
1991		44.7	117.6	173.6	231.3	-	-	4.2
1992		7.1	101.8	114.9	158.2	-	-	4.0
1993		4.4	125.5	136.6	194.1	-	-	3.7
1994		7.9	123.6	133.9	196.3	-	-	3.4
1995		80.8	193.3	277.6	419.4	-	-	3.1
1996		-	303.8	310.3	483.4	-	-	3.1
1997		33.0	272.8	313.1	502.9	-	-	3.1
1998		-	322.9	331.9	549.6	-	-	3.1
1999		-	289.5	299.1	510.6	-	-	3.1
2000		-	174.5	181.4	319.2	-	-	3.1
Subtota		230.1	2077.1	2376.3	3690.6	53.1	-	
Appropriation: MILCON								
1989	-	-	-	4.6	5.6	-	-	4.0
1990	-	-	-	-	-	-	-	3.6
1991	-	-	-	1.2	1.5	-	-	3.3
Subtotal	-	-	-	5.8	7.1	-	-	
Total**	(b)(1)	230.1	2077.1	2637.2	4014.8	171.5	97.5	

** Quantity does not include 31 launchers (Aircraft Procurement). Total funding includes aircraft procurement funding.

(U) Program Funding Summary--USN Only (Cont'd): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary --

Fiscal Year	(U) Qty	Flyaway FY85 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated *	Expended *	
Appropriation: RDT&E								
1988	-	-	-	6.6	7.4	7.4	6.9	3.1
1989	-	-	-	5.0	5.8	4.7	4.1	4.3
1990				3.2	3.9	-	-	4.0
Subtotal:	-	-	-	14.8	17.1	12.1	11.0	
Appropriation: Missile Procurement								
1989	25	20.7	19.8	72.3	89.4	-	-	4.2
Subtotal:	25	20.7	19.8	72.3	89.4	-	-	
Appropriation: MILCON								
1990	-	-	-	2.0	2.5	-	-	3.6
Subtotal	-	-	-	2.0	2.5	-	-	
Total	25	20.7	19.8	89.1	109.0	12.1	11.0	

*Reflects Program Office records as of Dec 1989.

17. ([redacted]) Production Rate Data:

a. ([redacted]) Annualized Production Rates -- (NOTE: The annualized production rates shown differ from the annual funded buy quantities because the funded delivery period for : FY89 is 9 months, FY91 is 10 months, and FY92 is 10 months.

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate ([redacted])	Production Estimate	Current ([redacted]) Estimate	Maximum Economic
1988	(b)(1)	N/A	0	N/A
1989		N/A	(b)(1)	N/A
1990		N/A		N/A
1991		N/A		N/A
1992		N/A		N/A
1993		N/A		N/A
1994		N/A		N/A
1995		N/A		N/A
1996		N/A		N/A
1997		N/A		N/A
1998		N/A		N/A
1999		N/A		N/A
2000		N/A		N/A

b. ([redacted]) Cost Variance -- Dollars in Millions

Item		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY$)	N/A	N/A	2726.3	N/A	N/A
	(TY$)	N/A	N/A	4123.8	N/A	N/A
PAUC *	(BY$) ([redacted])	N/A	N/A	(b)(1)	N/A	N/A
	(TY$) ([redacted])	N/A	N/A		N/A	N/A

* This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully configured end items for the purpose of this calculation.

(U) Production Rate Data (Cont'd):

c. (U) Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	(b)(1)	N/A	N/A
Duration (in Months)	N/A	N/A		N/A	N/A
End Date (Mo/Yr)	N/A	N/A		N/A	N/A

d. (U) Deliveries (Plan/Actual) --

	To Date
RDT&E	40/17
Procurement	0/0

e. (U) Approved Design to Cost Goal -- None

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules --

e support concept for Tacit Rainbow is as follows. The missile system is signed for dormant long-term storage and one-time use. The missile system is designed for a pre-launch reliability of (b)(1) and a mission reliability of (b)(1) A two level maintenance concept will be implemented. Organizational level maintenance will be limited to periodic inspections, go/no-go testing, and preparation for launch. All missile repairs will be done at depot level. Because of the low level of maintenance effort envisioned, contractor logistics support is planned for the depot. Operations and support costs address initial and replenishment spares, and costs for depot repair. There is no known antecedent for Tacit Rainbow.

(U) Operating and Support Costs: (Cont'd)

b. (U) Costs -- (FY 1985 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per 1000 AGM-136A
Personnel	.2218
O&S Consumables	.0090
Direct Depot Maintenance	.5074
Sustaining Investment	.4893
Other Direct Costs	.4889
Indirect Costs	N/A
Total	1.7166

c. (U) Contractor Support Cost--N/A

~~CONFIDENTIAL~~

SAR-89-029

N-24 LSD 41 CARGO VARIANT

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)

PROGRAM: LSD 41 CLASS (CARGO VARIANT)

AS OF DATE: December 31, 1989

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AS AMENDED

MAR 21 1990

1. (U) Designation/Nomenclature (Popular Name): LSD 41 Class (Cargo Variant) Dock Landing Ship

2. (U) DOD Component: U. S. Navy

3. (U) Responsible Office and Telephone Number:

Amphibious Warfare and Strategic Sealift Program Office (PMS377)
Naval Sea Systems Command
Washington, DC 20362-5101

PM: Mr. E. E. Shoults
Assigned: April 29, 1985
AV 332-8511; COMM (703) 602-8511

4. (U) Program Elements/Procurement Line Items:

RDT&E: PE 0603564N Project 00408 (Shared funding)
PE 0604567N Project 01803 (Shared funding)

PROCUREMENT: APPN 1611N ICN 3045
MILCON: PE 0204796N (Shared)

5. (U) Related Programs: LCAC, LSD 41

~~Classified by: OPNAVINST S5513.3B-41~~
~~Declassify on: Originating Agency Determination Required (OADR)~~
~~Downgrade Instructions: Not subject to Automatic Downgrade~~

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~~CONFIDENTIAL~~

6. (U) Mission and Description: To conduct sustained combat operations; to project naval power ashore by transporting landing force elements, cargo, Landing Craft (LCAC) and Assault Amphibians to the objective area and by launching preloaded assault craft and amphibians, to support amphibious assault; and to operate in the amphibious warfare environment.

The LSD 41 (CV) is a variant of the LSD 41 Class and takes advantage of the considerable experience gained during design, construction, and initial fleet operation of the LSD 41 Class. The ship will differ from the LSD 41 Class in its larger capacities to lift vehicles and cargo with a reduction in size of the well deck to accommodate two LCAC instead of four. The LSD 41 (CV) will retain the capability to operate conventional and air-cushion landing craft and to launch and recover helicopters. The LSD 41 (CV) will use the same diesel propulsion plant as the LSD 41 Class.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- The Tentative Operational Requirement (TOR), promulgated on 27 November 1983, provided guidance to examine the feasibility of three alternative designs for a LSD 41 Class follow ship. The Ships Class Improvement Board (SCIB) on 3 January 1985 approved the LSD 41 (CV) configuration.

The LSD 41 Cargo Variant has no requirement for operational or development test and evaluation as all systems have been demonstrated on the LSD 41 Class.

Milestone II approval was given at the 10 December 1987 Navy Programming Decision Memorandum (NPDM) Review.

On 17 June 1988, the Navy competitively awarded a Fixed Price Incentive Contract to Avondale Industries, Inc. for detail design and construction of the LSD 49 with options for LSD 50 through 53.

b. (U) Significant Development Since Last Report -- On 20 October 1989, the Milestone III (Follow-Ship Production) Acquisition Review Board (ARB) was conducted. On 6 November 1989, the Milestone III NPDM Review was conducted. On 7 November 1989, the approved updated DCP was promulgated. On 20 November 1989, Milestone III approval was granted by ASN(S&L). On 22 December 1989, the option for construction of the LSD 50 was exercised.

The LSD 41(CV) program is expected to meet its mission requirement.

c. (U) Changes Since "As Of" Date -- None

8. (U) Threshold Breaches: There are currently no DAE baseline (dated 27 February 1989) breaches.

9. (U) Schedule:

a. (U) Milestones --

	Development Estimate	Approved Program	Current Estimate
(U) Milestone I (SCIB)	May 84	May 84	May 84
(U) Milestone II (NPDM)	Dec 87	Dec 87	Dec 87
(U) Milestone III (NPDM)	Jul 89	Jul 89	Nov 89(CH-1)
(U) Launch First Ship	Oct 92	Oct 92	Oct 92
(U) Builders Trial	Jul 93	Jul 93	Jul 93
(U) Acceptance Trial	Sep 93	Sep 93	Sep 93
(U) Contract Award	May 88	May 88	Jun 88
(U) Delivery	Oct 93	Oct 93	Nov 93(CH-2)
*(U) Initial Operational Capability (IOC)	(b)(1)		

*IOC - Reflects date the lead ship is ready for operational deployment.

b. (U) Previous Change Explanation -- Contract Award was rescheduled from May 88 to Jun 88 because of the need to clarify technical and cost proposals which required additional time for offerers to respond.

c. (U) Current Change Explanations --

(U) (CH-1) Milestone III, Navy Program Decision Meeting (NPDM), slipped from Jul 89 to Nov 89. The delay was attributable to resolving certification dependent Logistics Review Group (LRG) findings and approval of other NPDM prerequisite documentation.

(U) (CH-2) (b)(1)

d. (U) References --

Development Estimate: NDCP, dated 10 December 1987, Subject "LSD 41 Cargo Variant."

Approved Program: DAE baseline approved 27 February 1989.

10. ~~(C)~~ Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/threshold	Demonstrated Perf	Current Estimate
a. (U) Technical --				
(U) Accommodations				
(1) Troops	504	504/504	--	504
(2) Crew	419	419/419	--	419
(U) Vehicle Sq Ft	14,200	14,200/14,200	--	14,200
(U) Marine Cargo (Cubic Ft)	40,000	40,000/40,000	--	40,000
(U) Helicopter Spots	1 + 1	1 + 1/1 + 1	--	1 + 1
(U) Landing Craft	2 LCAC	2 LCAC/2 LCAC	--	2 LCAC
(U) Length (ft)	609	609/609	--	609
(U) Beam (ft)	84	84/84	--	84
(U) Draft (ft)	20'4"	20'4"/20'4"	--	20'4"
b. (U) Operational --				
(U) Speed (kts)	21.6	21.6/21.6	--	21.6
(U) Endurance [21 kts] (NM)	(b)(1)			
(U) Mission Completion Success Probability	.075	.075/.075	--	.075
(U) Tactical Diameter at (21.6 kts)(yds)	(b)(1)			

c. (U) Previous Change Explanations -- None

d. (U) Current Change Explanations -- None

e. (U) References --

Development Estimate: NDCP, dated 10 December 1987, subject "LSD 41 Cargo Variant."

Approved Program: DAE Baseline approved 27 February 1989.

(U) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost			
Development (RDT&E)	15.4	17.1	12.9
Procurement (SCN)	1335.3	1361.8	1340.7
(Sailaway)	(1233.4)	(1253.4)	(1237.1)
(Ship System)	(4.6)	(4.5)	(4.5)
(Initial Spares)	(0.0)	(0.0)	(0.0)
(Outfitting/Post Delivery)	(97.3)	(103.9)	(99.1)
Construction (Milcon)	0.0	3.4	3.3
Total FY88 Base-Year $	1350.7	1382.3	1356.9
Escalation	233.3	258.4	338.2
Development (RDT&E)	(-0.2)	(0.2)	(-0.4)
Procurement (SCN)	(233.5)	(257.8)	(338.1)
Construction (Milcon)	(0.0)	(0.4)	(0.5)
Total Then-Year $	1584.0	1640.7	1695.1
b. Quantities			
Development (RDT&E)	0	0	0
Procurement (SCN)	5	6	6
Total	5	6	6

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Development Estimate: NDCP dated 10 December 1987, subject "LSD 41 Cargo Variant"

Approved Program: DAE Baseline Approved 27 February 1989

12. [redacted] Program Acquisition/Current Procurement Unit Cost Summary:

(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition --	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	1695.1	1640.7	1695.1
(2) Quantity	6	6	6
(3) Unit Cost	282.5	273.5	282.5
b. Current Procurement --	(FY 90)	(FY90 APPN)	(FY 91)
(1) Cost	226.4	226.4	240.0
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Less OF/PD	0.0	0.0	0.0
Less PY Escal	0.0	0.0	0.0
Net Total	226.4	226.4	240.0
(2) Quantity	1	1	1
(3) Unit Cost	226.4	226.4	240.0

[redacted] Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Est. (DEV)	15.2	1568.8	0.0	1584.0
Previous Changes:				
Economic	0.0	-1.6	0.0	-1.6
Quantity	0.0	268.9	0.0	268.9
Schedule	0.0	39.3	0.0	39.3
Engineering	0.0	0.0	0.0	0.0
Estimating	2.1	-264.6	3.8	-258.7
Other	0.0	0.0	0.0	0.0
Support	0.0	8.8	0.0	8.8
Subtotal	2.1	50.8	3.8	56.7
Current Changes:				
Economic	0.1	84.6	0.1	84.8
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	-4.9	-26.0	-0.1	-31.0
Other	0.0	0.0	0.0	0.0
Support	0.0	0.6	0.0	0.6
Subtotal	-4.8	59.2	0.0	54.4
Total Changes	-2.7	110.0	3.8	111.1
Current Estimate	12.5	1678.8	3.8	1695.1

[redacted] Cost Variance Analysis (Continued):

a. Summary -- (FY 1988 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Est. (DEV)	15.4	1335.3	0.0	1350.7
Previous Changes:				
Quantity	0.0	214.9	0.0	214.9
Schedule	0.0	31.9	0.0	31.9
Engineering	0.0	0.0	0.0	0.0
Estimating	1.7	-225.9	3.4	-220.8
Other	0.0	0.0	0.0	0.0
Support	0.0	5.6	0.0	5.6
Subtotal	1.7	26.5	3.4	31.6
Current Changes:				
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	-4.2	-21.9	-0.1	-26.2
Other	0.0	0.0	0.0	0.0
Support	0.0	0.8	0.0	0.8
Subtotal	-4.2	-21.1	-0.1	-25.4
Total Changes	-2.5	5.4	3.3	6.2
Current Estimate	12.9	1340.7	3.3	1356.9

13. [redacted] Cost Variance Analysis (Cont'd):

b. Previous Change Explanations --

RDT&E
Estimating: revised program estimates; decrease in R&D Contract Design Effort; revised estimate to complete contract design for FY93

Procurement
Economic: revised economic escalation rates
Quantity: addition of (1) ship in FY94
Schedule: schedule impact of slipping one of the two FY92 ships to FY93
Estimating: revised program estimates; reduction based on similarity to LSD 41 Class; escalation savings; revised estimate based on contract option prices; transfer of CAS to inhouse
Support: increase in Outfitting and Post Delivery for additional ship in FY94; reduction of outfitting based on LSD 44 actual cost; reduction of Post Delivery requirements

[redacted] Cost Variance Analysis (Continued):

c. Current Change Explanations

	(Dollars in Millions) Base-Year $	Then-Year $
1) RDT&E		
ECONOMIC		
Revised Dec 89 econ. escalation rates	0.0	0.1
ESTIMATING	-4.2	-4.9
Refinement of program estimates	(0.0)	(-0.1)
Reduction due to delay and new start from FY93 to FY94 ship	(-4.2)	(-4.8)
2) Procurement		
ECONOMIC		
Revised Dec 89 econ. escalation rates	0.0	84.6
ESTIMATING	-21.9	-26.0
Refinement of program estimates	(-13.1)	(-14.2)
Gramm Rudman adjustment	(-3.1)	(-3.7)
CAAS reduction	(-0.7)	(-0.8)
Repricing based on contractor extending option to FY93 ship	(-27.2)	(-35.9)
Repricing of FY94 ship to reflect non-recurring costs assoc. with a new contract	(21.0)	(28.6)
SUPPORT		
Rephasing of outfitting requirements	0.8	0.6
3) MILCON		
ECONOMIC		
Revised Dec 89 econ. escalation rates	0.0	0.1
ESTIMATING		
Refinement of program estimates	-0.1	-0.1

Program Acquisition Unit Cost (PAUC) History:

(Then-Year Dollars in Millions)

a. Initial SAR Estimate to Development Estimate --

PAUC (Planning Estimate)	Changes								PAUC (Development Est)
	Econ	Qty	Sched	Eng	Est	Other	Spt	Total	
330.3	3.4	-0.1	0.0	0.0	-16.8	0.0	0.0	-13.5	316.8

b. Development Baseline Estimate to Current Estimate --

PAUC (DE Estimate)	Changes								PAUC (Current Estimate)
	Econ	Qty	Sched	Eng	Est	Other	Spt	Total	
316.8	13.9	-8.1	6.6	0.0	-48.3	0.0	1.6	-34.3	282.5

15. [redacted] Contract Information: (Then-Year Dollars in Millions)

a. ([redacted]) RDT&E -- N/A

b. ([redacted]) Procurement --

LSD 49
Avondale Industries, Inc.
New Orleans, La
N00024-88-C-2048, FPI
Award: June 17, 1988
Definitized: June 17, 1988

Initial Contract Price		
Target	Ceiling	Qty
$147.0	$173.9	1

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$147.4	$174.5	1	$154.2	$168.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-0.7	$ 0.0
Cumulative Variances to Date (10/31/89)	$-2.6	$-0.3
Net Change	$-1.9	$-0.3

Explanation of Change: The majority of the unfavorable cost variance is due to engineering with growth occurring in labor and overhead. The unfavorable schedule variance is identified with material resulting from the contractor failing to include progress payments in his schedule. The Program Manager's assessment takes into consideration the above variances.

LSD 50 1/
Avondale Industries, Inc.
New Orleans, La
N00024-88-C-2048, FPI
Award: December 22, 1989
Definitized: December 22, 1989

Initial Contract Price		
Target	Ceiling	Qty
$127.8	$139.7	1

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$127.8	$139.7	1	*	$139.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (12/31/89)		
Net Change		

Explanation of Change: None

* First Cost Performance Report not required until 90 days after contract award.

