A-23 PATRIOT

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SAR-88-112

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

AS OF DATE: December 31, 1988

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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 M. Garnett
Assigned: February 12, 1987
AV742-3240; 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

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 (EMC).

~~CLASSIFIED BY PATRIOT SECURITY CLASSIFICATION GUIDE~~
~~DECLASSIFY: OADR~~

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

OASD(PA) DFOISR 89-T-0497

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. (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 arly flight verification of the TVM guidance system and emphasize greater austerity. SARC/DSARC decisions in January 1976 approved the program to resume full-scale ngineering 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, 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 third PATRIOT battalion was deployed to Europe in November 1986. The Netherlands received the first of four PATRIOT units in January 1986. During September 1986, PATRIOT successfully demonstrated the capability to engage and divert an attacking tactical ballistic missile from its intended target. Throughout 1986, data received from eployed European units showed PATRIOT to be exceeding the operational readiness require- ents of the system.

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

(U) There were 28 flight tests conducted during FY87. PATRIOT Anti-Tactical Missile (ATM) capability (PAC-2) was successfully tested in Nov 87. 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. The U.S. portion of this contract is for 33 fire units and 3,862 missiles. There were two additional battalions deployed in Europe bringing the total to five U.S. battalions deployed in Europe. The second Netherlands fire unit was delivered in Apr 87. A contract was signed in Dec 87 to build and operate a PATRIOT Missile Facility (PMF) through a NAMSA contract in Germany. This is the second PMF in Germany.

b. (U) Significant Developments Since Last Report--

(U) The Anti-Tactical Missile (ATM) program enjoyed significant progress during 1988 with the fielding of the initial ATM capability (PAC-1) in Jul 88 and the successful flight testing of three PAC-2 development missiles. The development effort resulted in approval of the final configuration of the ATM warhead and fuze. On 19 Dec 88, the PAC-2 Milestone III Decision IPR approved cut-in to production of the ATM (PAC-2). Funds for production of the ATM (PAC-2) capability are included in this report.

(U) During 1988, 35 flight tests were conducted; of these, 3 were successfully conducted against tactical missiles; 3 were fired as surveillance rounds and were used as targets for the tactical missiles tests, and the remaining 29 were against air breathing targets. Search, track, and post deployment software tests were successfully conducted during 1988.

(b)(1)

(U) Throughout 1988, a great deal of interest was directed toward the PATRIOT missile system by foreign nations. An agreement was signed with Italy whereby the U.S. will provide funding in FY90 ($248.3M) and FY91 ($248.2M) 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. The Netherlands is planning to procure four more PATRIOT Fire Units which will make a total of eight in their forces. Japan continues to manufacture PATRIOT as a licensed production program, also Korea continues to show interest in PATRIOT.

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

(U) Changes since "As Of" Date--None.

(U) Threshold Breaches: There are currently no DAE baseline breaches, (dated Mar 89), no DCP (dated Oct 14, 76, with Cover Sheet No. 1, approved Jan 20, 78, and Cover Sheet No. 2 approved Nov 24, 78) breaches, or SDDM (dated Sept 10, 80) threshold breaches.

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 (Ch-1)	Dec 82 (Ch-1)
Initial Operational Capability (IOC)	Apr 82	Jun 83	Jun 83

(U) Schedule (cont'd.)

a. Milestones (cont'd.)

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

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 Feb 83 to Jun 83 to reflect a change from the TRADOC to the CONUS IOC.

c. (U) Current Change Explanations
(Ch-1) New Milestones added as per guidance to match baseline document.

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 Mar 1989

10. (U) Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
(U) Characteristics				
(b)(1)				

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

	Approved	Demon-
(b)(1)		

(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 [redacted] size, altitude, speed, and maneuver (and time of execution of maneuver). Predicted [redacted] 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.

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 Mar 1989; DCP, approved August 20, 1980.

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

	Development Estimate	Approved Program	Current Estimate
a. (U) Cost --			
Development (RDT&E)	$1106.2	$1554.0	$1554.0
Procurement	3121.2	3286.2	3286.2
Guided Missile	(964.7)	1245.6	(1245.6)
HE Warhead	(121.9)	(114.7)	(114.7)
Adaption Kit	(271.7)	(0.0)	(0.0)
Fire Control Section (FCS)	(1141.8)	(887.8)	(887.8)
Launcher	(254.0)	(317.8)	(317.8)
Other (GSE)	(186.0)	(132.3)	(132.3)
Advanced Prod Engr	(56.9)	(0.0)	(0.0)
IPF		(129.2)	(129.2)
Total Flyaway	(2997.0)	(2827.4)	(2827.4)
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	65.0
Total FY 72 Base-Year $	4267.4	4905.2	4905.2
Escalation	973.1	7463.7	7463.7
Development (RDT&E)	(93.8)	(580.5)	(580.5)
Procurement	(848.6)	(6782.6)	(6782.6)
Construction (MILCON)	(30.7)	(100.6)	(100.6)
Total Then-Year $	5240.5	12368.9	12368.9
b. (U) Quantities --			
Development (RDT&E)	6.0	5.0	5.0
Procurement	234.0	103.0	103.0 1/
Total	240.0	108.0	108.0 1/

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

11. (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	$1157M	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: FY90/FY91 President's Budget.