1/ Added

c. [redacted] MILCON -- N/A

[redacted] Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 47.1% (8 yrs/ 17 yrs)

(2) Percent Program Cost Appropriated: 29.5% ($499.9/$1695.1)

b. Appropriation Summary --
(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY83-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-99)	Total
RDT&E	12.5	0.0	0.0	0.0	12.5
Procurement	257.2	226.4	240.0	955.2	1678.8
Milcon	0.0	3.8	0.0	0.0	3.8
TOTAL	269.7	230.2	240.0	955.2	1695.1

06. [redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY88 Dollars		Total Base Year $	Total Then-Year $			Escal Rate %
		NonRec	Rec		Program	Oblig	Expend	
APPROPRIATION: RDT&E								
1983	0	0.0	0.0	0.3	0.3	0.3	0.3	4.90
1984	0	0.0	0.0	0.8	0.7	0.7	0.7	3.80
1985	0	0.0	0.0	3.0	2.8	2.8	2.7	3.40
1986	0	0.0	0.0	0.7	0.7	0.7	0.7	2.80
1987	0	0.0	0.0	7.0	6.9	6.9	6.8	2.70
1988	0	0.0	0.0	1.1	1.1	1.1	1.0	3.00
1989	0	0.0	0.0	0.0	0.0	0.0	0.0	4.20
1990	0	0.0	0.0	0.0	0.0	0.0	0.0	4.00
1991	0	0.0	0.0	0.0	0.0	0.0	0.0	4.20
1992	0	0.0	0.0	0.0	0.0	0.0	0.0	4.00
Subtotal	0	0.0	0.0	12.9	12.5	12.5	12.2	----

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY88 Dollars		Total Base Year $	Total Then-Year $			Escal Rate %
		NonRec	Rec		Program	Oblig	Expend	
APPROPRIATION: Procurement								
1987	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
1988	1	39.2	187.9	231.6	257.2	219.9	18.8	2.50
1989	0	0.0	0.0	0.0	0.0	0.0	0.0	2.80
1990	1	0.0	189.4	189.4	226.4	164.5	0.0	4.00
1991	1	0.0	194.0	194.0	240.0	0.0	0.0	4.20
1992	1	0.0	195.3	197.7	252.5	0.0	0.0	4.00
1993	1	0.0	192.8	203.0	266.5	0.0	0.0	3.70
1994	1	0.0	238.5	277.4	372.7	0.0	0.0	3.40
1995	0	0.0	0.0	17.5	22.4	0.0	0.0	3.10
1996	0	0.0	0.0	14.1	18.6	0.0	0.0	3.10
1997	0	0.0	0.0	1.0	1.3	0.0	0.0	3.10
1998	0	0.0	0.0	12.7	17.8	0.0	0.0	3.10
1999	0	0.0	0.0	2.3	3.4	0.0	0.0	3.10
Subtotal	6	39.2	1197.9	1340.7	1678.8	384.4	18.8	----

6. [redacted] Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY88 Dollars		Total Base Year $	Total Then-Year $			Escal Rate %
		NonRec	Rec		Program	Oblig	Expend	
APPROPRIATION: Milcon								
1988	0	0.0	0.0	0.0	0.0	0.0	0.0	3.00
1989	0	0.0	0.0	0.0	0.0	0.0	0.0	4.20
1990	0	0.0	0.0	3.3	3.8	0.0	0.0	4.00
1991	0	0.0	0.0	0.0	0.0	0.0	0.0	4.20
1992	0	0.0	0.0	0.0	0.0	0.0	0.0	4.00
Subtotal	0	0.0	0.0	3.3	3.8	0.0	0.0	----
TOTAL	6	39.2	1197.9	1356.9	1695.1	396.9	31.0	----

(U) Production Rate Data: N/A

18. (U) Operating and Support Cost:

a. Assumptions and Ground Rules --
The LSD (CV) is designed to transport and launch Amphibious Craft and vehicles with their crews and embarked personnel in Amphibious Assault Operations and to provide limited docking and repair services for conventional Landing Craft and Landing Craft Air Cushion (LCAC). The O & S estimates assume that each ship will have an operating life of about 35 years. Based on the design parameters, each ship will consume about 83,025 BBL of fuel each year. Direct personnel costs are the annual cost for enlisted ad officers based on the LSD (CV) manning levels. Personnel retirement costs are not included. Direct operation includes the cost of fuel, repair parts, supplies, training expended stores and purchased services. Direct maintenance is intermediate and depot maintenance costs. Indirect costs include training, publications, engineering, and technical services and ammo handling. The baseline used to derive the estimates are the return costs from the LSD 36 Class Ships. Operating and support costs were developed by using historical return costs from the LSD 36 Class ships and are approximations using a mathematical model. These estimates were developed to support a NPDM Brief of 10 December 1987.

b. Costs --
(FY1988 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per LSD 41 (CV)	Avg Annual Cost Per LSD 36 (Antecedent)
Direct Personnel	7.2 *	6.5
Direct Operations	5.7	4.0 *
Direct Maintenance	9.2	7.5 *
Indirect Costs	0.4	0.3
Total	22.5	18.3

* Funding changes since the 31 December 1988 SAR reflect corrections to data within the mathematical model projection. NAVSEA's Cost Estimating Division (SEA-017) will evaluate the latest data to derive updated estimates prior to the next SAR.

c. Contractor Support Costs -- N/A.

N-25 MCM 1 SAR-89-030

[redacted]

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: MINE COUNTERMEASURES (MCM) PROGRAM

AS OF DATE: December 31, 1989

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1. Designation and Nomenclature (Popular Name): MCM 1 (Avenger Class) Mine Countermeasures Ship

2. DOD Component: U. S. Navy

3. Responsible Office and Telephone Number:
Mine Countermeasures (MCM) Ship
Acquisition Program Office (PMS 303) PM: Wm. R. Boyd
Naval Sea Systems Command Assigned: May 10, 1988
Washington D.C. 20362 AV 332-6481; COMM (703) 602-6481

4. Program Elements/Procurement Line Items:
PROCUREMENT: APPN: 1611 ICN 32401500
RDT&E,N: PE 0603564N Project 0408 (Shared)
RDT&E,N: PE 0604567N Project 1803 (Shared)

5. Related Programs: AN/SQQ-32 Advanced Minehunting Sonar (MCMs 1 and 10-14), AN/SQQ-30 Minehunting Sonar (MCMs 2-9), AN/SLQ-48 Mine Neutralization System, and AN/SSN-2 Navigation System

90-C0657

No Security Objection
to Open Publication
(AS AMENDED)
MAR 21 1990
Office of the Chief of
Naval Operations
Department of the Navy

[redacted]

6. Mission and Description: The MCM Ship Acquisition Program provides a new class of "state of the art technology" mine countermeasures ships which will replace the aging MSO 422/508 class ocean minesweeper fleet. The MCM is a 224 foot long wooden hull ship with a 1312 ton full load displacement. It utilizes low magnetic signature equipment, diesel propulsion, and two controllable reversible pitch propellers. The ship will conduct mine clearance operations utilizing an AN/SSN-2 Navigation System, AN/SLQ-48 Mine Neutralization System, AN/SQQ-30 Sonar (Hulls 2-9) (AN/SQQ-32 Advanced Minehunting Sonar for hulls 1 and 10-14), AN/WQN-1(V) Channel Finder and various other standard in-service mechanical and influence minesweeping equipments.

7. Program Highlights:

a. Significant Historical Developments -- In June 1979, several alternative program approaches were evaluated to replacing the aging MSO 422/508 ocean minesweeper fleet. The CNO approved the basic MSO 523 ship design as a candidate for the new MCM ship and directed that variations of the MSO 523 design be investigated. In consideration of operational and mission requirements, the most appropriate alternative was selected in countering the deep ocean mine threat. This "trade off" analysis, completed during March 1980, was accomplished in lieu of a preliminary design effort. During the latter portion of the contract design effort, two ship system design support (SSDS) contractors, one designated primary, the other secondary, were selected to participate in the ship design effort. The primary SSDS contractor, Peterson Builders, Inc. of Sturgeon Bay, WI, was awarded the contract for detail design and construction of the leadship (MCM 1 AVENGER). The MCM contract design was completed in February 1982 and award of the MCM 1 leadship was made in June 1982. Marinette Marine Corporation of Marinette, WI was selected as the followyard and awarded MCM 2 in May 1983. The program entails the construction and delivery of fourteen MCMs, four have been delivered with the remaining ten currently under construction. The MCM 1 delivered on 28 August 1987.

b. Significant Developments Since Last Report -- The final three ships of the class (MCMs 12-14) were awarded (option exercised) on 12 December 1989 to Peterson Builders, Inc. of Sturgeon Bay, WI. MCMs 2, 3, and 5 were delivered 8 September 1989, 28 August 1989, and 5 December 1989 respectively. MCM 1 OT-IIIA testing was conducted during the summer of 1989. Additional operational testing is currently planned for 1990.

c. Changes Since "As Of" Date -- None

8. Threshold Breaches: -- There are no current threshold breaches to the 31 December 1988 DAE baseline.

90-0657
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9. Schedule:

a. Milestones --	Production Estimate/ Approved Program	Current Estimate
Milestone I (*)	Apr 79/Apr 79	Apr 79
CEB Approval of Tradeoff Analysis	Mar 80/Mar 80	Mar 80
Milestone II (**)	Aug 81/Aug 81	Aug 81
Leadship Award	Jun 82/Jun 82	Jun 82
Followyard Leadship Award	May 83/May 83	May 83
Milestone III (***)	Jul 83/Jul 83	Jul 83
Leadship Delivery	Aug 87/Aug 87	Aug 87
Followyard Leadship Dlv	Nov 89/Nov 89	Sep 89(CH-1)

(*) CEB approved mission definition/commence tradeoff study in lieu of preliminary design.
(**) ASN (S&L)--production decision memo.
(***) SECNAV authorization for followship production.

b. Previous Change Explanations --

None

c. Current Change Explanations -- (CH-1) Followyard Leadship Delivery occurred in Sept 1989 vice previous estimate of Nov 1989.

d. References --

Production Estimate: Initial (31 Dec 88) SAR baseline.

Approved Program: DAE baseline dated 31 December 1988.

10. Technical/Operational Characteristics:

a. Technical --	Production Estimate	Approved Program Goal/ Threshold	Demonstrated Performance	Current Estimate
Operating Crew :	74/74	74	74	74
Beam (Ft) :	39.0/39.0	39.0	39.0	39.0
Draft (Ft) :	11.5/11.5	11.5	11.5	11.5
Length (Ft) :	224.0/224.0	224.0	224.0	224.0
Displace(Tons):	1312/1312	1312	1312	1312
b. Operational --				
Speed (Knots):	13.5/13.5	13.5	13.5	13.5
Endur(N.M.@10kts):	2500/2500	2500	2500	2500

c. Previous Change Explanations --

None

d. Current Change Explanations --

None

e. References --

Production Estimate: MCM Top Level Requirement document of 13 January 1987 and NDCP #S0910-MW (REV 1) of 20 July 1983.

Approved Program: DAE baseline dated 31 December 1988.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Production Estimate	Approved Program	Current Estimate
a. Cost - -			
Development (RDT&E)	21.2	21.2	21.2
Procurement (SCN)	1445.1	1445.1	1455.6
(Basic Ship Cost)	(838.3)	(838.3)	(869.9)
(Gov't Furn. Equip)	(490.2)	(490.2)	(478.1)
(Other)	(29.3)	(29.3)	(29.5)
(Outfit/Post Deliv)	(87.3)	(87.3)	(78.1)
Construction-MILCON	N/A	N/A	N/A
Total FY 1982 Baseyear	1466.3	1466.3	1476.8
Escalation			
Development (RDT&E)	0.0	0.0	0.0
Procurement	271.1	271.1	280.6
Construction-MILCON	N/A	N/A	N/A
Total Then-Year $	1737.4	1737.4	1757.4
b. Quantities - -			
Development (RDT&E)	N/A	N/A	N/A
Procurement	14	14	14
Total	14	14	14

c. Foreign Military Sales - - None

d. Nuclear Costs - - None

e. References - -

Production Estimate: FY 1990/1991 President's Biennial Budget.
Approved Program: DAE baseline date 31 December 1988.

12. Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions)

	Current Estimate (Dec 89 SAR)	Current Year UCR Baseline (Dec 88 SAR)	Budget Year UCR Baseline (Dec 89 SAR)
a. Program Acquisition			
(1) Cost	1757.4	1737.4	1757.4
(2) Quantity	14	14	14
(3) Unit Cost	125.5	124.1	125.5
b. Current Procurement --	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	346.9	346.9	15.8
Less CY Adv Proc	N/A	N/A	N/A
Plus PY Adv Proc	N/A	N/A	N/A
Less OF/PD	(9.8)	(9.8)	(15.8)
Net Total	337.1	337.1	0
(2) Quantity	3	3	0
(3) Unit Cost	112.4	112.4	N/A

13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	TOTAL
Baseline Est. (Pde)	21.2	1716.2	1737.4
Previous Changes:			
Economic	0.0	0.0	0.0
Quantity	0.0	0.0	0.0
Schedule	0.0	0.0	0.0
Engineering	0.0	0.0	0.0
Estimating	0.0	0.0	0.0
Other	0.0	0.0	0.0
Support	0.0	0.0	0.0
Subtotal	0.0	0.0	0.0
Current Changes:			
Economic	0.0	(8.1)	(8.1)
Quantity	0.0	0.0	0.0
Schedule	0.0	0.0	0.0
Engineering	0.0	0.0	0.0
Estimating	0.0	36.3	36.3
Other	0.0	0.0	0.0
Support	0.0	(8.2)	(8.2)
Subtotal	0.0	20.0	20.0
Total Changes	0.0	20.0	20.0
Current Estimate	21.2	1736.2	1757.4

13. Cost Variance Analysis (Continued):

a. Summary -- (FY 1982 (Base-Year) Dollars in Millions)

	RDT&E	PROC	TOTAL
Baseline Est. (Pde)	21.2	1445.1	1466.3
Previous Changes:			
Quantity	0.0	0.0	0.0
Schedule	0.0	0.0	0.0
Engineering	0.0	0.0	0.0
Estimating	0.0	0.0	0.0
Other	0.0	0.0	0.0
Support	0.0	0.0	0.0
Subtotal	0.0	0.0	0.0
Current Changes:			
Quantity	0.0	0.0	0.0
Schedule	0.0	0.0	0.0
Engineering	0.0	0.0	0.0
Estimating	0.0	19.7	19.7
Other	0.0	0.0	0.0
Support	0.0	(9.2)	(9.2)
Subtotal	0.0	10.5	10.5
Total Changes	0.0	10.5	10.5
Current Estimate	21.2	1455.6	1476.8

13. Cost Variance Analysis (Continued):

b. Previous Change Explanations --

RDT&E
N/A

Procurement - SCN
N/A

c. Current Change Explanations

	(Dollars in Millions) Base-Year $	Then-Year $
(1) RDT&E -- None		
(2) Procurement		
Revised Jan 90 economic escalation rates. (Economic)	N/A	- 8.1
Net changes associated with increase for MCM 9-14 basic construction contract awards; increase required to cover Marinette Marine Corp. contract settlement (including associated escalation increase); and reduction in GFE and Program Manager's Growth estimates. (Estimating)	+ 19.7	+ 36.3
Reestimate of MCM outfitting and post delivery account requirements. (Support)	- 9.2	- 8.2

14. Program Acquisition Unit Cost (PAUC) History:

(Millions of then-year dollars)

a. Initial SAR Estimate (PdE) to Current Baseline Estimate --

PAUC (Production Estimate)	Changes (Then Year Dollars in Millions)								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
124.1	0.6	0.0	0.0	0.0	2.6	0.0	0.0	0.0	125.5

15. Contract Information: (Dollars in Millions)

MCM 7
Marinette Marine Corp.
Marinette, WI
N00024-86-C-2189, FFP
Award: August 20, 1986
Definitized: August 20, 1986

Initial Contract Price		
Target	Ceiling	Qty
$ 51.7	$ N/A	1

Current Contract Price		
Target	Ceiling	Qty
$ 62.7	N/A	1

Estimated Price At Completion	
Contractor	Program Manager
$ 62.7	$ 62.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances To Date	$ + 0.3	$ - 1.8
Net Change	$ + 0.3	$ - 1.8

Explanation of Change: Cost: Small cumulative to date positive incurred cost to earned value variance. Schedule: Small variance due to manufacturing falling slightly behind planned budget. No impact to current P.M. delivery estimate of 6/91 is anticipated.

MCM 9, 10, 11
Peterson Builders, Inc.
Sturgeon Bay, WI
N00024-89-C-2126, FFP
Award: Feb 14, 1989
Definitized: Feb 14, 1989

Initial Contract Price		
Target	Ceiling	Qty
$ 185.1	$ N/A	3

Current Contract Price		
Target	Ceiling	Qty
$ 185.1	N/A	3

Estimated Price At Completion	
Contractor	Program Manager
$ 185.1	$ 185.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances To Date	$ - 0.1	$ - 5.2
Net Change	$ - 0.1	$ - 5.2

Explanation of Change: Cost: Minor cum. to date cost variance -- no impact relative to current contract target price. Schedule: Delays associated with manufacturing backlog (laminating and fabricating areas) in supplying hull and deckhouse parts. Backlog currently associated with manufacturing facility constraints. Schedule is being replanned to accommodate work arounds -- no impact to current P.M. delivery schedule is currently envisioned.

[redacted]

15. Contract Information: (Con't) (Dollars in Millions)

MCM 12, 13, 14
Peterson Builders, Inc.
Sturgeon Bay, WI
N00024-89-C-2126, (OPTION) FFP
Award: (Option Exer.) Dec 12, 1989
Definitized: Dec 12, 1989

Initial Contract Price		
Target	Ceiling	Qty
$ 180.5	$ N/A	3

Current Contract Price		
Target	Ceiling	Qty
$ 180.5	N/A	3

Estimated Price At Completion	
Contractor	Program Manager
$ 180.5	$ 180.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ N/A	$ N/A
Cumulative Variances To Date	$ *	$ *
Net Change	$ -	$ -

Explanation of Change: * Initial CSSR report submit for this recently awarded contract is scheduled for accounting period ending April 30, 1990.

[redacted]

[redacted]

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 75% (12 yrs/16 yrs)

(2) Percent Program Cost Appropriated: 97% ($1701.7/$1757.4)

b. Appropriation Summary --
(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY79-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-94)	Total
RDT&E	21.2	0.0	0.0	0.0	21.2
Procurement	1333.5	346.9	15.8	40.0	1736.2
Total	1354.7	346.9	15.8	40.0	1757.4

[redacted]

16. Program Funding Summary (Con't): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY 82 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1979			2.6	2.6	2.3	2.3	2.3	9.6
1980			3.6	3.6	3.3	3.3	3.3	10.6
1981			4.6	4.6	4.5	4.5	4.5	10.6
1982			3.2	3.2	3.2	3.2	3.2	7.6
1983			4.6	4.6	4.9	4.9	4.9	4.9
1984			1.0	1.0	1.1	1.1	1.1	3.8
1985			0.8	0.8	0.9	0.9	0.9	3.4
1986			0.3	0.3	0.4	0.4	0.4	2.8
1987			0.5	0.5	0.6	0.6	0.6	2.7
SUBTOT	0		21.2	21.2	21.2	21.2	21.2	-

Program Funding Summary (Con't)

Fiscal Year	Qty	Sailaway FY 82 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: SCN								
1982	1		118.2	118.2	128.7	110.9	103.9	7.5
1983	1		117.4	117.4	129.8	127.5	123.0	3.8
1984	3		326.2	326.2	367.8	319.9	301.3	3.6
1985	4		340.1	340.1	392.1	347.9	227.9	2.1
1986	2		244.8	244.8	290.0	243.7	65.3	1.0
1987	0		9.7	9.7	11.9	7.6	4.3	1.5
1988	0		2.5	2.5	3.2	3.0	2.6	2.5
1989	0		7.6	7.6	10.0	2.5	1.1	2.8
1990	3		251.6	251.6	346.9	245.8	0.0	4.0
1991	0		11.1	11.1	15.8	0.0	0.0	4.2
1992	0		13.0	13.0	19.2	0.0	0.0	4.0
1993	0		11.3	11.3	17.3	0.0	0.0	3.7
1994	0		2.1	2.1	3.5	0.0	0.0	3.4
SUBTOT	14		1455.6	1455.6	1736.2	1408.8	829.4	-
TOTAL	14		1476.8	1476.8	1757.4	1430.0	850.6	-

17. Production Rate Data:

a. Annual Production Rates -- N/A

b. Cost Variance -- N/A

c. Schedule Variance -- N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	N/A
Procurement	(1/1)

18. Operating and Support Costs

a. Contractor Support Costs -- N/A Program does not apply OP-18 reportable O&M,N cost

(1) SAR-89-071

~~SECRET~~ ATARS, December 31, 1989

AF-3 ATARS

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)

RDT&E-Only

PROGRAM: ATARS

AS OF DATE: December 31, 1989

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CLEARED FOR OPEN PUBLICATION AS AMENDED MAR 1 1990

DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

SAF/PAS 90-099 -T #18 BKS

1. Designation and Nomenclature (Popular Name): Advanced Tactical Air Reconnaissance System (ATARS)

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

ATARS Division
Directorate of Reconnaissance Programs
Electronic Combat & Reconnaissance SPO
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433-6503

Lt Col R. Pomeroy
Assigned: 1 JUL 87
AV 785-9883
COMM (513) 255-9883

4. Program Elements/Procurement Line Items:

RDT&E: PE 0207217F (Shared funding)
PE 0603239F

PROCUREMENT: NONE

5. Related Programs: USN Unmanned Air Vehicle (UAV).
Joint Services Imagery Processing System (JSIPS).
DON F/A-18D (RC)

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~~SECRET~~

~~Classified by: ATARS SPO~~
~~Declassified by: TMA2~~

12

[redacted]ission Description: The ATARS program, within the Follow-on Tactical [redacted]naissance System (FOTRS) Program Element, is designed to meet the needs of [redacted] tactical commander for detection, location and classification of tactical targets with sufficient location accuracy and detail to permit the timely delivery of appropriate air or ground launched weapons. The Tactical Air Force Statement of Need 320-79 and corresponding Justification for Major System New Start as approved by the Office of the Secretary of Defense in August 1982, identified the requirement for near-real-time intelligence information. ATARS focuses on full scale development of a common family of Electro-Optical/Infrared (EO/IR) sensor suites, data-link sets, recorders, and reconnaissance management system for upgrade of both USAF and USN (including USMC) manned and unmanned reconnaissance systems. The program is designed to replace the existing film based reconnaissance systems with EO/IR sensor suites. These sensor suites will be integrated into a mix of tactical reconnaissance platforms including stand-off and penetrating manned and unmanned vehicles. The ATARS program consists of the following projects:

a. The Tactical Air Reconnaissance System (TARS) project will develop a reconnaissance suite for manned platforms (RF-4C, DON F/A-18D (RC), a Tactical Reconnaissance pod, and the follow-on USN/USAF manned platforms).

b. The Unmanned Air Reconnaissance System (UARS) consists of either an EO or IR sensor suite integrated into an unmanned vehicle by the Air Force. The Unmanned Air Reconnaissance Vehicle is being developed by the Joint Program Office under the Medium-Range Unmanned Air Vehicle (MRUAV) Program and will be provided to the Air Force as Government Furnished Equipment. The funding provided by OSD for the unmanned effort is not included in this report.

c. The Joint Services Imagery Processing System (JSIPS) is a joint (USAF/USN/USA) ground station development program with the USAF designated as the lead service. The ground station will have commonality to Air Force manned and unmanned systems. JSIPS data is not within the scope of this report.

7. Program Highlights:

a. Significant Historical Developments -- ATARS Statement of Need submitted 7 Aug 1979 (TAF-SON 320-79), ATARS Mission Element Need Statement validated 22 Sep 1980, USDRE approved a Justification for a Major System New Start (JMSNS) 24 Mar 1982, funding approved by Congress in FY85 Budget, Program Review DSARC 1985, Program Review/Milestone II DSARC Nov/Dec 86, Milestone II Acquisition Decision Milestone (ADM), 30 Mar 1987, ATARS FSD source selection began 9 Jul 1987, UARS funding was transferred to Joint MRUAV program in Jan 1988, Firm Fixed Price Contract awarded to Control Data Corporation on 18 May 1988, Hardware Preliminary Design Review (PDR) was 31 Oct-13 Dec 1988 and Software Preliminary Design Review (PDR) was 14-16 Dec 1988. Funding for RF-16 development was zeroed by Program Budget Decision 905C, Nov 1988.

b. Significant Developments Since Last Report -- Hardware Critical Design Review (CDR) was 22-25 Sep 1989, Software CDR was 13-18 Nov 1989, and the RF-18 PDR was 26-27 Oct 1989. The MRUAV contract was awarded by the Navy to Teledyne Ryan Aeronautical on 30 June 1989. TARS procurement funding that was zeroed out in the FY 90-91 President's Budget was not restored. TARS & UARS are combined - last SAR reflected UARS and TARS separately (ref para 6.b.). Program Executive [redacted]line was approved by the SAE on 14 Oct 89. DT&E and OT&E will begin in FY91.

7. (U) Program Highlights (con't):

b. ATARS is expected to meet mission requirement.

c. Changes Since "As Of" Date -- None.

8. (U) Threshold Breaches: No DAE Baseline has been approved for this program.

9. (b)(1) Schedule: System: ATARS

a. (b)(1) Milestones

	Development Estimate	Approved Program	Current Estimate
( ) DAB 0 (Program Init)	Aug 82	N/A	Aug 82
( ) DAB I	Dec 85	N/A	Dec 85
( ) DAB II	Nov 86	N/A	Nov 86
( ) ATARS ADM	Mar 87	N/A	Mar 87
( ) FSD Contract Award	May 88	N/A	May 88
( ) Preliminary Design Reviev	Oct 88	N/A	Oct 88
( ) Critical Design Reviev	Apr 89	N/A	Jul-Sep 89
( ) DAB IIIA-			
( ) Low Rate Production	Aug 91	N/A	N/A
( ) DAB IIIB -			
( ) Full Production	Sep 93	N/A	N/A
(b)(1) IOC*	(b)(1)	N/A	N/A

* IOC is defined as a fully supportable operational squadron with support equipment and technical orders.

b. (U) Previous Change Explanations --
Critical Design Reviev was changed from Apr 89 to Jul-Sep 89 due to difficulties in receiving technical data on the ATARS platforms; however, there is no impact on cost or other milestones.

Program Management Directive 5063 (7)/27217F/27213F/27435F/31328F/63239F, 2 Mar 89 no longer identifies the IOC date.

c. ( ) Current Change Explanations -- None

d. ( ) References --

Development Estimate: Program Management Directive 5063 (5)/27217F/27213F/27435F/31328F/63239F, 15 Apr 87.

Approved Program: No DAE Baseline has been approved for this program.

10 (b)(1) Technical/Operational Characteristics: System: ATARS

a. (b)(1) Technical	Dev Est	Approved Program Goals/Threshold	Demonstrated Perf	Current Estimate
(b)(1) Sensor Suite Image Quality (Resolution)	(b)(1)	N/A	N/A	(b)(1)
( ) Continued Operations (degree bank)	90+	N/A	N/A	90+
( ) On-Board Recording (minutes)	30	N/A	N/A	30
( ) Environmental Control	Compatible with ATARS platforms		Compatible with ATARS platforms	

b. (U) Operational at Maturity (IOC + 2 years)

Sensor Suite Break Rate (Percent)-TARS	1.2	N/A	N/A	.95
Sensor Suite Combat Turnaround Time (minutes)-TARS	45	N/A	N/A	45
Sensor Suite Mean Repair Time ON Equipment (minutes)	20	N/A	N/A	20
OFF Equipment (minutes)	60	N/A	N/A	60

c. (U) Previous Change Explanations -- Negotiated change from 1.2 to .95 at FSD Contract Award for the Sensor Suite Break Rate.

d. ( ) Current Change Explanations -- None.

e. ( ) References --

Development Estimate: Program Management Directive 5063 (5)/27217F/27213F/27435F/31328F/63239F, 15 Apr 87.

Approved Program: No DAE Baseline has been approved for this program.

Program Acquisition Cost: (Current Estimate in Millions of Dollars)
System: ATARS

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	163.8	N/A	159.8 *
Procurement	811.0	N/A	0.0
Total Flyaway	(697.6)		(0.0)
Other Wpn Sys Cost	(73.3)		(0.0)
Initial Spares	(40.1)		(0.0)
Construction (MILCON)	0.0	N/A	0.0
Total FY 85 Base-Year $	974.8	N/A	159.8 *
Escalation	317.7	N/A	30.0
Development (RDT&E)	(30.1)	N/A	(30.0)
Procurement	(287.6)	N/A	(0.0)
Construction (MILCON)	0.0	N/A	(0.0)
Total Then-Year $	1292.5	N/A	189.8 *
b. Quantities --			
Development (RDT&E)	9	N/A	9
Procurement	560	N/A	0
Total	569	N/A	9

* Includes .2 of sunk UARS funding.

c. Foreign Military Sales -- None.

d. Nuclear Costs -- None.

e. References --

Development Estimate: Program Management Directive 5063 (5)/27217F/27213F/27435F/31328F/63239F, 15 Apr 87.

Approved Program: No DAE Baseline has been approved for this program.

[redacted]

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

System: TARS & UARS

	Current Year		Budget Year
	Current Est Dec 89 SAR	UCR Baseline Dec 88 SAR	UCR Baseline Dec 89 SAR
a. Program Acquisition --			
(1) Cost	189.8	312.3	189.8
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A
b. Current Procurement -- N/A			

NOTE: TARS production funds have been be zeroed out in the FY90/91 President's Budget. UARS development and procurement funding have been transferred to the UAV Joint Program Office.

11 Cost Variance Analysis:

Summary -- (Current (Then-Year) Dollars in Millions)

ATARS

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	193.9	1098.6	0.0	1292.5
Previous Changes:				
Economic	+.2	-17.3		-17.1
Quantity		-1081.3		-1081.3
Schedule				
Engineering	+ 21.9			+ 21.9
Estimating	+6.2			+6.2
Other	-16.4			-16.4
Support				
Subtotal	+11.9	-1098.6	0.0	-1086.7
Current Changes:				
Economic	+2.0			+2.0
Quantity				
Schedule				
Engineering				
Estimating	-10.2			-10.2
Other				
Support	-7.8			-7.8
Subtotal	-16.0		0.0	-16.0
Total Changes	-4.1	-1098.6	0.0	-1102.7
Current Estimate	189.8	0.0	0.0	189.8

13. Cost Variance Analysis (Con't):

ATARS (FY 1985 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	163.8	811.0	0.0	974.8
Previous Changes:				
Quantity		-811.0		-811.0
Schedule				
Engineering	+17.8			+17.8
Estimating	+4.8			+4.8
Other	-11.9			-11.9
Support				
Subtotal	+10.7	-811.0	0.0	-800.3
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	-8.3			-8.3
Other				
Support	-6.4			-6.4
Subtotal	-14.7	0.0	0.0	-14.7
Total Changes	-4.0	-811.0	0.0	-815.0
Current Estimate	159.8	0.0	0.0	159.8

b. Previous Change Explanations —

(1) RDT&E

ECONOMIC: Revised escalation indices.

ESTIMATING: Addition of dual sourcing, 3 common sensor suites moved to TARS (formerly under UARS, but directed to be under TARS), RF-16 planning, adjustment for current & prior year escalation. Reduction in RF-16 planning effort.

OTHER: Funding for UARS effort transferred to Joint UAV program.

ENGINEERING: Addition of RF-16 multi-national pod.
Deletion of funding for RF-16 missionization.

(2) PRODUCTION

ECONOMIC: Revised escalation indices.

QUANTITY: Production funding not approved.

QUANTITY: Funding for UARs effort transferred to Joint UAV program.

c. Current Change Explanations —

RDT&E (Dollars in Millions)	Base-Year	Then-Year
Revised escalation indices (ECONOMIC).	0	+2.0
Deletion of simulator (SUPPORT).	-6.4	-7.8
Reduction of dual sourcing (ESTIMATING).	-7.8	-9.6
Adjustment for current & prior year escalation (ESTIMATING).	-.5	-.6

14. Program Acquisition Unit Cost (PAUC) History:
(Millions of then-year dollars)

Initial SAR Estimate to Current Baseline Estimate --

ATARS

PAUC (Initial SAR Est)	Changes								PAUC (Current EST)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
2.308	-	-	-	-	-	-	-	-	NA

15 Contract Information: (Then-Year Dollars in Millions) --

a. RDT&E --

Sensor Suites:
Control Data Corporation
Government Systems Operations
Minneapolis, MN 55440-1305
F33657-87-C-0103, FPP
AWARD: May 16, 1988
Definitized: May 16, 1988

Target	Ceiling	Qty
$110.6	NA	9

Current Contract Price

Target	Ceiling	Qty
$135.7	NA	12

Estimated Price At Completion

Contractor	Program Manager
$135.7	$135.7

b. Procurement -- None.
c. MILCON -- None.

[redacted]

16 Program Funding Summary: (Current Estimate in Millions of Dollars)

System: ATARS

a. Program Status --

(1) Percent Program Completed: 60.0% (6yrs/10yrs)

(2) Percent Program Cost Appropriated: 72.7% (137.9/189.8)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Prior Years (FY85-89)	Budget Year (FY90)	Budget Year (FY91)	Balance at Completion (FY92-94)	Total
RDT&E	92.3	45.6	33.4	18.5	189.8
Procurement (3010)	0.0	0.0	0.0	0.0	0.0
MILCON	0.0	0.0	0.0	0.0	0.0
Total	92.3	45.6	33.4	18.5	189.8

16. Program Funding Summary (Con't):

System: ATARS (Summary)

c. Annual Summary --

Fiscal Year	QTY	Flyaway FY 85 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program *	Obligated **	Expended **	
Appropriation: RDT&E								
1985				2.8	2.8	2.8	2.8	3.4
1986				2.1	2.2	2.2	2.2	2.8
1987				8.3	8.9	8.9	4.9	2.7
1988				29.1	32.5	32.5	25.7	3.1
1989				39.4	45.9	45.8	18.4	4.2
1990				37.6	45.6	25.3	0.1	4.0
1991				26.5	33.4	0.0	0.0	4.2
1992				11.2	14.7	0.0	0.0	4.0
1993				1.4	1.9	0.0	0.0	3.7
1994				1.4	1.9	0.0	0.0	3.4
SUBTOTAL	9			159.8	189.8	117.5	54.1	

*Includes .2 of UARS funding in FY87.
**Reflects program office records as of 31 Dec 89.
Note: RDT&E funds are under a shared program element between ATARS and JSIPS, above funds reflect ATARS development only.

17. Production Rate Data: System: ATARS

a. Annual Production Rates -- TARS

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1991	21	N/A	N/A	N/A
1992	33	N/A	N/A	N/A
1993	68	N/A	N/A	N/A
1994	68	N/A	N/A	N/A
1995	66	N/A	N/A	N/A
1996	44	N/A	N/A	N/A

17. Production Rate Data (Con't) UNCLASSIFIED

a. Annual Production Rates -- UARS

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1991	10	N/A	N/A	N/A
1992	20	N/A	N/A	N/A
1993	40	N/A	N/A	N/A
1994	40	N/A	N/A	N/A
1995	50	N/A	N/A	N/A
1996	50	N/A	N/A	N/A
1997	50	N/A	N/A	N/A

b. Cost Variance - Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Est	Variance (CE less Max)	Maximum Econ
*PAC BY $	N/A	N/A	N/A	N/A	N/A
TY $	N/A	N/A	N/A	N/A	N/A
PAUC BY $	N/A	N/A	N/A	N/A	N/A
TY $	N/A	N/A	N/A	N/A	N/A

* Program Acquisition Cost

c. Schedule Variance -

	Production Estimate	Variance (CE less PdE)	Current Est	Variance (CE less Max)	Maximum Econ
Start (Mo/Yr)	N/A	N/A	N/A	N/A	N/A
Duration (Mo)	N/A	N/A	N/A	N/A	N/A
End (Mo/Yr)	N/A	N/A	N/A	N/A	N/A

d. Deliveries (Plan/Actual) -- RDT&E 0/0 (To Date)
Production 0/0

e. Approved Design-to-cost Goal -- N/A

UNCLASSIFIED

18. Operating and Support Costs:

. Assumptions and Ground Rules --

(1) Assumes procurement of planned sensor suite kits.