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1)	(U) Cost	12368.9	12527.3	12368.9
(2)	(U) Quantity	108 1/	108 1/	108 1/
(3)	(U) Unit Cost	114.5	116.0	114.5
b.	(U) Current Procurement	(FY 1989)	(FY 1989) APPN	(FY 1990)
(1)	(U) Cost	844.9	844.9	723.3 2/
	Less CY Adv Proc	37.4	37.4	0
	Plus PY Adv Proc	47.1	47.1	20.5
	Net Total	854.6	854.6	743.8
(2)	(U) Quantity	9	9	3
(3)	(U) Unit Cost	95.0	95.0	247.9

1/ Does not include the 3 fire units bought with NATO Air Base Defense funds.
2/ Excludes Army and other services funding ($248.3M) for Italian agreement to provide 10 radars, 10 ECS, and 2 ICCs in FY90.

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	+2030.1	-35.2	+2073.2
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	+2046.5	+195.5	+2374.4
Other	+27.6	-	-	+27.6
Support	+130.6	+1251.0	-	+1381.6
Subtotal	+934.5	+6268.7	+83.6	+7286.8
Current Changes				
Economic	-	-20.0	-	-20.0
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-119.2	+11.3	-107.9
Other	-	-	-	-
Support	-	-30.5	-	-30.5
Subtotal	0.0	-169.7	+11.3	-158.4
Total Changes	+934.5	+6099.0	+94.9	+7128.4
Current Estimate	2134.5	10068.8	165.6	12368.9

(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	+746.6	+64.8	+875.4
Other	+24.5	-	-	+24.5
Support	+63.6	+432.0	-	+495.6
Subtotal	+447.8	+212.6	+19.4	+679.8
Current Changes				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-38.7	+5.6	-33.1
Other	-	-	-	-
Support	-	-8.9	-	-8.9
Subtotal	0.0	-47.6	+5.6	-42.0
Total Changes	+447.8	+165.0	+25.0	+637.8
Current Estimate	1554.0	3286.2	65.0	4905.2

3. (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 ECCM to accommodate state-of-the-art changes
Estimating :	changes of PEP, redefined estimating procedures, add RSI and 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, ARM decoy, fuze, radar side lobe cancellers, and ATM
Estimating:	reflects refined estimating techniques, deletion of non-peculiar GFE, and savings due to FMS and multiyear procurement.
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

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) (U) RDT&E		
None		
(2) (U) Procurement		
Revised Feb 88 escalation rates (Economic)	N/A	-20.0
Transfer to Navy for ship procurement	(-13.8)	(-40.0)
Full funding reduction for Gov't Eng	(-6.6)	(-20.9)
Revised estimate for planned multiyear	(-11.5)	(-38.3)
Revised estimate based on program office update (Estimating)	(-6.8) -38.7	(-20.0) -119.2

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

Revised estimate for Initial Spares (Support)	-8.9	-30.5
(3) (U) MILCON		
Revised Estimate	+5.6	+11.3

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	
6.881	+6.580	+3.888	+0.897	+1.346	+2.243	-	-	+14.954	21.835

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

PAUC (Dev Est)	Changes								PAUC (Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
21.835	+19.011	+19.129	+21.756	-0.956	+20.986	+.256	+12.510	+92.692	114.527

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 DAAH01-82-C-A181, CPIF Award: March 10, 1981 Definitized: April 27, 1982	$11.3	N/A	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$111.3	N/A	N/A	$108.9	$108.9

	Cost Variance	Schedule Variance
Previous Cumulative Variance (October 25, 1987)	$ 3.3	$-1.4
Cumulative Variances to Date (October 30, 1988)	$ 1.6	$-2.2
Net Change	$-1.7	$-0.8

(U) Explanation of Change: The change in cost variance is due to greater than planned effort associated with Post Deployment Build-2 software, Pulse Doppler Search/Track (PDS/T) software enhancement, and Standoff Jammer Counter. The change in schedule variance is due to schedule slips associated with PDS/T software enhancement, Standoff Jammer Counter, guidance enhancement, and responsive threat analysis.

(U) The $0.5M increase in the Program Manager's estimate is due to (1) a $0.9M increase resulting from contract modification for additional requirements associated with guidance enhancement; and (2) a $0.4M net decrease in Estimate-to-Complete (ETC) due to ETC increases for PDS/T software enhancement and Standoff Jammer Counter, and ETC decreases due to an assessment of remaining effort to complete contract requirements. The total program estimate and schedule are not affected by these variances.

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	$68.4	$69.6

	Cost Variance	Schedule Variance
Previous Cumulative Variance (October 25, 1987)	$6.3	$-3.7
Cumulative Variances to Date (October 30, 1988)	$6.4	$-0.8
Net Change	$0.1	$ 2.9

(U) Explanation of Change: The cost variance increase is due primarily to reduced material commitments in Andover factory test equipment and to concentrated efforts to complete two final missile test stations. The favorable schedule variance change is due to the reduced material commitments mentioned above. The contractor's estimated price at completion increased due to the incorporation of test station modifications. The decrease in Project Manager's cost at completion is due to the latest assessment of the estimated completion costs. The total program estimate and schedule are not affected by these changes.