(2) TARS: The concept of operation is an 18 Primary Aircraft Authorized (PAA) fighter squadron flying each fighter 302.4 hours per year. The Maintenance concept is a baseline two level consisting of Organizational and Depot. The Tactical Air Force (TAF) manning requirement is one sensor technician per aircraft. Reliability/maintainability is based upon a subsystem break rate of .95%. The depot cost is a summary cost which includes interim contractor support, sensor system LRU/SRU repair, Class V modification installations, and software support. The sustaining investment consists primarily of replenishment spares and repair parts, support equipment replacement, and modification kits for prime mission hardware.

b. Costs -- (FY1985 Constant (Base Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per Aircraft System
SATAF - Government	.007
Installation	.017
Drone Vehicle Maintenance	.010
Base Operations & Maint	.949
Personnel Acq & Training	.267
Depot Non-Maintenance	.198
Depot Maintenance	.052
Sustaining Investment	.020
Total	1.520

NOTE: The ICA estimate did not break out TARS and UARS separately. The cost is an average of both TARS and UARS combined.

c. Contractor Support Cost -- N/A

AF-24 RAIL GARRISON ~~SECRET~~

SAR-89-085

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#12

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: PK RAIL GARRISON

AS OF DATE: December 31, 1989

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AS AMENDED
FEB 28 1990
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE
24

1. (U) **Designation and Nomenclature (Popular Name):** Peacekeeper Advanced Basing (Rail Garrison)

2. (U) **DoD Component:** USAF

3. (U) **Responsible Office and Telephone Number:**
Vice Commander and PK Rail Garrison Program Director
Ballistic Systems Division
Norton AFB, CA 92409-6468
Col. Roger McClain
Assigned: April 1,1987
AV 876-6014 COMM 714-382-6014

4. (U) **Program Elements/Procurement Line Items:**
RDT&E:
PE 0604312F (Shared)
PROCUREMENT:
APPN 3020 ICN 0101215F (Air Force) (Shared)
MILCON:
PE 0101215F (Shared)

5. (U) **Related Programs:** Peacekeeper in Minuteman Silo, Small ICBM

6. (U) **Mission and Description:** The mission of Peacekeeper Rail Garrison (PRG) is to enhance the deterrent posture of the US strategic forces by

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Mission and Description (Cont'd):

providing a highly survivable ICBM system. Survivability is achieved by dispersing the trains onto the nation's mainline rail network, thus severely stressing the Soviet planners' ability to target this system along with all other US strategic forces. Should deterrence fail, these Peacekeeper (PK) missiles will provide a highly accurate, prompt retaliatory capability against the full spectrum of designated targets, launchable from garrison or virtually any location along the rail network.

PRG is a force of 50 PK missiles deployed on trains. The trains are parked inside train alert shelters (TASs) at secure garrisons located on existing Air Force bases. Each train has two locomotives, two security cars, two missile launch cars (MLCs), one launch control car (LCC), a maintenance car, a fuel car, and additional cars as required. Each garrison accommodates the TASs and the associated operational and maintenance support equipment and facilities. The PK missiles are maintained on continuous strategic alert in garrisons. Trains will have the capability to deploy along the commercial rail network on receipt and authentication of a deployment directive from higher authority. The system provides prompt launch capability in both garrisoned and deployed operational modes. No changes, except for software, are required for the PK missile. PRG does not replace an existing system.

Program Highlights:

a. (U) Significant Historical Developments -- On 19 Dec 86, the President selected PRG as the basing mode for the second 50 PK missiles. A 7 Jan 87 message amendment to Program Management Directive (PMD) 0075(17), ICBM Modernization, directed Air Force Systems Command to begin development of the Rail Garrison basing mode for Peacekeeper.

In Jan 87, the Ballistic Missile Office (BMO) began siting work at the 11 candidate bases previously identified. The Main Operating Base will be at F.E. Warren AFB, WY, as directed.

Rail Garrison development contractual efforts are divided into three major contracts: (1) Basing Test and System Support (BT&SS), (2) Missile Launch Car (MLC), and (3) Launch Control System (LCS). The BT&SS contract was awarded in Sep 87 to Boeing Aerospace Company. The MLC and LCS contracts were awarded in May 88 to Westinghouse Electric Corporation and Rockwell International (Autonetics Division), respectively.

The PRG Milestone II Acquisition Decision Memorandum (ADM) was signed by the Secretary of Defense (OSD) on 18 May 1988 as a result of the Defense Acquisition Board (DAB). This memorandum authorized the Secretary of the Air Force to proceed with Full Scale Development (FSD) of the PRG basing system. The PRG System Design Review (SDR) was completed in Sep 88.

(U) Program Highlights (Cont'd):

b. (U) Significant Developments Since Last Report -- The site-specific Environmental Impact Statement (EIS) for the final garrison sites was submitted in Feb 89. The Record of Decision (ROD) announcing the final six bases was filed in Nov 89. They are Barksdale AFB, LA; Grand Forks AFB, ND; Fairchild AFB, WA; Dyess AFB, TX; Little Rock AFB, AR; and Wurtsmith AFB, MI.

The Preliminary Design Reviews (PDRs) began in Feb 89. In accordance with PMD 0075(10) dated 17 Oct 89, PRG will be the basing mode for the redeployment of the first 50 PK missiles. In Nov 89, Congress authorized advance procurement funds in order to begin production of the PRG basing.

The PRG weapon system is expected to satisfy the mission requirement.

c. (U) Changes Since As Of Date -- None.

8. (U) Threshold Breaches: PRG has breached the Defense Acquisition Executive (DAE) baseline (31 December 1988) milestones with schedule slips of of at least six months for Milestone III, First Assest Delivered (FAD), and Full Operational Capability (FOC). See Section 9c(CH-1) for explanations.

9. (U) Schedule:

a. (U) Milestones --

	Development Estimate	Approved Program	Current Estimate
Full-Scale Development (FSD)	MAY 88	MAY 88	MAY 88
System Design Review (SDR)	AUG 88	AUG 88	AUG 88
Critical Design Review (CDR)	MAR 90	MAR 90	JAN 91(Ch-1)
Milestone III	APR 90	APR 90	FEB 91(Ch-1)
IOT&E	MAR 92	FEB 92	N/A
IOC/First Asset Delivered (FAD)	JUN 92	DEC 91	DEC 92(Ch-1)
Full Operational Capability	JUN 94	JUN 93	DEC 97(Ch-1)

b. (U) Previous Change Explanations --

SDR and CDR schedules determined, previously TBD.
Delay in receiving formal OSD approval.
Established approved program dates for SDR and CDR.
Reflects USD(A) baseline approval.
FSD authorized by OSD ADM.
Incorporation of DAE baseline milestones into SAR.
IOC/FOC slipped due to funding cuts.

c. (U) Current Change Explanations --

(Ch-1) Funding cuts and content changes since the 31 Dec 88 SAR have resulted in milestone slips.

[redacted]. (U) Schedule (Cont'd):

IOC (FAD) is defined as one complete train, including support equipment and missiles, delivered and available for alert. FOC is defined as 50 missiles deployed on trains.

d. (U) References --

Development Estimate: PRG Milestone II Acquisition Decision Memorandum, dated 13 May 88; FY 90-9I President's Budget.

Approved Program: DAE Baseline dated Dec 88.

PK RAIL GARRISON, December 31, 1989

10. (U) Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold		Demon-strated Perf.	Current Estimate
a. (S) Technical --					
(S) CEP (at about	(b)(1)				
(S) MRA (Mission Reliability and Availability)					
(S) MRMA (Mobility Reliability, Mobility Availability)	.86	.86	.86	N/A	.86
(S) MTTR (Mean Time to Repair) (hrs)	8	8	8	N/A	8
b. (S) Operational --					
(S) Reaction Time (min)	(b)(1)				
(S) Parked, Stabilize					
(S) Dispersed, Moving					
(S) Endurance (days)					
(S) Pre-attack					
(S) Post-attack (Autonomous)					

c. (U) Previous Change Explanations -- None.

d. (U) Current Change Explanations -- None.

e. (U) References --

Development Estimate: PRG Milestone II Acquisition Decision Memorandum, dated 13 May 88; FY 90-91 President's Budget.

Approved Program: DAE baseline dated Dec 88.

11 (U) Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. (U) Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	1945.4	1945.4	1823.0
Procurement	2235.5	2235.5	2385.0
Total Flyaway	(1985.2)	(1985.2)	(2183.1)
Other Wpn Sys Cost	(25.6)	(25.6)	(25.6)
Peculiar Support	(0.0)	(0.0)	(0.0)
Initial Spares	(224.7)	(224.7)	(176.3)
Construction	497.3	497.3	434.4
Ops. and Maint. (O&M)	0.0	0.0	0.0
Total FY 82 Base-Year $	4678.2	4678.2	4642.4
Escalation	2148.6	2148.6	2485.9
Development (RDT&E)	(660.1)	(660.1)	(649.2)
Procurement	(1285.1)	(1285.1)	(1632.2)
Construction (MILCON)	(203.4)	(203.4)	(204.5)
Ops. and Maint. (O&M)	(0.0)	(0.0)	(0.0)
Total Then-Year $	6826.8	6826.8	7128.3
b. (U) Quantities --			
Development (RDT&E)	0	0	0
Procurement	50	50	50
Construction (MILCON)	0	0	0
Total	50	50	50

Paragraph 11 Comments:
Procurement missile costs are included in the Peacekeeper SAR; the cost of five PK missiles to support the basing verification are included in RDT&E.

The end item basing unit is defined as one missile launch car and all associated support equipment, not including the missile.

c. (U) Foreign Military Sales -- None.

d. (U) Nuclear Costs -- None.

e. (U) References --

Development Estimate: PRG Milestone II Acquisition Decision Memorandum, dated 13 May 88; FY 90-91 President's Budget.

e. References -- (Cont'd)

Approved Program: DAE Baseline dated Dec 88.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. (U) Program Acquisition	(DEC 89 SAR)	(DEC 88 SAR)	(DEC 89 SAR)
(1) Cost	7128.3	6826.8	7128.3
(2) Quantity	50.0	50.0	50.0
(3) Unit Cost	142.57	136.54	142.57
b. (U) Current Procurement --	(FY 1990)	(FY 1990 APPN) *	(FY 1991)
(1) Cost	102.6	102.6	1346.0
Less CY Adv Proc	102.6	102.6	133.9
Plus PY Adv Proc	0.0	0.0	102.6
Net Total	0.0	0.0	1314.7
(2) Quantity	0.0	0.0	14.0
(3) Unit Cost	-	-	93.91

Paragraph 12 Comments:
* The Current Year UCR Baseline for Procurement in 1990 differs from the Dec 88 SAR due to the FY 90 Appropriations Bill.

13. (U) **Cost Variance Analysis:**

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	2605.5	3520.6	700.7	6826.8
Previous Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes:				
Economic	+28.8	+200.0	+23.2	+252.0
Quantity	-	-	-	-
Schedule	-	+36.0	-	+36.0
Engineering	-	+331.5	-	+331.5
Estimating	-162.1	-6.9	-85.0	-254.0
Other	-	-	-	-
Support	-	-64.0	-	-64.0
Subtotal	-133.3	+496.6	-61.8	+301.5
Total Changes	-133.3	+496.6	-61.8	+301.5
Current Estimate	2472.2	4017.2	638.9	7128.3

11. Cost Variance Analysis (Cont'd):

(FY 1982 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1945.4	2235.5	497.3	4678.2
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	+194.8	-	+194.8
Estimating	-122.4	-4.4	-62.9	-189.7
Other	-	-	-	-
Support	-	-40.9	-	-40.9
Subtotal	-122.4	+149.5	-62.9	-35.8
Total Changes	-122.4	+149.5	-62.9	-35.8
Current Estimate	1823.0	2385.0	434.4	4642.4

Paragraph 13 Comments:
Procurement missile costs are included in the Peacekeeper SAR. PK missiles to support the basing verification are included in RDT&E.

b. Previous Change Explanations -- None

c. Current Change Explanations --

		(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E			
Revised Dec 89 escalation indices	(Economic)	-	+28.8

c. (U) Current Change Explanations -- (Cont'd)

		(Dollars in Millions) Base-Year	Then-Year
Adjustment for current and prior year inflation	(Estimating)	-5.8	-7.9
Refinement of estimate; favorable contract negotiation and Congressional funding cuts	(Estimating)	-116.6	-154.2
(2) PROCUREMENT			
Revised Dec 89 escalation indices	(Economic)	-	+200.0
Adjustment for current and prior year inflation	(Estimating)	-4.4	-6.9
Adjustment for change in procurement profile	(Schedule)	-	+36.0
PDR changes including the delay barrier system, external appearance, and system security; Additional funds required for break in production		+153.9	+267.5
	(Engineering)	(+194.8)	(+331.5)
	(Support)	(-40.9)	(-64.0)
(3) MILCON			
Revised Dec 89 escalation indices	(Economic)	-	+23.2
Adjustment for current and prior year inflation	(Estimating)	-3.6	-5.0
Refinement of estimate as a result of updated Program Estimate	(Estimating)	-59.3	-80.0

14. [redacted] Program Acquisition Unit Cost (PAUC) History: (Then-Year Dollars [redacted] Millions)

a. [redacted] Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
182.1	+1.0	--	+1.8	--	-42.6	--	-5.8	-45.6	136.5

b. [redacted] Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
136.54	+5.040	+0.000	+0.720	+6.630	-5.080	--	-1.280	+6.030	142.57

15. [redacted] Contract Information: (Then-Year Dollars in Millions)

a. ([redacted]) RDT&E

Basing,Test,Sys Supt:	Initial Contract Price		
	Target	Ceiling	Qty
[redacted]ing [redacted]ttle, WA	$235.5	N/A	N/A

F04704-87-C-0108, CPIF/AF
Award: September 14, 1987
Definitized: September 14, 1987

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$279.8	N/A	N/A	$311.0	$311.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$-0.4
Cumulative Variances To Date (11/30/89)	$-8.7	$0.7
Net Change	$-8.7	$1.1

Explanation of Change:

Cumulative Variance Change Percent N/A +275.0%

The cost variance in the previous SAR was incorrect. The unfavorable cost variance is due to new requirements and redesign of the maintenance car, garrison physical security system, transportation and handling, and Vandenberg Air Force Base (VAFB) test facilities.

5. Contract Information (Cont'd): (Then-Year Dollars in Millions)

The improved schedule variance is due to the sub-contractor for VAFB test facilities performing ahead of schedule.

During this period, missile system support, rail replacement and operational blast loads were authorized on this contract, thus increasing the Target and Estimated Prices at Completion.

Footnote: The Program Manager's Estimated Price at Completion (PMEPAC) includes authorized unpriced work (AUW). To prevent disclosure of our negotiating position, the AUW is valued at the contractor's estimate for purposes of this report.

No program impact.

Launch Control Sys:	Initial Contract Price Target	Ceiling	Qty
Rockwell (Autonetics Div) San Bernardino, CA F04704-88-C-0043, CPIF/AF Award: May 18, 1988 Definitized: May 18, 1988	$161.8	$183.5	0.0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$217.4	$251.1	0.0	$237.4	$237.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date (11/30/89)	$-9.3	$-9.1
Net Change	$-9.3	$-9.1

Explanation of Change:

Cumulative Variance Change Percent	N/A	N/A

The quantity in the previous SAR was incorrect. The unfavorable cost variance is due to indirect and general and administrative (G&A) rate increases. The unfavorable schedule variance is due to a design change in the launch control system area.

During this period, efforts for an 87 foot rail car, rail car external appearance modification, fuel car locomotive interchange, ground control launch center, and garrison alert security control center were added to this contract, thus increasing the Target and Estimated Prices.

Footnote: The PMEPAC includes AUW. To prevent disclosure of our negotiating position, the estimate is valued at the contractor's estimate

. **Contract Information (Cont'd):** (Then-Year Dollars in Millions)

for purposes of this report.

No program impact.

Missile Launch Car:
Westinghouse Elec Corp
Sunnyvale, CA
F04704-88-C-0026, FPIF/AF
Award: May 18, 1988
Definitized: May 18, 1988

Initial Contract Price		
Target	Ceiling	Qty
$167.0	$188.8	8.0

Current Contract Price		
Target	Ceiling	Qty
$199.6	$227.3	8.0

Estimated Price At Completion	
Contractor	Program Manager
$209.6	$209.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date (11/30/89)	$-7.8	$-6.3
Net Change	$-7.8	$-6.3
Explanation of Change:		
Cumulative Variance Change Percent	N/A	N/A

The eight MLCs are not counted as program units because they do not fit the defined unit constraints. The RDT&E units will be used for engineering evaluation and basing verification tests.

The increase in unfavorable cost variance is due to the incorporation of automated features into the stabilization control unit, more design and drafting effort for the engineering model drawing than planned, and the associated overhead rates. The unfavorable schedule variance is due to the engineering model (EM-1) fabrication complications and the rescheduling of the stabilization hydraulics.

Delay barrier system phase II and external appearance efforts have been added to this contract since the last report, thus increasing the Target and Estimated Prices.

Footnote: The PMEPAC includes AUW. To prevent disclosure of our negotiating position, the estimate is valued at the contractor's estimate for purposes of this report.

No program impact.

16. (U) **Program Funding Summary:**

a. (U) Program Status --

(1) Percent Program Completed: 44.4% (4 yrs/9 yrs)

(2) Percent Program Cost Appropriated: 26.4% ($1880.7 / $7128.3)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY 87-89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance To Complete (FY 92-95)	Total
RDT&E	871.5	774.2	548.0	278.5	2472.2
Procurement	-	102.6	1346.0	2568.6	4017.2
MILCON	16.7	115.7	268.6	237.9	638.9
O&M	-	-	-	-	-
Total	888.2	992.5	2162.6	3085.0	7128.3

c. (U) Annual Summary --

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 3600 Research, Development, T & E, Air Force								
1987				74.2	90.0	88.7	82.9	2.7
1988				257.0	322.8	316.2	277.9	3.1
1989				349.9	458.7	451.3	236.9	4.2
1990				567.6	774.2	228.2	8.4	4.0
1991				386.2	548.0			4.2
1992				160.8	236.8			4.0

PK RAIL GARRISON, December 31, 1989

c. (U) Annual Summary -- (Cont'd)

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: 3600 Research, Development, T & E, Air Force (Cont'd)								
1993				27.3	41.7			3.7
Subtot	0			1823.0	2472.2	1084.4	606.1	
Appropriation: 3020 Missile Procurement, Air Force								
1990			49.0	65.6	102.6			4.0
1991	14	58.6	676.5	830.4	1346.0			4.2
1992	18	26.3	559.8	676.1	1133.1			4.0
1993	12		517.5	517.5	895.2			3.7
1994			53.7	53.7	95.8			3.4
1995	6		241.7	241.7	444.5			3.1
Subtot	50	84.9	2098.2	2385.0	4017.2			
Appropriation: 3300 Military Construction, Air Force								
1988				2.7	3.5			3.1
1989				9.7	13.2			4.2
1990				82.0	115.7			4.0
1991				183.3	268.6			4.2
1992				156.7	237.9			4.0
Subtot	0			434.4	638.9			
Total	50	84.9	2098.2	4642.4	7128.3	1084.4	606.1	

(U) **Production Rate Data:**

a. (U) Annualized Production Rates --

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1990	0	N/A	0	N/A
1991	20	N/A	21	N/A
1992	23	N/A	18	N/A
1993	24	N/A	24	N/A
1994	0	N/A	0	N/A
1995	0	N/A	24	N/A

b. (U) Cost Variance -- None.

c. (U) Schedule Variance -- None.

d. (U) Deliveries (Plan/Actual) -- None.

e. (U) Approved Design-to-Cost Goal -- None.

Paragraph 17 Comments:
Except for FY 92, the annualized production rates shown differ from the annual funded buy quantities because the funded delivery period is 8 months for FY 91, 6 months for FY 93, and 3 months for FY 95.

18. (U) **Operating and Support Costs:**

a. (U) Assumptions and Ground Rules --

The concept of operation is based on using 50 operational missiles and assumes: (a) 7 garrisons at 7 specific existing SAC bases (2 Minuteman and 5 non-Minuteman bases) with the Main Operating Base located at F.E. Warren AFB; (b) 3-level maintenance; (c) a train crew of 41 personnel consisting of a 6 member maintenance, 26 member security, 3 member train

ew, 4 member combat crew, 1 train commander, and 1 medical technician; ditional personnel capacity to support instructor/evaluator personnel; (d) 3-4 TASs per garrison/3-4 trains per garrison; (e) 66 OT&E flights; and (f) 25 operational trains and 2 training trains.

Site Activation Task Force (SATAF) personnel are not included in O&S costs, but are costed under assembly & checkout by the program office. In summary, O&S costs are estimated by accumulating personnel, material and facility costs, both of a direct and non-direct nature that the Air Force incurs while operating, maintaining and supporting the Peacekeeper Rail Garrison weapon system scenario.

The cost structure is based on the Office of the Secretary of Defense Cost Analysis Improvement Group format as outlined in AFR 173-13 and categarized using the Strategic Missile Cost Estimating (STRAMICE) model and the applicable cost factors therein. The model was adjusted to reflect manpower derived in coordination with HQ SAC (with some exceptions) and depot support and maintenance costs derived from the Ogden Air Logistics Center Program Decision Package (FY 92-97 POM).

b. (U) Costs -- (FY 1982 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per Steady State	Avg Annual Cost Per No Antecedent (Antecedent)
Personnel	68.3	0.0
O&S Consumables	6.0	0.0
Direct Depot Maintenance	35.8	0.0
Sustaining Investment	16.7	0.0
Other Direct Costs	69.5	0.0
Indirect Costs	17.8	0.0
Total	214.1	0.0

c. (U) Contractor Support Costs -- None.

N-4 AOE 6

SAR-89-015

UNCLASSIFIED

SELECTED ACQUISITION REPORT (RCS: DD-COMP(O&A)823)
PROGRAM: AOE 6 FAST COMBAT SUPPORT SHIP

AS OF DATE: December 31, 1989

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1. **Designation/Nomenclature (Popular Name):** AOE-6 FAST COMBAT SUPPORT SHIP

2. **DOD Component:** U.S. Navy (NAVSEA)

3. **Responsible Office and Telephone Number:**

Auxiliary/Special Mission Ship	PM:	CAPT J. M. Todd
Acquisition Project Office (PMS383)	Assigned:	10/01/89
Department of the Navy (NAVSEA)	Autovon:	332-3507
Washington D.C. 20362-5101	Commercial:	(703) 602-3507

4. **Program Elements:**

RDT&E:	PE: 0603564N Project 0408 (Shared)
	PE: 0604567N Project 0857 (Shared)
	PE: 0604567N Project 1803 (Shared)
Procurement (SCN):	PE: 24441N APPN 1611 ICN 5023

5. **Related Programs:** TAO 187 Class

90-C-0673

No Security Objection
Open Publication
(AS AMENDED)
MAR 22 1990
Office of the Chief of
Naval Operations
Dept. of the Navy

MAR 22 1990

UNCLASSIFIED

90 0691/8

6. Mission and Description:

DESCRIPTION: A 156,000 barrel capacity, twin screw, 20+ knots speed, gas turbine powered Fast Combat Support Ship with a 753' 8" overall length, a 107' beam, and a mean draft of 38' 3". The ship will carry an 1800 long ton notional load of ammunition, 400 long tons of Chill and Freeze Storage, 250 long tons of other cargo stowage, two H-46 vertical replenishment (VERTREP) helicopters, and will have accommodations for 667 men.

MISSION: The Fast Combat Support Ship operates as an integral part of the Carrier Battle Group (CVBG) providing simultaneous multiproduct underway replenishment (UNREP) by means of connected replenishment (CONREP) and vertical replenishment (VERTREP) using embarked helicopters. The ship delivers bulk petroleum (POL) products, ammunition, fresh, frozen and dry stores, and delivers/receives fleet freight, mail, and personnel to combatant forces underway. The ship will be capable of replenishing from six stations simultaneously.

7. Program Highlights:

a. Significant Historical Developments - The AOE 6 Class program was approved by NDCP on 20 March 1986. The lead ship contract for detail design and construction was awarded on 23 January 1987. The option for the first follow ship (AOE 7) was awarded on 3 November 1988; for the second follow ship (AOE 8) on 6 December 1989. The award was a one plus three option-type, fixed price incentive (FPI), subject to escalation, contract (50/50 share). Production started on 22 June 88 with delivery of the lead ship anticipated in July 1991.

b. Significant Developments since Last Report - Second follow ship option (AOE 8) exercised on 6 December 1989. Large lot procurement strategy added two ships to FY 1993 for a total buy of three; the one ship in FY 1992 and 1994 were deleted.

c. Changes Since "As of" Date - None

8. Threshold Breaches: The current estimate for the last AOE delivery date breaches the DAE baseline dated 31 Dec 88,

9. Schedule:

a. Milestones - -	Production Estimate	Approved Program	Current Estimate
Operational Requirement (OR)	Jul 82	Jul 82	Jul 82
Ship Charac. Improv. Board (SCIB)	Jul 83	Jul 83	Jul 83
Characteristics Approved	Oct 84	Oct 84	Oct 84
Production Decision	Mar 86	Mar 86	Mar 86
Production Contract Award	Jan 87	Jan 87	Jan 87
Production Started - First Ship	Jun 88	Jun 88	Jun 88
Follow on Production Decision	Nov 88	Nov 88	Nov 88
Exercise Option (AOE 7)	N/A	N/A	Nov 88
Exercise Option (AOE 8)	N/A	N/A	Dec 89
Launch - First Ship	Feb 90	May 90	Aug 90(CH-1)
Exercise Option (AOE 9)	N/A	N/A	Nov 90
Acceptance Trials - First Ship	Mar 91	Jul 91	Sep 91(CH-2)
Delivery - First Ship	Apr 91	Aug 91	Nov 91(CH-3)
Initial Operating Capability	Aug 91	Nov 91	Jan 92(CH-4)
Last AOE Delivery (AOE 12)	Feb 98	Feb 98	Apr 99(CH-5)

b. Previous Change Explanations - - None.

c. Current Change Explanations - -

(CH-1) - Delay from May to Aug 90 due to transfer of work from "on-ship" to "on-block" (modular construction) in order to increase production efficiency.

(CH-2) - Delay from Jul to Sep 91 due to delay in launch plus late receipt of main reduction gear and concurrent propulsion testing.

(CH-3) - Delay from Aug to Nov 91 due to delay in Acceptance Trials.

(CH-4) - Delay from Nov 91 to Jan 92 due to change in fitting out period caused by delay in delivery.

(CH-5) - Change from Feb 98 to Apr 99 due to large lot buy-out in FY 1993.

d. References - Production Estimate:

NDCP Approved 20 Mar 1986 - Lead ship production.
DCP Approved 25 May 1989 - Follow ship production.

Approved Program:
DAE Baseline: 31 DEC 1988.

10. Technical/Operational Characteristics:

	Product. Estimate	Approved Program Goals/ Thresholds	Demon-strated Perfor-mance	Current Estimate
a. Technical - -				
Length Overall (ft)	753' 8"	753' 8"	753' 8"	753' 8"
Beam (maximum) (ft)	107' 0"	107' 0"	107' 0"	107' 0"
Draft (mean) (ft)	37' 9"	38' 3"	38' 3"	38' 3"
Displacement (Ltons)	48,500	48,998	48,998	48,998
Propulsion				
(1) Gas Turbines	4	4	4	4
(2) Shafts	2	2	2	2
(3) SHP (each)	100,000	100,000	100,000	100,000
Accommodations	667	667	667	667
b. Operational - -				
Speed (kts)	20+	20+	20+	20+
Armament:				
NSSMS	1	1	1	1
CIWS	2	2	2	2
25mm Guns	2	2	2	2
.50 Cal Guns	4	4	4	4
Cargo Fuel Cap. (bbls)	156,000	156,000	156,000	156,000
DFM-JP5-Conv.	30-40-30%	30-40-30%	30-40-30%	30-40-30%
Ordnance Stowage (Ltons)	1,800	1,800	1,800	1,800
Chill & Freeze (Ltons)	400	400	400	400
Other Cargo (Ltons)	250	250	250	250
H-46 Helo (UNREP)	2	2	2	2

c. Previous Change Explanation - - None.

d. Current Change Explanation - - None.

e. References - Production Estimate:
NDCP Approved 20 Mar 1986 - Lead ship production.
DCP Approved 25 May 1989 - Follow ship production.

Approved Program:

DAE Baseline: 31 DEC 1988.

II. **Program Acquisition Cost:** (Current Estimate in Millions of Dollars)

a. Cost - -	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	29.4	29.4	32.2
Procurement	2303.1	2303.1	2479.8
Total Sailaway	(2230.6)	(2230.6)	(2413.3)
Other Weapon System Costs	-	-	-
Initial Spares	-	-	-
Total FY86 Base-Year $	2332.5	2332.5	2512.0
Escalation	502.3	502.3	675.3
Development (RDT&E)	(-0.6)	(-0.6)	(-0.0)
Procurement (SCN)	(+502.9)	(+502.9)	(+675.3)
Total Then-Year $	2834.8	2834.8	3187.3
b. Quantities - -			
Development (RDT&E)	-	-	-
Procurement	7	7	7
Total	7	7	7

c. **Foreign Military Sales** - - N/A

d. **Nuclear Costs** - - N/A

e. **References** - Production Estimate:

NDCP Approved 20 Mar 1986 - Lead ship production.
DCP Approved 25 May 1989 - Follow ship production.

Approved Program:

DAE Baseline: 31 DEC 1988.

PROGRAM: AOE-6 FAST COMBAT SUPPORT SHIP
AS OF DATE: December 31, 1989

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	3187.3	2834.8	3187.3
(2) Quantity	7	7	7
(3) Unit Cost	455.3	405.0	455.3
b. Current Procurement	(FY 1990)	(FY 1990 APPN)	(FY 1991)
(1) Cost	384.6	384.6	405.5
Less CY Adv Proc	-	-	-
Less PY Adv Proc	-	-	-
Net Total	384.6	384.6	405.5
(2) Quantity	1	1	1
(3) Unit Cost	384.6	384.6	405.5

13. Cost Variance Analysis:

a. Summary - - (Current (THEN-YEAR) Dollars in Millions)

	RDT&E	PROC	TOTAL
Production Estimate	28.8	2806.0	2834.8
Previous Changes:			
Economic	-	-	-
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	-	-	-
Other	-	-	-
Support	-	-	-
SUBTOTAL	-	-	-
Current Changes:			
Economic	-	+ 120.8	+ 120.8
Quantity	-	-	-
Schedule	-	+ 1.2	+ 1.2
Engineering	-	-	-
Estimating	+ 3.4	+ 227.2	+230.6
Other	-	-	-
Support	-	- 0.1	- 0.1
SUBTOTAL	+ 3.4	+ 349.1	+ 352.5
TOTAL CHANGES	+ 3.4	+ 349.1	+ 352.5
CURRENT ESTIMATE	32.2	3155.1	3187.3

13. **Cost Variance Analysis:** (Cont.)

(FY 1986 Constant Dollars (BASE YEAR) in Millions)

	RDT&E	PROC	TOTAL
Production Estimate	29.4	2303.1	2332.5
Previous Changes:			
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	-	-	-
Other	-	-	-
Support	-	-	-
SUBTOTAL	-	-	-
Current Changes:			
Quantity	-	-	-
Schedule	-	+ 0.9	+ 0.9
Engineering	-	-	-
Estimating	+ 2.8	+ 175.8	+ 178.6
Other	-	-	-
Support	-	-	-
SUBTOTAL	+ 2.8	+ 176.7	+ 179.5
TOTAL CHANGES	+ 2.8	+ 176.7	+ 179.5
CURRENT ESTIMATE	32.2	2479.8	2512.0

b. **Previous Change Explanation - -**

(1) RDT&E — N/A (initial report)

(2) Procurement — N/A (initial report)

(3) MILCON — None

c. Current Change Explanation - -

		(Dollars in Millions) BASE-YEAR	THEN-YEAR
(1) RDT&E			
Estimating:	Increase in Engineering Development costs.	+ 2.8	+ 3.4
(2) Procurement			
Economic:	Revised inflation indices.	N/A	+120.8
Schedule:	Change in acquisition strategy: from 1-1-1 to 0-3-0 (92-94).	+ 0.9	+ 1.2
Estimating:	Repricing based on prior year ships.	+175.8	+227.2
Support:	Decrease in outfitting and material costs.	0.0	- 0.1
(3) MILCON		None	None

14. Program Acquisition Unit Cost (PAUC) History:
(Millions of then-year dollars)

a. Initial SAR Estimate to Current Baseline Estimate - -
Same as Current Baseline Estimate.

b. Production Estimate to Current Estimate - -

PAUC Product. Estimate	Changes (Then Year Dollars in Millions)								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
405.0	+17.4	-	+ 0.2	-	+32.7	0.0	-	+50.3	455.3

15. Contract Information: (Then-Year Dollars in Millions)
Procurement

National Steel and Shipbuilding Company (NASSCO) N00024-87-C-2002 (FPI)
Award: Jan 23, 1987
Definitized: Jan 23, 1987
AOE 6,7,8

Initial Contract Price		
Target	Ceiling	Qty
281.5	319.9	1

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
711.0	800.8	3	753.3	800.8

	Cost Variance	Schedule Variance
Previous Cumulative Variance	-15.6	- 0.7
Cumulative Variance to Date (12/31/89)	-57.2	- 6.1
Net Change	-41.6	- 5.4

Explanation of Change: The variance analysis data reflects both AOE 6 and AOE 7; construction has not yet commenced on AOE 8. The increase in the cost variance is due to higher than anticipated labor rates and overhead costs.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status - -

(1) Percent Program Completed: 52.9% (9yrs/17yrs)

(2) Percent Program Cost Appropriated: 41.6% ($1325.1/$3187.3)

b. Appropriation Summary - - (Then-Year Dollars in Millions)

Appropriation	Prior Years (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-98)	Total
RDT&E	27.4	0.8	3.5	0.5	32.2
Procurement	912.3	384.6	405.5	1452.7	3155.1
Total	939.7	385.4	409.0	1453.2	3187.3

16. **Program Funding Summary:** (Current Estimate in Millions of Dollars)

c. Annual Summary: (cont.)

Fiscal Year	Qty	Sailaway FY86 Dollars		Total Base Year	Then-Year Dollars			Escal Rate %
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1982	-	-	-	2.6	2.3	2.3	2.3	7.6
1983	-	-	-	4.0	3.7	3.7	3.7	4.9
1984	-	-	-	7.9	7.6	7.6	7.6	3.8
1985	-	-	-	7.7	7.6	7.6	7.6	3.4
1986	-	-	-	4.4	4.5	4.5	4.5	2.8
1987	-	-	-	1.5	1.6	1.6	1.6	2.7
1988	-	-	-	0.1	0.1	0.1	0.1	3.0
1989	-	-	-	-	-	-	-	4.2
1990	-	-	-	0.7	0.8	-	-	4.0
1991	-	-	-	2.9	3.5	-	-	4.2
1992	-	-	-	0.4	0.5	-	-	4.0
SUBTOTAL	-	-	-	32.2	32.2	27.4	27.4	-

16. **Program Funding Summary:** (Current Estimate in Millions of Dollars)

c. Annual Summary: (cont.)

Fiscal Year	Qty	Sailaway FY86 Dollars		Total Base Year	Then-Year Dollars			Escal Rate %
		Nonrec	Rec		Pro-gram	Obli-gated	Ex-pended	
Appropriation: Procurement								
1987	1	-	-	495.4	547.0	440.9	290.2	1.5
1988	-	-	-	-	-	-	-	2.5
1989	1	-	-	304.7	365.3	301.9	47.7	2.8
1990	1	-	-	309.3	384.6	254.5	-	4.0
1991	1	-	-	315.0	405.5	-	-	4.2
1992	-	-	-	9.4	12.4	-	-	4.0
1993	3	-	-	1011.5	1388.1		-	3.7
1994	-	-	-	7.3	10.4	-	-	3.4
1995	-	-	-	5.3	7.8	-	-	3.1
1996	-	-	-	5.0	7.5	-	-	3.1
1997	-	-	-	8.4	13.0	-	-	3.1
1998	-	-	-	8.5	13.5	-	-	3.1
Subtotal	7	-	-	2479.8	3155.1	997.3	337.9	-
Total	7	-	-	2512.0	3187.3	1024.7	365.3	-

17. **Production Rate Data:** N/A

18. **Operating and Support Costs:** N/A

A-16 LONGBOW

SAR-89-100

~~SECRET~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)
"RDT&E Only SAR"
PROGRAM: LONGBOW

AS OF DATE: December 31, 1989

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1. (U) Designation and Nomenclature (Popular Name): LONGBOW (formerly Airborne Adverse Weather Weapon System (AAWWS)).