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

b. (U) Procurement (Cont'd)

Production Contract (FY86)	Initial Contract Price		
	Target	Ceiling	Qty
Raytheon Company, Boston, MA DAAH01-86-C-A020, FPI Award: February 5, 1986 Definitized: February 22, 1986	$933.9	$1046.3	15 2/ 3/

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$950.2	$1064.6	15 3/	$903.0	$902.8

	Cost Variance	Schedule Variance
Previous Cumulative Variance (October 25, 1987)	$ 0.7	$-91.1
Cumulative Variances to Date (October 30 1988)	$39.1	$-33.0
Net Change	$38.4	$ 58.1

(U) Explanation of Change: The favorable cost variance change is due primarily to underruns in Ground Support Equipment and Missile fabrication, assembly, inspection, test, and associated labor due to improved methods and parts availability, and favorable overhead rates. Cost variance at Martin is due to underruns in missile factory labor and materials usage. The favorable schedule variance change is due primarily to schedule recovery at Raytheon associated with payback of materials previously loaned to other production contracts. Schedule variance at Martin is due primarily to recovery on launch station and missile material issues and improved factory performance in launcher electronics modules.

(U) The Project Manager's Estimated Price at Completion decreased $52.0M due to (1) a decrease of $47.3M resulting from underruns identified through assessments of contractor performance and estimated completion costs; (2) a decrease of $5.8M for an adjustment in contract pricing based on duplication of parts by two plants in the original contract proposal; and (3) a $1.1M increase due to the incorporation of various contract modifications.

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

b. (U) Procurement (cont'd.)

Production Contract (FY87-91)

Raytheon Company, Boston, MA
DAAH01-82-C-A025, FFP
Award: March 31, 1987
Definitized: March, 31, 1987

Initial Contract Price

Target	Ceiling	Qty 2/ 4/
$3,550.0	N/A	48

Current Contract Price

Target	Ceiling	Qty 4/
$3,850.2	N/A	48

Estimated Price at Completion

Contractor	Program Manager
$3,850.2	$3,850.2

Variances: Not required on FFP contracts.

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

FOOTNOTES:

1/ The quantities of Special Tools (ST) and Special Test Equipment (STE) are too numerous to list; however, ST and STE quantities have been procured to support production rates as discussed in prior SAR reports.

2/ Quantity = Fire Unit

3/ 12 U.S./3 FMS

4/ 37 U.S./11 FMS

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

a. (U) Program Status --

(1) (U) Percent Program Completed: 89.3% (25 yrs/28 yrs)

(2) (U) Percent Program Cost Appropriated: 84.8% ($10486.7/$12368.9)

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	8205.6	723.3	612.1	527.8	10068.8
MILCON	146.6	15.4	0	3.6	165.6
Total	10486.7	738.7	612.1	531.4	12368.9

c. (U) Annual Summary--

Fiscal Year	Qty FU/Msl	FY 72 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway						
		Nonrec	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	44.8	44.8	43.1	4.9
1984				32.9	78.4	78.4	76.0	3.8
1985				24.5	60.4	60.4	60.0	3.4
1986				18.6	47.2	47.2	46.6	2.8
ubtotal	5/126			1554.0	2134.5	2134.5	2126.4	

1/ Does not include MIPA for Initial Spares, Spares are procured by the U.S. Army Msl Cmd

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		Total	Program	Obligated	Expended	
		Nonrec	Rec					
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	271.8	316.3	961.5	849.1	831.2	8.0
1985	12/440	7.3	271.7	326.3	1025.4 3/	935.8	868.4	3.4
1986	12/560		259.9	292.5	945.2 3/	905.9	770.1	2.8
1987	12/700		246.2	287.7	962.0	913.9	518.9	2.7
1988	12/715		220.0	264.6	917.6	760.0	34.0	3.1
1989	9/815		218.6	236.3	844.9	687.7	0.2	4.0
1990	3/815		178.8	196.9	723.3			2/ 3.6
1991	0/817		150.0	162.8	612.1			2/ 3.3
1992	0/440		105.9	160.7	527.8			2.8
Subtotal	103/6452 1/	128.6	2698.8	3286.2	10068.8	7406.3	5350.3	
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	3.1
1989				0.4	1.1			4.0
1990				4.9	15.4			3.6
1991				0.0	0.0			3.3
1992				1.1	3.6			2.8
Subtotal				65.0	165.6	145.5	145.5	
Total	108/6578	128.6	2698.8	4905.2	12368.9	9686.3	7622.2	

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

2/ Excludes Army and other Service funding in FY90/91 ($496.5M) for Italian agreement to provide 20 Radars, 20 ECSs, and 4 ICCs.

3/ FY85 and FY86 includes $92.7M for Initial Spares that are not reflected in the data base (FY85-$14.6M; FY86-$78.1M).

17. (U) Production Rate Data:

a. (U) Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum 1/ 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	880
1992			440	880
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	9	15
1990			3	15
1991				15

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

(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 $)	4690.2	+193.7	4905.2	0.0	4905.2
(TY $)	11312.2	+1065.7	12368.9	0.0	12368.9
PAUC (BY $)	43.4	+1.8	~~41.9~~ ~~45.4~~ ok	0.0	45.4
(TY $)	104.7	+9.8	114.5	0.0	114.5

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	48	171	0	171
End Date (Mo/Yr)	12/90	48	12/94	0	12/94

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

	To Date
RDT&E	
Fire Units	5/5
Missiles	126/126
Procurement	
Fire Units	67/67
Missiles	2150/2204

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	.202
Then-Year $		.113 2/		.635		.629
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		18.297
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		4.993
Launching Station						
FY 72 Base-Year $	625/15	.250	704/11	.432	704/11	.426
Then-Year $		.316		1.346		1.326

The Mar 72 DCP reflected contractor Design-to-Unit Production Cost Goals.
Missile Round without Warhead and Canister.