2. (U) DoD Component: Department of the Army

3. (U) Responsible Office and Telephone Number:

TADS/PNVS Project Manager
4300 Goodfellow Boulevard
St. Louis, MO 63120-1798

Colonel David R. Forville
Assigned: 5 May 1989
AV: 693-1992; Comm (314) 263-1992

CLEARED AS AMENDED
FOR OPEN PUBLICATION
MAR 22 1990 21
DIRECTORATE FOR FREEDOM OF INFORMATION
AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

4. (U) Program Elements/Procurement Line Items:

RDT&E: PE 63776 Project D472
PE 64816 Project DC27

PROCUREMENT: SSN Not Applicable

MILCON: SSN Not Applicable

(b)(1)

5. (U) Related Programs: AH-64 APACHE, HELLFIRE Modular Missile System (HMMS), and Light Helicopter (LH).

OASD(PA) DFOISR 90-T-0703/1

PROTECTIVE MARKING(S) CANCELLED WHEN SEPARATED FROM INCLOSURES

~~SECRET~~

CLASSIFIED BY: AAWWS SECURITY CLASSIFICATION GUIDE
DECLASSIFY ON: OADR

(U) Mission and Description: The LONGBOW consists of a mast mounted Fire Control Radar (FCR), which will be integrated into the AH-64 airframe, and a Radio Frequency (RF) autonomous seeker in a HELLFIRE missile. LONGBOW will provide the AH-64 and LH a true fire-and-forget capability, greatly increasing weapon system effectiveness and aircraft survivability. The weapon system will be employable day or night in adverse weather and in obscurants. HELLFIRE must effectively engage and destroy advanced threat armor on the AirLand Battlefield of the late 1990's and into the next century. To be effective and survive on this future battlefield, the attack helicopter team must rapidly engage multiple targets with minimum exposure time, and deploy a system that is inherently resistant to threat countermeasures.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- The LONGBOW program evolved from the Helicopter Adverse Weather Target Acquisition and Designation System (HAWTADS) activity initiated in 1978. Industry-wide interaction led to the initiation of the Helicopter Adverse Weather Fire Control and Acquisition Radar (HAWFCAR) program. The Applied Technology Laboratory, now the U.S. Army Aviation Applied Technology Directorate, conducted HAWFCAR competition. Martin Marietta Corporation (MMC) and Westinghouse Electric Corporation (WEC) were awarded parallel competitive technology demonstration contracts for a [redacted]FCR to be integrated and tested on the AH-64 APACHE. In late 1981, [redacted]lassified program was initiated to add an RF Seeker for HELLFIRE to the FCR yielding a total system approach for APACHE. In 1982, WEC and MMC were awarded parallel competitive contracts for the first phase, CTD.

Following the August 1985 Milestone I In-Process Review (IPR), a Joint Venture (JV) contract was awarded in November 1985 to MMC and WEC for tactical LONGBOW preliminary design. The JV was formed to take advantage of the technical expertise in the companies and to ensure competition throughout the program, i.e. these two companies will compete for award of full rate production contracts. In August 1986 a Proof of Principle (POP) demonstration contract was awarded to the JV. AATD will continue management of the POP program through Early User Test and Experimentation (EUTE), which will conclude the POP phase in March 1990.

Concurrent with POP, the engineering development program was approved in the Acquisition Decision Memorandum (ADM), 20 July 1989. A thirteen month Initial Design Phase (IDP) contract was awarded to the JV on 28 September 1989.

b. (U) Significant Developments Since Last Report -- Initial SAR. The LONGBOW system is expected to satisfy the mission requirement.

c. (U) Changes Since "As Of" Date -- None.

(U) Threshold Breaches: A DAE Baseline has not been approved for this program.

9. (U) Schedule:

a. (U) Milestones --

	Planning Estimate	Approved Program	Current Estimate
Milestone I IPR	Aug 85	N/A	Aug 85
Preliminary Design Contract Awd	Nov 85	N/A	Nov 85
Contract Award (POP)	Aug 86	N/A	Aug 86
Milestone Ib (ASARC Ib)	Jul 89	N/A	Jul 89
IDP Contract Award	Sep 89	N/A	Sep 89
DT/EUTE Start	Jan 90	N/A	Jan 90
DT/EUTE Completed	Feb 90	N/A	Feb 90
Milestone II (ASARC II)	May 90	N/A	May 90
Milestone II (Defense Acquisition Board (DAB))	Jul 90	N/A	Jul 90
Development/Production Proveout Contracts Award	Oct 90	N/A	Oct 90
Milestone IIIa (ASARC IIIa)	Oct 92	N/A	Oct 92
Low Rate Initial Production (LRIP) Contract Award (FCR)	Jul 93	N/A	Jul 93
Initial Operational Test and Evaluation (IOTE) Start	Jan 94	N/A	Jan 94
Initial Operational Test and Evaluation (IOTE) Complete	Mar 94	N/A	Mar 94
First Prod Delivery (FPD) FCR	Mar 94	N/A	Mar 94
LRIP Contract Award Seeker	Jul 94	N/A	Jul 94
Milestone III (ASARC III)	May 94	N/A	May 94
Full Rate Production (FRP) Contract Award (FCR)	Jul 94	N/A	Jul 94
FRP Contract Award (Seeker)	Jan 95	N/A	Jan 95
FPD Seeker	Jul 95	N/A	Jul 95
First Unit Equipped (FUE)	(b)(1)	N/A	(b)(1)
Initial Operational Capability (IOC)		N/A	

b. (U) Previous Change Explanations: None.

c. (U) Current Change Explanation: None.

d. (U) References:

(U) Planning Estimate: ADM, 20 July 1989. Integrated Program Summary (IPS) for LONGBOW, 15 May 1989.

(U) Approved Program: A DAE Baseline has not been approved for this program.

(U) Technical/Operational Characteristics:

a. (U) Technical --	Planning Estimate	Approved Program Goal	Demonstrated Perf 1/	Current Estimate
Fire Control Radar (FCR)				
False Alarms (alarms per scans)	(b)(1)			
Search Time (@ 90 deg scan/@ 6-8 k				
Weight (uninstalled)	350 lbs.	N/A	N/A	350 lbs.
Seeker	(b)(1)			
Prob of Hit				
Prob of Kill				
Prob of Acquisition				
Weight	17 lbs.	N/A	N/A	17 lbs.

b. (S) Operational --	Planning Estimate	Approved Program Goal	Demonstrated Perf 1/	Current Estimate
Fire Control Radar (FCR)				
Reliability (Hrs)				
Mean Time Between Failure (MTBF)	170	N/A	N/A	170
Mean Time Between Mission Affecting Failures (MTBMAF)	142	N/A	N/A	142
Mean Time To Repair (MTTR)				
Aviation Unit Maintenance (AVUM)	.30	N/A	N/A	.30
Depot	2.0	N/A	N/A	2.0
Seeker				
Reliability	.95	N/A	N/A	.95
LONGBOW System (S)	(b)(1)			
Operational Avail				

1/ Values to be demonstrated initially during Proof of Principle (POP) testing.

c. (U) Previous Change Explanations: None.

d. (U) Current Change Explanations: None.

e. (U) References:

(U) Planning Estimate: ADM, 20 July 1989. IPS 15 May 1989.

LONGBOW, December 31, 1989

(U) Technical/Operational Characteristics (Cont'd):

(U) Approved Program: A DAE Baseline has not been approved for this program.

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Planning Estimate	Approved Program	Current Estimate
a. (U) Cost --			
Development (RDT&E)	$693.8	N/A	$693.8
Total FY 90 Base Year$	693.8	N/A	693.8
Escalation	12.4	N/A	12.4
Development (RDT&E)	(12.4)	N/A	(12.4)
Total Then-Year $	$706.2	N/A	$706.2
b. (U) Quantities --			
Development(RDT&E)			
FCR (FSED)	9	N/A	9
Seekers			
(All Up Rounds (AUR))	87	N/A	87
(Seeker only)	26	N/A	26
(Launch Transient)	8	N/A	8

c. (U) Foreign Military Sales -- None.

(U) Nuclear Costs -- None.

e. (U) References:

(U) Planning Estimate: FY 1991 Budget Estimate, 29 Jan 1990.

(U) Approved Program: A DAE Baseline has not been approved for this program.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions):

NOTE: In accordance with Title 10, U.S.C. 2433, unit cost reporting shall not apply to reports that are limited to development (RDT&E) program.

Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions):

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	706.2			706.2
Previous Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0.0			0.0
Current Changes				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0.0			0.0
al Changes	0.0			0.0
rent Estimate	706.2			706.2

(FY 1990 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	693.8			693.8
Previous Changes:				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0.0			0.0
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0.0			0.0
Total Changes	0.0			0.0
Current Estimate	693.8			693.8

( ) Program Acquisition Unit Cost (PAUC) History: Not Required.

15. ( ) Contract Information: (Then-Year Dollars in Millions)

( ) RDT&E --

Proof of Principle	Initial Contract Price Target	Ceiling	Qty
Joint Venture (Martin Marietta Corp./ Westinghouse Electric Corp.) Orlando, FL DAAJ09-86-C-A335, CPAF Award: 6 August 1986 Definitized: 6 August 1986	$176.4	N/A	N/A

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$224.4	N/A	N/A	$235.8	$241.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date	(1.3)	(2.4)
Net Change	(1.3)	(2.4)

Initial Design Phase	Initial Contract Price Target	Ceiling	Qty
Joint Venture (Martin Marietta Corp./ Westinghouse Electric Corp.) Orlando, FL DAAJ09-89-C-0403, CPFF Award: 28 September 1989 Definitized: 28 September 1989	$92.3	N/A	N/A

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$92.3	N/A	N/A	$92.3	$92.3

	Cost Variance	Schedule Variance 1/
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date	0	0
Net Change	0	0

1/ CPR reporting for this contract will begin in April 1990.

LONGBOW, December 31, 1989

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status --

(1) (U) Percent Program Completed: 66.7% (6 yrs/9 yrs)

(2) (U) Percent Program Cost Appropriated: 54.8% (387.3/706.2)

b. (U) Appropriation Summary --

(Then Year Dollars in Millions)

Appropriation	Prior Years (FY 85-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-93)	Total
RDT&E	$291.1	96.2	159.1	159.8	$706.2

6. (U) Program Funding Summary (Cont'd):

c. (U) Annual Summary --

Fiscal Year	Qty 1/	Flyaway FY90 Dollars		Total Base Year $	Total Then-Year $			Escl Rate %
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1985				16.9	14.7	14.7	14.7	2.6
1986				33.7	30.2	30.2	30.2	2.6
1987				84.4	77.6	77.6	77.6	2.7
1988			5.0	87.4	83.0	83.0	82.8	3.0
1989				86.7	85.6	85.4	56.4	4.2
1990				93.7	96.2	56.2	.1	4.0
1991			2.8	148.8	159.1			4.2
1992			2.8	88.1	97.7			4.0
1993				54.1	62.1			3.7
TOTAL	9		10.6	693.8	706.2	347.1	261.8	

16. (U) Program Funding Summary (Cont'd):

1/ Number of prototype airframes. Prototype FCRs = 9 (plus 4 in POP); Prototype Seekers = 87 All Up Rounds (AUR) plus 26 Seeker only configurations, plus 8 Launch Transients.

17. (U) Production Rate Data. Not Applicable.

18. (U) Operating and Support (O&S) Costs. Not Applicable.

A-10 FAADS LOS-R

SAR-89-104

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: FORWARD AREA AIR DEFENSE SYSTEM (FAADS) AVENGER (LOS-R)

AS OF DATE: December 31, 1989

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1. (U) **Designation and Nomenclature (Popular Name):** Forward Area Air Defense System (FAADS) Line of Sight-REAR (LOS-R); Avenger (Pedestal Mounted Stinger)

2. (U) **DoD Component:** Department of the Army

3. (U) **Responsible Office and Telephone Number:**

STINGER Project Office
Air Defense Program Executive Ofc
Redstone Arsenal, AL 35898-5750

Project Manager: George B. Reed, Jr.
COL, AD
Assigned: November 15, 1988
Autovon: 746-6191
Commercial: (205) 876-6191

4. (U) **Program Elements/Procurement Line Items:**

RDT&E:	PE 64306A	Project D646 (LOS-R/AVENGER) (Shared Funding)
PROCUREMENT:	APPN 2032	SSN CA0260 Initial Spares
	APPN 2032	SSN C16000 (LOS-R/AVENGER) (Superseded C9803)
	APPN 2032	SSN C18500 (LOS-R/AVENGER) (Shared Funding)
MILCON:	None	

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DEPARTMENT OF DEFENSE

5. (U) **Related Programs:** Line of Sight-Forward-Heavy; Non-Line of Sight; Forward Area Air Defense Command, Control, and Intelligence; STINGER Reprogrammable Microprocessor.

(b)(1)

OASD(PA) DFOISR 90-T-0703

Classified By: LOS-R SCG
Declassify On: OADR September 29, 1989

~~CONFIDENTIAL~~

. (U) **Mission and Description**: The FAADS encompasses an integrated air defense program to meet the growing air threat to the forward area of the battlefield through the 1990's. The FAADS provides total coverage in the division area which permits the enemy no preferred attack option. The FAADS LOS-R component is AVENGER. The AVENGER (LOS-R) system is a lightweight, highly mobile and transportable surface-to-air missile/0.50 caliber machine gun system. It is operated by a two man crew for defense against helicopters and fixed-wing aircraft at low altitude in day or night operations and in clear or adverse weather. The system is mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV) and incorporates an operator's position with controls and displays, fire control electronics and a Standard Vehicle Mounted Launcher (SVML) (including seeker coolant bottles and related hardware) to support and launch multiple STINGER missiles. The SVML provides output signals that shall be used to display to the gunner exactly where the STINGER missile is pointed. This driven sight reticle capability aids the gunner in severe background clutter and electronic counter-measure (ECM) environments. The system interfaces and functions with standard unmodified Basic STINGER, STINGER-POST, and STINGER-RMP missile rounds. The AVENGER incorporates a 0.50 caliber machine gun to provide virtual attrition/suppression of threat aircraft operation, ranging from degradation of ordnance delivery accuracy to total abort of mission.

(U) The LOS-R Fire Unit (FU) provides man machine interface to maximize STINGER missile operational effectiveness in the threat environment. The LOS-R FU includes subsystems necessary for an operator to conduct an engagement sequence (detect, acquire, identify, track, and fire) against hostile aircraft with either the missile or the machine gun.

7. (U) **Program Highlights**:

a. (U) Significant Historical Developments -- A production contract was awarded to the Boeing Company in August 1987. This contract provided for the production of 20 LOS-R units in conjunction with other support efforts such as Product Assurance, Configuration Management, Test and Evaluation, and Logistics Planning. Option II of the contract was awarded in March 1988 for 39 units.

b. (U) Significant Developments Since Last Report --

(U) A Decision Coordinating Paper (DCP) has been drafted in support of the Defense Acquisition Board (DAB) Milestone IIIB decision necessary for the Full-Rate Production phase of the AVENGER (LOS-R) weapon system. The U.S. Army Missile Command (MICOM) Materiel Acquisition Review Board (MARB) package was approved November 28, 1989 and the preliminary Army Systems Acquisition Review Council (Pre-ASARC) was convened on November 30, 1989. Final draft documents in support of the ASARC were delivered to HQDA on December 20, 1989. The 1988 annual SAR submission rebaselined the SAR from a Planning Estimate to a Production Estimate.

(U) The LOS-R system is expected to satisfy the mission requirements.

c. (U) Changes Since "As of" Date -- Final draft documents in support of the DAB were delivered to HQDA on January 8, 1990.

8. (U) **Threshold Breaches**: There are no breaches to the DAE approved Baseline, dated March 2, 1989.

9. (U) **Schedule**:

a. (U) Milestones --

	Production Estimate	Approved Program	Current Estimate	
Joint Requirements Mgt Board	Jan 86	Jan 86	Jan 86	
Milestone IIIA	Mar 86	Mar 86	Mar 86	
Nondevelopment Item Candidate Evaluation (NDICE) Started	Nov 86	Nov 86	Nov 86	
Type Classified - Limited Production Urgent (LPU)	Apr 87	Apr 87	Apr 87	
NDICE Completed	Jul 87	Jul 87	Jul 87	
Initial Production Contract Award Option I	Aug 87	Aug 87	Aug 87	
Contract Award - Option II	Mar 88	Mar 88	Mar 88	
Force Development Test & Experimentation (FDTE) I Started	May 88	May 88	May 88	
FDTE I Completed	Jun 88	Jun 88	Jun 88	
Test and Evaluation Master Plan (TEMP) Approved (Army)	Jul 88	Jul 88	Jul 88	
Type Classified - LPU Extension	Sep 88	Sep 88	Sep 88	
Initial Prod Deliveries Start	Nov 88	Nov 88	Nov 88	
Contract Award Option III (FY89)	Dec 88	Dec 88	Dec 88	
FDTE II Start	Feb 89	Feb 89	Feb 89	
FDTE II Completed	Mar 89	Mar 89	Mar 89	
Production Qualification Test (PQT) Start	Mar 89	Mar 89	Mar 89	
Initial Operational Test & Evaluation (IOT&E) Start	Apr 89	Apr 89	Apr 89	
First Unit Equipped (FUE)-FORSCOM	Apr 89	Apr 89	Apr 89	
Option II Deliveries Start	Jul 89	Jul 89	Jul 89	
IOT&E Complete	Aug 89	Aug 89	Sep 89	(CH-1)
PQT Complete	Sep 89	Sep 89	Dec 89	(CH-1)
Type Classified-Standard	Nov 89	Nov 89	Feb 90	(CH-2)
Milestone IIIB	Dec 89	Dec 89	Mar 90	(CH-2)
Contract Award-Option IV (FY90)	Dec 89	Dec 89	May 90	(CH-3)
Option III Deliveries Start	Apr 90	Apr 90	Apr 90	
Contract Award-Option V (FY91)	Nov 90	Nov 90	Nov 90	
FUE-USAREUR	Feb 91	Feb 91	Jun 91	(CH-4)
Option IV Deliveries Start	Apr 91	Apr 91	Jul 91	(CH-3)
Option V Deliveries Start	Mar 92	Mar 92	Mar 92	
FUE-EUSA	Jun 92	Jun 92	Jun 92	
FUE-WESTCOM	Apr 96	Apr 96	Apr 96	
FUE-ARNG	Aug 96	Aug 96	Aug 96	

9. [illegible] **Schedule**: **(Continued)**

b. [illegible] Previous Change Explanations -- None.

c. [illegible] Current Change Explanations --

(CH-1) The IOT&E Complete changed from August 1989 to September 1989 and the PQT Complete changed from September 1989 to December 1989 to accommodate test activity Master Schedules.

(CH-2) The Type Classified-Standard changed from November 1989 to February 1990 and the Milestone IIIB changed from December 1989 to March 1990 to accommodate completion of operational and technical tests.

(CH-3) The Contract Award-Option IV (FY90) for Full Scale Production was delayed from December 1989 to May 1990 and the Option IV Deliveries Start was delayed from April 1991 to July 1991 to accommodate the Milestone IIIB decision.

(CH-4) The FUE-USAREUR was changed from February 1991 to June 1991 due to slippage in procurement of 30 additional fire units from FY 89 to FY 90 to obtain a more favorable price for the government.

d. [illegible] References --
Production Estimate: DAE approved Baseline dated March 2, 1989.
Approved Program: DAE approved Baseline dated March 2, 1989.

10. [illegible] **Technical/Operational Characteristics**:

a. [illegible] Technical --

	Prod Est	Approved Program Goal/Threshold	Demo[1] Perf	Cur Est
[illegible] Number of Stinger Missiles	(b)(1)			
[illegible] Range of Predicted Fire Weapons (Km)				
[illegible] Fire Unit full reload time (day, MOPP O) (Min				
[illegible] FLIR Detection Range:				
[illegible] Under Standard 23km meterological visibility				
Fixed-Wing (Km)				
Rotary-Wing (Km)				
[illegible] Climatic Operating range (includes solar radiation) (°F)	-25 to 140	-25 to 140/ -25 to 140		-25 to 140

/1 Performance demonstrated during IOT&E.

10. [illegible] Technical/Operational Characteristics: (Continued)

	Prod Est	Approved Program Goal/Threshold	Demo/1 Perf	Cur Est	
[illegible] Remote Operation (M)	50	50/50	50	50	
[illegible] Laser Range Finder:					
[illegible] Min range (Km)					
[illegible] Max Range (Km)					

(b)(1) [redacted]

b. [illegible] Operational --

[illegible] Availability:

[illegible] Fire Unit --

[illegible] Operational availability (Ao) with ALDT of 7 hrs	.71	.71/.71	.83	.71	
[illegible] MTBOMF (hrs)	45	45/45	31	45	
[illegible] MTTR ORG (hrs)	1.5	1.5/1.5	.40	.40	(CH-1)
[illegible] MTTR above ORG (hrs)	3	3/3	3	3	

[illegible] Weapon Subsystem --

[illegible] Operational availability (Ao) with ALDT of 7 hrs	.89	.89/.89	.90	.89	
[illegible] MTBOMF (hrs)	54	54/54	57	54	
[illegible] MTTR ORG (hrs)	1.5	1.5/1.5	.37	.37	(CH-1)
[illegible] MTTR above ORG (hrs)	3	3/3	3	3	

[illegible] Abbreviations Used:
ALDT = Administrative and Logistics Down Time
MTBOMF = Mean Time Between Operational Mission Failures
MTTR ORG = Mean Time to Repair at Organizational Level
MTTR above ORG = Mean Time to Repair above Organizational Level

[illegible] The STINGER missile must be capable of being fired both in MANPAD and LOS-R configuration. STINGER missile performance must not be degraded in either configuration.

c. [illegible] Previous Change Explanations -- None

d. [illegible] Current Change Explanations --

[illegible] (CH-1) Number of STINGER Missiles changed from (b)(1) [redacted] MTTR ORG changed from 1.5 hrs to .40 hrs, and MTTR changed from 1.5 hrs to .37 hrs to reflect demonstrated performance.

e. [illegible] References --
Production Estimate: DAE approved Baseline, dated March 2, 1989.
Approved Program: DAE approved Baseline, dated March 2, 1989.

/1 Performance demonstrated during IOT&E.

11. [redacted] **Program Acquisition Cost:** (Current Estimate in Millions of Dollars)

	Production Estimate	Approved Baseline	Current Estimate
a. Cost --			
Development (RDT&E)	$ 13.3	$ 13.3	$ 13.3
Procurement	1089.8	1089.8	1053.6
Total Rollaway	(1011.7)	(1011.7)	(939.3)
Initial Spares	(78.1)	(78.1)	(114.3)
Construction (MILCON)	0.0	0.0	0.0
Total FY 89 Base Year $	1103.1	1103.1	1066.9
Escalation	163.6	163.6	222.0
Development (RDT&E)	(-0.5)	(-0.5)	(-0.5)
Procurement	(164.1)	(164.1)	(222.5)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Total Then-Year $	$ 1266.7	$ 1266.7	$ 1288.9
b. Quantities (Fire Units) --			
Development (RDT&E)	0	0	0
Procurement	1207	1207	1207
Total	1207	1207	1207

c. ([redacted]) Foreign Military Sales -- None

d. ([redacted]) Nuclear Costs -- None

e. ([redacted]) References --
Production Estimate: FY 1990-1991 President's Budget and DAE approved Baseline dated March 2, 1989.
Approved Program: DAE approved Baseline dated March 2, 1989

12. [redacted] **Program Acquisition/Current Procurement Unit Cost Summary:** (Current (Then Year) Dollars in Millions)

	Current Est	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition --	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	$1,288.9	$1,266.7	$1,288.9
(2) Quantity	1207	1207	1207
(3) Unit Cost	$1.07	$1.05	$1.07
b. Current Procurement --	(FY 90)	(FY 90 APPN)	(FY 91)
(1) Cost	$122.4	$122.4	$123.1
Less CY Adv Proc	0.0	0.0	-25.7
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	$122.4	$122.4	$97.4
(2) Quantity	122	122	88
(3) Unit Cost	$1.00	$1.00	$1.11

13. (U) **Cost Variance Analysis:**

a. (U) Summary -- (Current (Then-year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	12.8	1253.9	0.0	1266.7
Previous Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0.0	0.0	0.0	0.0
Current Changes:				
Economic		+72.5		+72.5
Quantity				
Schedule		+2.8		+2.8
Engineering				
Estimating		-97.4		-97.4
Other				
Support		+44.3		+44.3
Subtotal	0.0	+22.2	0.0	+22.2
Total Changes	0.0	+22.2	0.0	+22.2
Current Estimate	12.8	1276.1	0.0	1288.9

(FY 89 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	13.3	1089.8	0.0	1103.1
Previous Changes:				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0.0	0.0	0.0	0.0
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating		-72.5		-72.5
Other				
Support		+36.3		+36.3
Subtotal	0.0	-36.2	0.0	-36.2
Total Changes	+0.0	-36.2	0.0	-36.2
Current Estimate (FY89$)	13.3	1053.6	0.0	1066.9

13. (U) Cost Variance Analysis: (Continued)

b. (U) Previous Change Explanations -- None.

c. (U) Current Change Explanations --

(1) RDT&E -- None.

	(Dollars in Millions) Base-Year	Then-Year
(2) PROCUREMENT		
Revised escalation indices (Economic).	NA	+72.5
Increase cost for change in schedule of buy quantities (Schedule).	-----	+2.8
Revised estimate (Estimating)	-72.5	-97.4
o Refinement of outyear cost estimate beyond FYDP.	(-69.9)	(-94.5)
o Adjustment for current and prior inflation offset.	(-2.6)	(-2.9)
Increase in funding for initial spares (Support).	+36.3	+44.3

14. (U) Program Acquisition Unit Cost (PAUC) History:
(Millions of Then-Year Dollars)

a. (U) Planning Estimate to Production Estimate --

PAUC *(Cur Est Dec 87)	Changes								PAUC (Prod Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1.057	-.002	--	+.021	--	-.027	--	+.001	-.007	1.050

* First SAR reporting quantities (December 31, 1987)

b. (U) Production Estimate to Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1.050	+.060	--	+.002	--	-.081	--	+.037	+.018	1.068

15. [redacted] **Contract Information**: (Then-Year Dollars in Millions)

a. ([redacted]) RDT&E -- None

b. ([redacted]) Procurement --

Avenger (LOS-R):

Boeing Aerospace Company Huntsville, AL	Initial Contract Price Target	 Ceiling	 Qty
DAAH01-86-C-A077, FFP[1]	$42.6	NA	59

Award: Aug 87 (Option II--Mar 88)
Definitized: Aug 87 (Option II -- Mar 88)

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$99.6	NA	129	$99.6	$99.6

Note: Cost Performance Report (CPR) data is not required on Firm Fixed Price (FFP) contracts.

c. [redacted] MILCON -- None

1 FY 87/88 production buys

16. [redacted] **Program Funding Summary**: (Cur Estimate in Millions of Dollars)

a. [redacted] Program Status --

(1) Percent Program Completed: 41.7% (5/12)

(2) Percent Program Cost Appropriated: 26.3% (339.3/1288.9)

b. [redacted] Appropriation Summary --

Appropriation	Current & Prior Yrs (FY86-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY 92-97)	Total
RDT&E	12.8	0.0	0.0	0.0	12.8
Procurement	204.1	122.4	123.1	826.5	1276.1
MILCON	0.0	0.0	0.0	0.0	0.0
Total	216.9	122.4	123.1	826.5	1288.9

16. (U) **Program Funding Summary: (Continued)**

c. (U) Annual Summary --

FISCAL YEAR	QTY	FY 89 BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESCL RATE %
		ROLLAWAY		TOTAL	Program	Obli-gated	Ex-pended	
		NONREC	REC					
APPROPRIATION: RDT&E								
1986				4.5	4.2	4.2	3.9	2.8
1987				2.8	2.7	1.8	1.6	2.7
1988				6.0	5.9	5.9	4.2	3.1
SUBTOTAL	0			13.3	12.8	11.9	9.7	
APPROPRIATION: PROCUREMENT								
1987	20		36.5	41.2	41.2	36.9	33.4	2.7
1988	39		43.8	62.0	64.1	43.8	24.3	3.0
1989	100		85.9	92.0	98.8	62.3	14.3	4.2
1990	122		102.1	109.5	122.4			4.0
1991	88		106.2	106.2	123.1			4.2
1992	144		132.0	132.0	158.4			4.0
1993	144		114.9	139.4	172.6			3.7
1994	144		72.5	125.9	160.8			3.4
1995	140		57.8	57.8	76.1			3.1
1996	133		95.2	95.2	129.3			3.1
1997	133		92.4	92.4	129.3			3.1
SUBTOTAL	1207		939.3	1053.6	1276.1	143.0	72.0	
TOTAL	1207		939.3	1066.9	1288.9	154.9	81.7	

Fiscal Year 1987 procurement funds ($41.2M) shared with STINGER (SSN C18500). All RDT&E funds are shared with STINGER (PE 64306A, Project D646 and Project D524).

17. [redacted] **Production Rate Data**:

a. [redacted] Annualized Production Rates -- Based on a 1-8-5 production schedule. The Annual production rates differ from the annual funded quantities as shown because the funded delivery period for Fiscal Year 1989 is 16 months, and for Fiscal Year 1991 is 8 months. Quantities reflected in Fiscal Years 1987 and 1988 are actuals.

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1987	N/A	20	20	20
1988	N/A	39	39	39
1989	N/A	100	88	100
1990	N/A	122	106	122
1991	N/A	132	132	144
1992	N/A	132	144	144
1993	N/A	132	144	144
1994	N/A	132	144	144
1995	N/A	132	140	144
1996	N/A	133	133	144
1997	N/A	133	133	144

b. [redacted] Cost Variance -- Dollars in Millions

ITEM	Production Estimate	Variance (CE Less PDE)	Current Estimate	Variance (CE Less MAX)	Maximum Economic
Prog Acq Cost (BY $)	1,103.1	-36.2	1,066.9	+74.1	992.8
(TY $)	1,266.7	+22.2	1,288.9	+133.5	1,155.4
PAUC (BY $)	0.914	-0.030	0.884	+0.061	0.823
(TY $)	1.050	+0.018	1.068	+0.111	0.957

c. [redacted] Schedule Variance --

	Production Estimate	Variance (CE Less PDE)	Current Estimate	Variance (CE Less MAX)	Maximum Economic
Start Date (Mo/Yr)	8 / 87	0	8 / 87	0	8 / 87
Duration (In Months)	140	0	140	+1	139
End Date (Mo/Yr)	4 / 99	0	4 / 99	+1	3 / 99

d. [redacted] Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
Procurement	38/40

e. [redacted] Approved Design to Cost Goal -- Since LOS-R consists primarily of off-the-shelf Non-Developmental Items (NDI), Design-to-Cost Goals are not applicable.

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules -- Operating and support costs are included for 1207 AVENGER (LOS-R) fire units including training base, floats and spares. OPTEMP is 1481 kilometers per year. Twenty full-up years, plus ramp up are costed for the fire units. Military personnel costs included two crew members per fire unit, maintenance personnel, and support personnel. O&M costs include all fielding costs, replenishment and replacement parts, petroleum, oil and lubricants, ammunition, depot maintenance material and labor, field maintenance labor, transportation, personnel replacement training, military personnel direct charges, project management and modification kits. Source: BCE excursion dated December 1989.

b. (U) Costs -- Annual cost per LOS-R Fire Unit is $199K in Fiscal Year 1989 constant dollars.

	per LOS-R Fire Unit
Personnel	0.154
O&S Consumables	0.016
Direct Depot Maintenance	0.016
Sustaining Investment	0.003
Other Direct Costs	0.003
Indirect Costs	0.007
Total	0.199

c. (U) Contractor Support Costs -- (Current (Then-Year) Dollars in Millions)

Funding	FY 1989 & Prior	FY1990	FY1991	Balance To Complete	Total
O&M	0.5	0.7	2.0	0.0	3.2
Industrial Fund	0.0	0.0	0.0	0.0	0
Total	0.5	0.7	2.0	0.0	3.2

A-11 FAADS NLOS

SAR-89-103

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: FORWARD AREA AIR DEFENSE SYSTEM (FAADS)
NON-LINE OF SIGHT (NLOS) FIBER OPTIC GUIDED MISSILE (FOG-M)

AS OF DATE: December 31, 1989

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1. (U) **Designation and Nomenclature (Popular Name):** Forward Area Air Defense System (FAADS) Non-Line of Sight (NLOS) Fiber Optic Guided Missile System (FOG-M)

2. (U) **DoD Component:** Department of the Army

3. (U) **Responsible Office and Telephone Number:**

Non-Line of Sight Project Office
Air Defense Program Executive Ofc
Redstone Arsenal, AL 35898-5750

Project Manager: COL Oleh B. Koropey
Assigned: July 1, 1987
Autovon: 746-7725
Commercial: (205) 876-7725

4. (U) **Program Elements/Procurement Line Items:**

RDT&E:	PE 63757A	Project D465 (NLOS)
	PE 64810A	Project DC26 (FOG-M ED)
PROCUREMENT:	APPN 2032	SSN HO3100 (NLOS System)
	APPN 2032	SSN CA0263 (Initial Spares)
MILCON:	None	

AS AMENDED

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MAR 23 1990
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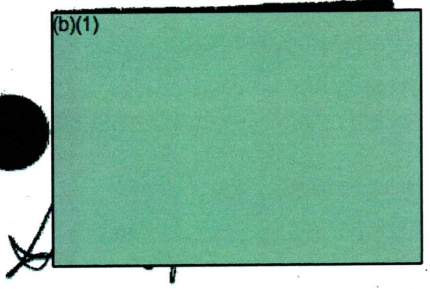
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

5. (U) **Related Programs:** Combined Arms; Line of Sight-Forward-Heavy; Line of Sight-Rear; and Forward Area Air Defense Command, Control, and Intelligence.

(b)(1)



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CLASSIFIED BY: NLOS (FOG-M) SCG, August 7, 1989
DECLASSIFY ON: OADR

OASD(PA) DFOISR 90-T-0703

6. (U) **Mission and Description**: The Fiber Optic Guided-Missile (FOG-M) system is the Non-Line Of Sight (NLOS) system element of the Forward Area Air Defense System (FAADS). The FOG-M system consists of a multiple missile launcher and fire control ground station mounted on either a light or heavy vehicle fully compatible with light or heavy divisions. The light system is transportable by C-130, C-141, or CH-47D. As part of the FAAD system, it will provide air defense protection to the maneuver force against masked, stand-off rotary-wing aircraft. In addition, the NLOS system will provide fully adequate anti-armor capability against threat armor well beyond the maximum range of tank main guns or direct fire anti-tank missiles. Other potential uses include hard point targets, fortifications and surgical strikes against bridges and buildings. It will have a night/adverse weather capability and utilize an on-board passive sensor which will allow the fire unit to autonomously acquire targets. The NLOS system will be fielded as a defensive weapon system, and thus will not be counted in the Conventional Forces Europe (CFE) totals.

(U) The NLOS system will permit a safely concealed and protected gunner to engage both fixed and moving targets to extended ranges, even when the targets are in defilade or concealed positions. NLOS survivability is enhanced due to stand off targeting, the non-ballistic missile flight path, and the ability to launch from hidden positions. The gunner locates targets by viewing on a video screen what the missile imaging seeker (either television [TV] or Imaging Infrared [IIR]) sees as the missile cruises at low altitudes below cloud ceilings. The image is transmitted from the missile through a fiber optic datalink to a gunner located on the ground. Simultaneously, guidance commands are transmitted to the missile on the same optical fiber from the ground computer located in the gunner station.

7. (U) **Program Highlights**:

a. (U) Significant Historical Developments -- July 29, 1986, the Joint Requirements & Management Board (JRMB) approved the concept for execution of the overall FAAD program as a system of systems. A draft Request for Proposal (RFP) for Full Scale Development of NLOS (FOG-M) was released to industry in December 1986. After a review by the Conventional Systems Committee of the Defense Acquisition Board (DAB) in October 1987, the final RFP was released in November 1987. The Army provided a detailed briefing to the DAB on August 4, 1988, which was a Milestone II Decision Review. An Acquisition Decision Memorandum (ADM) approving the Acquisition Strategy (AS), to include Advance Procurement, as well as authority to proceed into Full Scale Development (FSD) was approved on September 23, 1988. The FSD contract was awarded December 14, 1988. The December 1988 SAR rebaselined NLOS from a Planning Estimate to a Development Estimate.

b. (U) Significant Developments Since Last Report -- The Operational Test and Evaluation Agency (OTEA) announced that the Initial Operational Evaluation (IOE) missile firing program at White Sands Missile Range (WSMR) was successfully completed on September 16, 1989. OTEA and AMSAA are currently evaluating test data before submission of their final reports. Additionally, Extended User Employment (EUE) flight testing was completed December 15, 1989.