(U) Operating and Support Costs:

a. Assumptions and Ground rules--NA

b. Cost--NA

c. Contractor Support Cost--

(Then-Year Dollars in Millions)

	1/ FY1989 $ Prior	FY1990 Year	FY1991 Year	Balance to Complete	Total
O&M (Army)	57.1	46.0	58.4	-0-	161.5

1/ This represents cost for FY1988 and FY1989.

A-16 HELLFIRE ~~CONFIDENTIAL~~ SAR-88-107

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

PROGRAM: HELLFIRE MODULAR MISSILE SYSTEM (HMMS)

AS OF DATE: DECEMBER 31, 1988

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1. (U) Designation: Not applicable - subsystem of the AH-64 APACHE Weapon System.

Nomenclature: Armament System Helicopter: HELLFIRE

2. (U) DOD Component: Department of Army

3. (U) Responsible Office and Telephone Number:
HELLFIRE/GLD PM Office
RSA, AL 35898-5610
PM: COL R. E.
Assigned: 1 Feb 88
AV 842-1365; COM (205) 876-1365

4. (U) Program Elements/Procurement Line Items:
RDTE: PE 064310A Project D074
PE 023747A Project D045
PE 023802A Project D045
MIPA: APPN 2032 SSN C70000
MILCON: None

5. (U) 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

6. (U) 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,

OASD(PA) DFOISR 89-T-0634

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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 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 during 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 is underway to improve warhead lethality against near-term threat armor 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. (U) Program Highlights:

a. (U) Significant Historical Development -- In 1972, the Army initiated an Advanced Development (AD) Program to demonstrate critical subsystems 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. The dual source acquisition strategy enabled the Government

to implement the fly-to-buy testing and acceptance program to provide added assurance that missiles accepted conform to contractual and user requirements. Dual source competition will be maintained throughout the program if it continues to be economically prudent. 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 -- The contract with Rockwell International Corporation to develop a digital autopilot (DAP) was continued; six missiles incorporating development prototypes of the DAP were fired during Aug thru Dec 88 and test objectives were met.

A development contract for warhead improvements was awarded to Rockwell International Corporation in May 88. The technical approach for this near-term warhead improvement is based on existing technology and early testing indicates warhead lethality will meet effectiveness requirements against near-term threat armor.

In Nov 88, the Army directed that development effort be initiated for missile modifications to improve the laser seeker's performance against countermeasures, combine digital autopilot and improved seeker functions, and to develop a more robust warhead than the near-term solution with the potential for introducing the improvements into production in FY 92.

A unit training program was initiated in Feb 88. To date 15 missiles have been fired with 13 direct hits.

The HELLFIRE Missile System satisfies all mission requirements except missile weight. Weight reduction from the current nominal weight of 99.8 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 no DAE baseline breaches or DCP (DCP #118, dated 7 Jan 82) threshold breaches.

9. (U) Schedule:

a. (U) Milestones --

	Development Estimate	Approved Program	Current Estimate
Advanced Development			
Start	Dec 72	N/A	N/A
Complete	Oct 75	N/A	N/A
Competitive AD Contracts			
Start	Jun 74	N/A	N/A
Complete	Oct 75	N/A	N/A
Milestone II (ASARC/DSARC II)	Feb 76	N/A	~~N/A~~ Feb 76
ED Contract award	Oct 76	N/A	N/A
PQT-C (Contractor)			
Start	Mar 79	N/A	N/A
Complete	Aug 79	N/A	N/A
Operational Test (OT)(COBRA)			
Start	Aug 79	N/A	N/A
Complete	Dec 79	N/A	N/A
Milestone III (ASARC III)	Feb 80	Mar 82	Mar 82
Production Contr Award	Apr 80	N/A	~~N/A~~
Prod Val Tests Complete	Oct 81	N/A	N/A
ASARC/DSARC IIIA	Nov 81	N/A	N/A
Full-Scale Production	Jan 82	N/A	N/A
Missile Fly-to-Buy (FTB) Lot Acceptance Test Start (FY 84 Buy)	N/A	N/A	N/A(Ch-1)
TRADOC FUE	N/A	Dec 85	Dec 85
FORSCOM FUE	N/A	May 86	May 86
Initial Operational Capability (IOC) (on AH-64)	May 83	N/A	Jul 86
USAREUR FUE	N/A	Jan 87*	Jan 87
National Guard FUE	N/A	Nov 87*	Nov 87
Contract Award - Interim Warhead	N/A	N/A	May 88(Ch-2)
FY 89 Missile Contract Award	N/A	Dec 88	Apr 89(Ch-2)
First Delivery (FY 88 Buy)	N/A	Aug 89	Aug 89(Ch-2)
Contract Award - Optimized Msl	N/A	N/A	Dec 89(Ch-2)
ECP Available - Interim Warhead	N/A	N/A	Jan 90(Ch-2)
FY 90 Missile Contract Award	N/A	Dec 89	Apr 90(Ch-2)
First Delivery (FY 89 Buy)	N/A	Aug 90	Aug 90(Ch-2)
FY 91 Missile Contract Award	N/A	Dec 90	Apr 91(Ch-2)
First Delivery (FY 90 Buy)	N/A	Aug 91	Aug 91(Ch-2)
ECP Available - Optimized Msl	N/A	N/A	Mar 92(Ch-2)
FY 92 Missile Contract Award	N/A	Dec 91	Apr 92(Ch-2)
First Delivery (FY 91 Buy)	N/A	Aug 92	Aug 92(Ch-2)
FY 93 Missile Contract Award	N/A	Dec 92	Apr 93(Ch-2)
First Delivery (FY 92 Buy)	N/A	Aug 93	Aug 93(Ch-2)
FY 94 Missile Contract Award	N/A	N/A	Apr 94(Ch-2)
First Delivery (FY 93 Buy)	N/A	Aug 94	Aug 94(Ch-2)
FY 95 Missile Contract Award	N/A	N/A	Apr 95(Ch-2)
First Delivery (FY 94 Buy)	N/A	N/A	Aug 95(Ch-2)
FY 96 Missile Contract Award	N/A	N/A	Apr 96(Ch-2)
First Delivery (FY 95 Buy)	N/A	N/A	Aug 96(Ch-2)
First Delivery (FY 96 Buy)	N/A	N/A	Aug 97(Ch-2)

* Reflects dates of actual accomplishment.

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

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 RDTE funding, delays in procurement funding, and delays in testing caused by late delivery of hardware and correction of deficiencies revealed in earlier tests. 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.

c. (U) Current Change Explanations --

(Ch-1) SAR/Baseline value no longer applicable. These values will be deleted in the next SAR.

(Ch-2) Draft DAE Baseline, Feb 89, elements added pending baseline approval.

d. (U) References --

Development Estimate: DCP #118, dated 12 Nov 76.

Approved Program: DAE Baseline, Feb 88.

10. (U) Technical/Operational Characteristics: 2/

a. (U) Technical --	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
Missile Weight Maximum (lbs)	95	99.8/99.8	99.8	99.8
(b)(1)				
(degrees)			-18.1	
(U) Time of Flight (Sec)				
(U) 3 Km	13	13/13	9.6	13
(U) 5 Km	20	22/22	18.1	18.1
(U) Reliability				
(U) Missile (in-flight)	.92-.95	.94/.94	.96 3/	.92-.95
(b)(1)				
(U				

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

c. (U) Previous Change Explanations --

(b)(1)

d. (U) Current Change Explanations -- AMENDED

(Ch-1) SAR/Baseline value no longer applicable. These values will be deleted in the next SAR.

(Ch-2) Draft DAE Baseline, Feb 89, elements added pending baseline approval.

e. (U) References --

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

Approved Program: DAE Baseline, Feb 89.

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

a. (U)

Cost --	Development Estimate	Approved Program	Current Estimate
Development 1/	$ 211.9	$ 288.9	$ 288.9
Procurement	276.7	821.7	821.7
Missile Bus	(143.1)	(+ 444.5)	(+ 444.5)
Laser Seeker	(109.4)	(+ 346.2)	(+ 346.2)
Total Flyaway	(252.5)	(+ 790.7)	(+ 790.7)
Other Wea Sys Cost 2/	(4.0)	(+ 27.9)	(+ 27.9)
Initial Spares	(20.2)	(+ 3.1)	(+ 3.1)
Construction	0.0	0.0	0.0
Total FY 75 Base-Year	$ 488.6	1110.6	1110.6
Escalation	214.8	1567.8	1567.8
Development	(54.3)	(163.8)	(163.8)
Procurement	(160.5)	(1404.0)	(1404.0)
Construction	(0.0)	(0.0)	(0.0)
Total Program Cost	$703.4	$2678.4	$2678.4

[redacted]

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

		Development Estimate	Approved Program	Current Estimate
b. (U)	Quantities --			
	Development			
	Missile	241	333	333
	Laser Seeker	241	381	381
	Launcher	74	74	74
	Procurement			
	Missile	24,600	56,716	56,716
	Laser Seeker 3/	24,600	N/A	N/A
	Launcher 4/	2,000	N/A	N/A
	Total Missiles	24,841	57,049	57,049

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References --

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

Approved Program: FY 1990-91 President's Budget. 5/

NOTES:

1/ Development estimate revised from $210.3 due to conversion of Pre-Base Year Actuals to Base Year 75.

2/ Other includes data, training, support and test equipment.

3/ Missiles are being procured as all-up-rounds. Seekers were not procured as a GFE item after the second buy.

4/ Launcher procurement funds were transferred from missile procurement to aircraft procurement in FY 84.