(U) The FAADS, to include the NLOS component, is expected to satisfy mission requirement.

7. (U) **Program Highlights (Cont.)**:

c. (U) Changes Since "As of" Date -- The President's Budget submitted January 1990 does not fund the procurement program but continues to fund the development program.

8. (U) **Threshold Breaches**: There are currently no threshold breaches to the AAE Baseline approved February 26, 1990.

9. (U) **Schedule (cont)**:

a. (U) Milestones

	Development Estimate	Approved Program	Current Estimate	
(U) RFP Release	Nov 87	Nov 87	Nov 87	
(U) Milestone II (DAB)	Aug 88	Aug 88	Aug 88	
(U) Start Initial Operational Evaluation (IOE)	Nov 88	Nov 88	Nov 88	
(U) FSD Contract Award	Dec 88	Dec 88	Dec 88	
(U) End IOE	Aug 89	Sep 89	Sep 89	(Ch-1)
(U) Start Extended User Employment (EUE)	Sep 89	Sep 89	Sep 89	
(U) Advance Procurement LRIP (LLI)	May 90	N/A	N/A	(Ch-4)
(U) Start Engineering Development Test-Contractor (EDT-C)	Nov 90	Nov 90	Nov 90	(CH-3)
(U) End EUE	Sep 91	Jun 91	Oct 90	(Ch-2)
(U) End EDT-C	Jul 91	Jul 91	Jul 91	(Ch-3)
(U) Milestone IIIA (DAB)	Jul 91	N/A	N/A	(Ch-4)
(U) Contract Award LRIP	Jul 91	N/A	N/A	(Ch-4)
(U) Start Force Development Test and Experimentation (FDT&E) I	Sep 91	Sep 91	Oct 91	(Ch-3)
(U) End FDT&E I	Oct 91	Oct 91	Dec 91	(Ch-3)
(U) Start Early User Test and Evaluation (EUT&E)	Jan 92	Jan 92	Jan 92	
(U) End EUT&E	Mar 92	Mar 92	Mar 92	
(U) First Unit Equipped (FUE)	Aug 93	N/A	N/A	(Ch-4)
(U) Start FDT&E II	Jul 93	Jul 93	Mar 93	(Ch-3)
(U) End FDT&E II	Sep 93	Sep 93	May 93	(Ch-3)
(U) Start Live Fire Vulnerability/ Lethality (VUL/LETH)	Sep 93	Sep 93	Feb 93	(Ch-3)
(U) Start Initial Operational Test & Evaluation (IOT&E)	Oct 93	Oct 93	Jul 93	(Ch-3)
(U) End VUL/LETH	Nov 93	Nov 93	Sep 93	(Ch-3
(U) End IOT&E	Dec 93	Dec 93	Dec 93	
(U) Milestone III (DAB) Full Scale Production (FSP)	Jan 94	N/A	N/A	(Ch-4)
(U) FSP Contract Award	Mar 94	N/A	N/A	(Ch-4)
(C) Initial Operational Capability (IOC)	(b)(1)	N/A	N/A	(Ch-4)
(U) First FSP Delivery	Sep 95	N/A	N/A	(Ch-4)

9. Schedule (cont):

b. (U) Previous Change Explanations -- None

c. (U) Current Change Explanations --

(Ch-1) Changed from August 1989 (previous SAR incorrectly stated August 1988) to September 1989 to reflect completion date. Delay was a result of range priorities at White Sands Missile Range (WSMR) in which facilities and test instrumentation were used for higher priority FAADS and SDI programs.

(CH-2) Changed from September 1991 to October 1990 due to accomplishment of technical objectives.

(Ch-3) Restructuring of program testing for consistency to budget changes. The following milestones were affected:

Start FDTE I changed from September 1991 to October 1991
End FDTE I changed from October 1991 to December 1991.
Start FDTE II changed from July 1993 to March 1993.
End FDTE II changed from September 1993 to May 1993.
Start VUL/LETH changed frm September 1993 to February 1993.
Start IOT&E changed from October 1993 to July 1993.
End VUL/LETH changed from November 1993 to September 1993.
The title of Engineering Development Test-Contractor/Government Operational Analysis (EDT-C/GOA) was changed to Engineering Development Test-Contractor (EDT-C) because Procurement Funding was deleted.

(Ch-4) In the FY 90 budget the procurement program was unfunded thereby causing all production related milestones to be changed from the Development estimate specified dates to NA.

d. (U) References --

Development Estimate: Draft DAE Baseline; FY 90-91 President's Budget dated January 1989.
Approved Program: AAE Baseline approved February 26, 1990

10. (U) **Technical/Operational Characteristics:**

a. (U) Technical --

	Dev Est	Approved Program Goal/Threshold /1	Demo Perf	Current Estimate /1
(S) PSSK: /2		(b)(1)		
Tank				
Helo				
(S) Range (km)				
Max Eff				
Min Eff				
(U) Environmental Operations	-25°F to 120°F	-50°F to 120°F/ -25°F to 120°F		-25°F to 120°F
(U) Missile Speed (Variable) (mps)	150-200	200/150		150 (CH-1)
(U) Missile Required:				
Light	6	8/6		6
Heavy	12	24/12		12

b. (U) Operational --

(S) Multiple MSL Engage (b)(1)

(U) Reload Time (min):			
Normal	30	20/30	30
NBC Adverse Weather, Night	45	30/45	45

(S) Opn Time Lines (b)(1)
Emplacement (min)
March Order (sec)

/1 It is planned that ROC requirements will be met at IOC plus two years. At that time adequate testing and correction of deficiencies will occur in order to achieve these requirements. Progressive growth through the development program is stated via separate documents (i.e., TEMP & Performance Growth Plan).

/2 Probability Single Shot Kill (PSSK) values are based on target description in MICOM system specification number 40920, amendment 01, October 11, 1987.

10. (U) Technical/Operational Characteristics (Cont.):

	Dev Est	Approved Program Goal/Threshold /1	Demo Perf	Current Estimate /1
(U) Mean Time Between Unscheduled Maint. Actions (MTBUMA)				
Heavy Firing Unit (HFU)	89 hrs	131 hrs/89 hrs		89 hrs
Light Firing Unit (LFU)	90 hrs	133 hrs/90 hrs		90 hrs
(U) Mean Time to Repair - UNIT (MTTR-UNIT)				
HFU	2.5 hrs	1.5 hrs/2.5 hrs		2.5 hrs
LFU	2.5 hrs	1.5 hrs/2.5 hrs		2.5 hrs

(U) Missile Storage Reliability - The preflight reliability shall not degrade below 95% for the first 5 years of storage and shall not degrade more than 0.5% per year for the next 5 years of storage.

c (U) Previous Change Explanations -- None

d. (U) Current Change Explanations --

(Ch-1) Values were changed from a range value of 150-200 mps to 150 mps to align with the AAE Baseline threshold approved February 1990.

(U) References --

Development Estimate: Draft DAE Baseline; FY 90-91 President's Budget dated January 1989
Approved Program: AAE Baseline approved February 26, 1990

/1 It is planned that ROC requirements will be met at IOC plus two years. At that time adequate testing and correction of deficiencies will occur in order to achieve these requirements. Progressive growth through the development program is stated via separate documents (i.e., TEMP & Performance Growth Plan).

11. (U) **Program Acquisition Cost**: (Cur Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Cur Estimate
a. (U) Cost --			
Development (RDT&E)	535.7	591.1	591.1
Procurement	1984.0	0.0	0.0
Flyaway Cost	(1794.4)	0.0	0.0
Other Weapon System Cost	(138.3)	0.0	0.0
Initial Spares	(51.3)	0.0	0.0
Construction (MILCON)	0.0	0.0	0.0
Total FY89 Base Year $	2519.7	591.1	591.1
Escalation	400.7	39.7	39.7
Development (RDT&E)	(20.2)	(39.7)	(39.7)
Procurement	(380.5)	(0.0)	(0.0)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Total Then-Year $	2920.4	630.8	630.8
b. (U) Quantities -- Fire Units			
Development (RDT&E)	8	11	11
Procurement	403	0	0
Total	411	11	11

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References --

Development Estimate: Draft DAE Baseline; FY 90-91 President's Budget dated January 1989.
Approved Program: AAE Baseline approved February 26, 1990

12. (U) **Program Acquisition/Current Procurement Unit Cost Summary:** (Current (Then Year) Dollars in Millions)

	Current Est	Current Year UCR Baseline	Budget Year UCR Baseline
a. (U) Program Acquisition--	(Dec 89 SAR)	(Dec 88 SAR)	(Dec 89 SAR)
(1) Cost	630.8	2920.4	630.8
(2) Quantity [1]	0	403	0
(3) Unit Cost (Fire Units)	NA	7.2	NA

b. (U) Current Procurement -- None

[1] This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such items are not considered fully-configured end items for the purposes of this calculation.

13. (U) Cost Variance Analysis:

a. (U) Summary -- (Current (Then-year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	555.9	2364.5	N/A	2920.4
Previous Changes:				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	--	--	--
Current Changes:				
Economic	+6.3	+189.6	--	+195.9
Quantity	+19.4	-2311.5	--	-2292.1
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+49.2	-48.5	--	+0.7
Other	--	--	--	--
Support	--	-194.1	--	-194.1
Subtotal	+74.9	-2364.5	--	-2289.6
Total Changes	+74.9	-2364.5	--	-2289.6
Current Estimate	630.8	0.0	--	630.8

(FY 89 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	535.7	1984.0	TBD	2519.7
Previous Changes:				
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	--	--	--
Current Changes:				
Quantity	+16.4	-1794.4	--	-1778.0
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+39.0	-39.0	--	0.0
Other	--	--	--	--
Support	--	-150.6	--	-150.6
Subtotal	+55.4	-1984.0	--	-1928.6
Total Changes	+55.4	-1984.0	--	-1928.6
Current Estimate	591.1	0.0	--	591.1

13. (U) Cost Variance Analysis (Cont):

b. (U) Previous Change Explanations -- None.

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised escalation indices. (Economic)	N/A	+6.3
Additional quantities required to conduct IOT&E, FDT&E and Live Fire testing of the system. (Procurement funds shifted to RDT&E to comply with Title 10 USC.) (Quantity)	+16.4	+19.4
Revised estimate: (Estimating)	+39.0	+49.2
o To conduct IOT&E, FDT&E and Live Fire testing of the system. (Procurement funds shifted to RDT&E to comply with Title 10 USC.)	(+39.0)	(+46.7)
o The cost of shifting $21.4 from FY89, 90, and 91 to FY92 and 93.	N/A	(+2.5)
(2) Procurement		
Revised escalation indices. (Economic)	N/A	+189.6
President's budget submission in January 1990 does not fund the Procurement program:		
o (Support)	-150.6	-194.1
o (Quantity)	(-1778.0)	(-2291.4)
Quantities required to conduct IOT&E, FDT&E and Live Fire testing of the system shifted to RDT&E to comply with Title 10 USC. (Quantity)	(-16.4)	(-20.1)
Total Quantity Changes	-1794.4	-2311.5
Funds to conduct IOT&E, FDT&E and Line Fire testing shifted to RDT&E to comply with Title 10, USC (Estimating)	-39.0	-48.5

14. (U) Program Acquisition Unit Cost (PAUC) History:
(Millions of Then-Year Dollars)

a. (U) Development Estimate to Current Estimate -- [1]

PAUC (Dev Est)	Changes								PAUC (Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
7.2	+.486	-7.686	--	--	--	--	--	-7.200	0

[1] This value has been revised to exclude R&D units that are not planned to be part of the inventory objective. Such R&D units are not considered fully-configured end items for the purposes of this calculation.

15. (U) Contract Information: (Then-Year Dollars in Millions) --

a. (U) RDT&E --

Fire Units/Missiles:	Initial Contract Price Target	Ceiling	Qty
[2] Boeing Aerospace Co., Huntsville, AL/ Hughes Aircraft Co., Canoga Park, CA	131.3	NA-Cost Plus	8/40

Contract No.: DAAH01-89C-0066
Type of Contract: CPIF/AF
Awarded: December 14, 1988
Definitized: December 14, 1988

Current Contract Price Target	Ceiling	Qty	Estimated Cost at Completion Contractor	Program Manager
133.9M	NA-Cost Plus	8 FUs 40 MSLs	164.3	164.3

	Cost Variance	Schedule Variance
Previous Cum Variances	0.0	0.0
Cum Variances To Date (November 23, 1989)	(18.2)	(4.5)
Net Change	(18.2)	(4.5)

Explanation of Change: The contractor's performance measurement baseline is not yet approved; therefore, variance may require adjustment upon Extended Subsequent Application Review (E-SAR) approval, pending completion of subcontracts negotiations for system components. The FSD contract costs remain within the approved project baseline cost estimate and projected cumulative contract expenditures are within the Project Managers overall program baseline.

b. (U) Procurement -- None

c. (U) MILCON -- None

[2] Boeing and Hughes are teamed with Boeing as the lead.

16. (U) **Program Funding Summary**: (Cur Estimate in Millions of Dollars)

a. (U) Program Status --

(1) Percent Program Completed: 50.0% (4 Years/8 Years)

(2) Percent Program Cost Appropriated: 61.0% ($385.0M/$630.8M)

b. (U) Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Prior Years (FY87-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-97)	Total
RDT&E	262.9	122.1	99.1	146.7	630.8
Procurement	0.0	0.0	0.0	0.0	0.0
MILCON	0.0	0.0	0.0	0.0	0.0
Total	262.9	122.1	99.1	146.7	630.8

c. (U) Annual Summary --

Fiscal Year	Qty /1	Flyaway FY 89 Dollars Nonrec	Flyaway FY 89 Dollars Rec	Total Base Year $	Total Then Year $ Program	Total Then Year $ Oblig	Total Then Year $ Expended	Escl Rate (%)
Appropriation: RDT&E								
1987				63.2	60.2	60.2	60.2	2.7
1988				61.3	60.3	60.3	56.7	3.0
1989				138.7	142.4	137.3	56.1	4.2
1990				114.3	122.1	35.4	0.7	4.0
1991				89.1	99.1			4.2
1992				60.6	69.9			4.0
1993				51.0	60.9			3.7
1994				12.9	15.9			3.4
Total	74/11			591.1	630.8	293.2	173.7	

/1 Quantities shown are missiles/fire units.

17. (U) **Production Rate Data**

a. (U) Annual Production Rates --

Missiles

Fiscal Year	Production Rates (Quantity / Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1991	256	N/A	N/A	N/A
1992	473	N/A	N/A	N/A
1993	2112	N/A	N/A	N/A
1994	3298	N/A	N/A	N/A
1995	4160	N/A	N/A	N/A
1996	4228	N/A	N/A	N/A
1997	2023	N/A	N/A	N/A

Fire Unit

Fiscal Year	Production Rates (Quantity / Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1991	9	N/A	N/A	N/A
1992	13	N/A	N/A	N/A
1993	67	N/A	N/A	N/A
1994	102	N/A	N/A	N/A
1995	90	N/A	N/A	N/A
1996	91	N/A	N/A	N/A
1997	31	N/A	N/A	N/A

b. (U) Cost Variance -- Dollars in Millions (NOTE: Subject to Limitations on production rates above.)

Item		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY $)	N/A	N/A	591.1	N/A	N/A
	(TY $)	N/A	N/A	630.8	N/A	N/A
PAUC (Fire Unit)	(BY $)	N/A	N/A	N/A	N/A	N/A
(Fire Unit)	(TY $)	N/A	N/A	N/A	N/A	N/A

c. (U) Schedule Variance -- (NOTE: Subject to Limitations on production rates above.)

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A
Duration (in Months)	N/A	N/A	N/A	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A

17. (U) Production Rate Data (Cont.) :

d. (U) Deliveries (Plan/Actual) --

Fire Units	To Date
RDT&E	0/0
Procurement	0/0

Missiles	To Date
RDT&E	0/0
Procurement	0/0

e. (U) Approved Design to Cost Goal --

	(Average Unit Flyaway Cost) Development Estimate	Current Estimate	Latest Approved Threshold
Fire Units			
HFU			
@ Qty 285 @ Peak Rate:	6/Mo	N/A	N/A
FY 89 Base-Year $	1.705		
Then-Year $	2.026		
LFU			
@ Qty 118 @ Peak Rate:	2.5/Mo	N/A	N/A
FY 89 Base-Year $	0.783		
Then-Year $	0.933		
Missiles			
IIR			
@ Qty 5220 @ Peak Rate:	113/Mo	N/A	N/A
FY 89 Base-Year $	0.089		
Then-Year $	0.106		
TV			
@ Qty 11330 @ Peak Rate:	240/Mo	N/A	N/A
FY 89 Base-Year $	0.066		
Then-Year $	0.079		

18. (U) **Operating and Support Costs:**

a. (U) Assumptions and Ground Rules -- Operating and support costs are included for 118 light division fire units and 285 heavy division fire units including training base, floats and spares. The operational tempo (OP TEMPO) is specified as 1022 miles per/yr. Twenty full-up years, plus ramp up and ramp down are costed for the fire units. Two crew members per light fire unit and three crew members per heavy fire unit have been costed. The personnel costs included the military personnel required (crew, maintenance, and support) and civilian personnel for project management. The O&S consumables cost includes repair parts, POL, and ammunition. The depot cost is a summary which includes civilian labor for depot support, depot materiel and maintenance support. The sustaining investment consists primarily of fielding sustainment and modification kits. The other direct cost category includes costs for transportation and special training equipment. The indirect costs are for permanent change of station costs. 16550 missiles will be fielded and a missile recertification is costed for every ten years of sustainment. This information is based on the NLOS Baseline Cost Estimate dated June 1988.

b. (U) Costs --

(FY89 Constant (Base-Year) Dollars in Millions)

Cost Element	Annual Cost Per NLOS Fire Unit
Personnel	.288
O&S Consumables	.026
Direct/Depot Maint	.065
Sustaining Investments	.054
Other Direct Cost	.006
Indirect cost	.007
Total	.393

c. (U) Contractor Support Costs -- None