5/ 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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1)	Cost	2,678.4	2,420.7	2,678.4
(2)	Quantity	57,049	48,925	57,049
(3)	Unit Cost	.047	.049	.047

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

		Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
b. (U)	Current Procurement	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1)	Cost	204.7	204.7	138.3
	Less CY Adv Proc	0.0	0.0	0.0
	Plus FY Adv Proc	0.0	0.0	0.0
	Net Total	204.7	204.7	138.3
(2)	Quantity	6,000	6,000	3,102
(3)	Unit Cost	.034	.034	.045

13. (U) Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	266.2	437.2	-	703.4
Previous Changes:				
Economic	+8.0	+130.4	-0.4	+138.0
Quantity	-3.5	+465.8	-	+462.3
Schedule	+14.6	+434.9	+0.4	+449.9
Engineering	+14.2	+303.1	-	+317.3
Estimating	+13.6	+335.1	-	+348.7
Other	-	-	-	-
Support	+4.1	-3.0	-	+1.1
Subtotal	+51.0	+1666.3	-	+1717.3
Current Changes:				
Economic	-	-.2	-	-.2
Quantity	-	+334.8	-	+334.8
Schedule	-	+68.6	-	+68.6
Engineering	+136.1	+149.8	-	+285.9
Estimating	-.6	-464.1	-	-464.7
Other	-	-	-	-
Support	-	+33.3	-	+33.3
Subtotal	+135.5	+122.2	-	+257.7
Total Changes	+186.5	+1788.5	-	+1975.0
Current Estimate	452.7	2225.7	-	2678.4

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

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	211.9	276.7	-	488.6
Previous Changes:				
Quantity	-2.7	+153.6	-	+150.9
Schedule	+9.1	+56.3	-	+65.4
Engineering	+8.7	+119.0	-	+127.7
Estimating	+1.2	+184.8	-	+186.0
Other	-	-	-	-
Support	+2.0	-3.5	-	-1.5
Subtotal	+18.3	+510.2	-	+528.5
Current Changes:				
Quantity		+105.1	-	+105.1
Schedule		+18.5	-	+18.5
Engineering	+59.1	+45.8	-	+104.9
Estimating	-.4	-144.9	-	-145.3
Other		-	-	-
Support		+10.3	-	+10.3
Subtotal	+58.7	+34.8	-	+93.5
Total Changes	+77.0	+545.0	-	+622.0
Current Estimate	288.9	821.7	-	1110.6

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 and autopilot improvements.

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

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. Removal of funds from Basic Laser Hellfire, FY 87 out. Funding established in new line for improved Hellfire system to meet an evolving threat.

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.

Procurement

Economic: Revised escalation indices.

Quantity: Addition of 24,096 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. Addition of 1,000 rounds in FY 89 and deletion of 1,000 rounds in FY 93.

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 89 and subsequent buys.

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.

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 requirement.

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

MILCON -- None

c. (U) Current Change Explanations --

			(Dollars in Millions) Base Year	Then Year
(1)	(U)	RDT&E		
		Increase due to inclusion of improvement program (Engineering)	+59.1	+136.1
		Decrease in prior year program authority. (Estimating)	-.4	-.6
(2)	(U)	Procurement		
		Revised Dec 88 economic escalation rates. (Economic)	N/A	-.2
		Addition of 8,020 rounds. (Quantity)	+105.1	+334.8
		Re-profiling of missile procurement schedule. (Schedule)	+18.5	+68.6
		Change in improvement program to refect optimized missile. (Engineering)	+45.8	+149.8
		Prior year program authority adj and decrease due to Navy proration. Shortfall FY 92-96. (Estimating)	(-19.8) (-125.1) -144.9	(-57.8) (-406.3) -464.1
		Decrease due to revision of initial spares requirements. Increase for out year data and training equipment, de-icing kits, test program sets. (Support)	(-.8) (+11.1) +10.3	(-2.6) (+35.9) +33.3
(3)	(U)	MILCON		
		None	0.0	0.0

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) 1/	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Engr	Est	Other	Spt	Total	
$ .029M	-	-	-	-	-	-.001	-	-.001	$ .028M

b. (U) Current Baseline Estimate to Current Estimate:

PAUC (Revised Dev Est) 2/	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Engr	Est	Other	Spt	Total	
$ .028M	+.002	-.002	+.009	+.011	-.002	-	+.001	+.019	$ .047M

NOTES:

1/ Initial SAR date: 30 Jun 76.

2/ Revision of HELLFIRE development estimate in the Jun 84 SAR transferring $31.7M previously in the HELLFIRE DE for the HELLFIRE launcher to the APACHE program.

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

a. (U) RDT&E -- None

b. (U) Procurement --

Third Production Buy	Initial Contract Price		
	Target	Ceiling	Qty
Rockwell Int. Corp., Duluth, GA, DAAH01-84-C-A162, FFP, Award: June 29, 1984 Definitized: June 29, 1984	$113.2	N/A	2651

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$117.6	N/A	2651	$117.6	$117.6

For FFP contracts, cost and schedule variance information is not required.

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

Fourth Production Buy	Initial Contract Price Target	Ceiling	Qty
Rockwell Int. Corp., Duluth, GA, DAAH01-85-C-A040, FFP, Award: March 15, 1985 Definitized: March 15, 1985	$ 66.3	N/A	1676

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$ 72.4	N/A	1676	$ 72.4	$ 72.4

For FFP contracts, cost and schedule variance information is not required.

Fourth Production Buy	Initial Contract Price Target	Ceiling	Qty
Martin Marietta, Orlando, FL DAAH01-85-C-A041, FFP, Award: March 15, 1985 Definitized: March 15, 1985	$126.2	N/A	4104

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$137.4	N/A	4104	$137.4	$137.4

For FFP contracts, cost and schedule variance information is not required.

Fifth Production 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	N/A	4500

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$132.6	N/A	4500	$132.6	$132.6

For FFP contracts, cost and schedule variance information is not required.

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

Fifth Production Buy
Martin Marietta, Orlando, FL
DAAH01-86-C-0496, FFP,
Award: March 17, 1986
Definitized: June 26, 1986

Initial Contract Price		
Target	Ceiling	Qty
$ 65.9	N/A	1500

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 65.9	N/A	1500	$ 65.9	$ 65.9

For FFP contracts, cost and schedule variance information is not required.

Sixth Production Buy
Martin Marietta, Orlando, FL
DAAH01-88-C-0109, FFP,
Award: December 23, 1987
Definitized: December 23, 1987

Initial Contract Price		
Target	Ceiling	Qty
$121.5	N/A	3750

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$125.3	N/A	3750	$125.3	$125.3

For FFP contracts, cost and schedule variance information is not required.

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

a. Program Status --

(1) Percent Program Completed: 72.0% (18 yrs/25 yrs)

(2) Percent Program Cost Appropriated: 66.7% ($1786.9/$2678.4)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY72-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-96)	Total
RDT&E	361.8	29.1	35.2	26.6	452.7
Procurement	1425.1	138.3	137.9	524.4	2225.7
MILCON	0	0	0	0	0
Total	1786.9	167.4	173.1	551.0	2678.4

c. (U) Annual Summary -- The Army will procure the maximum number of supportable systems consistent with the dollars appropriated.

Fiscal Year	Qty	FY 75 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Program	Obligated	Expended	
		Nonrec	Rec					
Appropriation: RDT&E								
1972				5.9	4.9	4.9	4.9	4.6
1973	14			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	3.9	3.9	3.9	6.6
1977T				.6	.7	.7	.7	2.9
1977	215			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				7.9	14.6	14.6	14.3	4.9
1984				.8	1.5	1.5	1.5	3.8
1985				.2	.5	.5	.5	3.4
1986				2.3	4.7	4.7	4.6	2.8
1987				4.4	9.2	9.2	9.2	2.7
1988	36			9.8	21.1	21.1	10.3	3.1
1989	8			6.7	15.0	3.6	.1	4.0
1990	21			12.6	29.1			3.6
1991	30			14.8	35.2			3.3
1992	9			7.3	17.8			2.8
1993				2.2	5.4			2.3
1994				1.3	3.4			1.8
Subtotal	333			288.9	452.7			

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

Fiscal Year	Qty	FY 75 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Program	Obligated	Expended	
		Nonrec	Rec					
Appropriation: Procurement								
1981 2/	LLI	9.9	1.3	11.2	22.6	25.0	25.0	11.6
1982 2/	680	9.5	37.9	51.1	113.0	123.5	121.1	14.3
1983 3/	3971	3.3	96.7	103.6	243.4	255.5	252.4	9.0
1984	4651		85.6	88.9	216.2	214.0	213.9	8.0
1985	5780		84.9	88.5	222.9	216.0	208.6	3.4
1986	6000		74.3	77.9	202.7	192.1	106.7	2.8
1987	0				0			2.7
1988	6000		71.4	71.5	199.6	143.0	50.8	3.1
1989	6000		70.7	71.1	204.7			4.0
1990	3102	.6	45.5	46.8	138.3			3.6
1991	3002		44.2	45.6	137.9			3.3
1992	3166	.8	46.0	48.1	148.4			2.8
1993	3500		40.4	42.2	132.7			2.3
1994	3150		30.4	30.6	97.9			1.8
1995	6000		29.0	34.7	113.1			1.8
1996	1714		8.3	9.9	32.3			1.8
Subtotal 1/	56716	24.1	766.6	821.7	2225.7			
Appropriation: MILCON								
Subtotal					0			
Total	57049	24.1	766.6	1110.6	2678.4			

1/ Does not include $1.8M FY 92; $52.3M FY 93; $48.4M FY 94, which is AAWWS resources. AAWWS will have a separate Baseline and SAR. 2/ Following funds for HF launcher are contained in APACHE SAR - FY 81 - $2.4M; FY 82 $12.8M. 3/ FY 83 local reprogramming of $13.2M for cost growth on contract.

17. (U) Production Rate Data:

a. (U) Annual Production Rates --(NOTE: The funded delivery period (current estimate) for the FY 83 contract was 21 months, FY 84 through FY 86 is 14 months, FY 88 is 24 months, and FY 96 is 4 months. The delivery period for all other buys is 12 months. Maximum production economic rate shown below is not currently attainable due to the participation of the Navy in program production.)

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1980	346			
1981	1050			
1982	5225	742	680	680
1983	6000	3971	2269	2269
1984	6000	6218	3987	4175
1985	4462	5683	4954	5330
1986		6853	5143	6261
1987		6351		
1988		6000	3000	6240
1989			6000	9228
1990			3102	9228
1991			3002	9228
1992			3166	9228
1993			3500	9228
1994			3150	9228
1995			6000	
1996			5142	

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

b. (U) Cost Variance -- (NOTE: The production estimate tracks to the 31 Dec 81 SAR which was the first SAR after the Milestone III production decision review. HELLFIRE launcher costs are excluded for the production estimate, because these costs were transferred to the APACHE program. Cost associated with maximum economic production assumes Navy participation.)

Item	Production Estimate	Variance (CE less Pde)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost (BY $M)	882.0	+228.6	$1110.6	15.5	$1095.1
(TY $M)	$1953.4	+725.0	$2678.4	54.8	$2623.6
PAUC (BY $M)	$ .025	$- .005	$ .020	$ .001	$ .019
(TY $M)	$ .054	$- .007	$ .047	$ .001	$ .046

c. (U) Schedule Variance -- (NOTE: Schedule associated with maximum economic production assumes Navy participation.)

	Production Estimate	Variance (CE vs PdE)	Current Estimate	Variance (CE vs Max)	Maximum Economic
Start Date (Mo/Yr)	2/82	~~N/A~~	2/82	N/A	2/82
Duration (in Months)	103	86	189	40	149
End Date (Mo/Yr)	9/90	N/A	11/97	N/A	7/94

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

Missile		To DATE
	RDT&E	233/233
	Procurement	17132/14366

2/82 to 2/90 = 96
2/90 to 9/90 = 7
103

2/82 to 2/97 = 80
2/90 to 11/90 = 9
89

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

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

(Average Flyaway Cost)

	Dev Est/ Approved Program	Current Estimate	Latest Approved Threshold
@Qty: 24,600 - @Peak Rate: 500/mo			
FY 75 Base-Year $	10,264/18,680 1/	18,680	N/A
Then-Year $	17,796 /46,004	46,004	N/A

NOTE:

1/ 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.

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules -- N/A

b. (U) Costs -- N/A

c. (U) Contractor Support Costs --

(Then-year Dollars in Millions)

	FY1989 1/ & PRIOR	FY1990 YEAR	FY1991 YEAR	BALANCE TO 2/ COMPLETE	TOTAL
O&M	.2	2.0	2.4	---	4.6

NOTES:

1/ Includes FY88-89

2/ Includes BTC PY

SAR-88-098

A-8 CH-47D

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

Program: CH-47D

AS OF DATE: December 31, 1988

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CLEARED
MAR 1 1989 23

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
1 MAR 1989

4. Program Elements/Procurement Line Items:

RDT&E: PE 64213A Project DC37 (Sunk)
PROCUREMENT: APPN 2031 SSN AA0250
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 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

OASD(PA) DFOISR 89 -T- 0557

6. Mission and Description (Cont'd):

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 Europe was completed in November, 1988, and the National Guard in December, 1988.

The CH-47D system is expected to satisfy the mission requirement.

c. Changes Since the "As of Date"--The final contract was negotiated in December, 1988, and will be signed on January 13, 1989. This is an FY 90-92 Multiyear Contract for 144 aircraft.

8. Threshold Breaches: There are currently no DAE baseline, DCP (dated August 15, 1980), or Secretary of Defense Decision Memorandum (SDDM) (dated October 20, 1980) threshold breaches. Average unit flyaway and procurement DCP thresholds were breached and reported in the December, 1983, SAR. Breach occurred as a result of program stretch-out caused by OSD and DA direction per PBD 102, dated December 7, 1983, to reduce yearly procurement objective from 60 to 48 aircraft/year and pursue a 5-year MYP (FY 1985-1989) for 240 aircraft. Notification was made by the PM thru HQ, AMC, to HQ, DA, on February 13, 1984.

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(Ch-1)
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(Ch-1)
First Unit Equipped	NA	Feb 83	Feb 83(Ch-1)
First Delivery, Second Production Contract	NA	May 83	May 83(Ch-1)
Third Production Contract Award (Single Year)	NA	Sep 83	Sep 83(Ch-1)
IOC (24th Aircraft 1st Unit)	Aug 83	Feb 84	Feb 84
Fourth Production Contract Award (Single Year)	NA	Mar 84	Mar 84(Ch-1)

a. Milestones --

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

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 Structure of the Army (ARCSA) III and initial allocation of four CH-47D aircraft to test and training base TDA requirement. Current estimate for DSARC III changed from September, 1980, as the SECDEF Decision Memorandum (SDDM) was signed October 20, 1980.

c. Current Change Explanations --

(Ch-1) Added milestones to agree with approved DAE Baseline.

d. References --

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

Approved Program: DAE Baseline March 1989.

10. Technical/Operational Characteristics:

a. Technical --	Dev Est	Approved Program Goal/Threshold	Demonstrated 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	1.5	2/	1.33
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	4.8	2/	3.58
Maintenance Man-Hour/Flight Hour	17.66	15.10/16.24	9.7	2/(Ch-1)	15.10
Vertical Rate of Climb (fpm)	200	200/200	200	1/	200
Hover-Out-of-Ground Effect (lbs) (Ch-4)	NA	50,000/50,000	50,000		53,950

a. Technical (Cont'd) --	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
Crashworthiness (Vertical Impact Velocity, FPS) (Ch-4)	NA	8.2/8.2	8.2	8.2
Engine Size, Intermediate Rated Power at Sea Level Standard (Ch-4)	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/(Ch-2)	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 (Ch-3)	13,400
Mission III Payload (lbs) (Outbound;Inbound) (Ch-4)	NA	13000;6500/ 13000;6500	13907;6953 (Ch-3)	13907;6953
Air Transportability in C-5 (Time to Load/Unload) (hrs) (Ch-4)	NA	7.5/12	7.5	7.5
Self-Deployable (NM) (Ch-4)	NA	1260/422		1260

Footnotes:

1/ Demonstrated performance reflects production testing.

2/ Sample field data collection as of August, 1987.

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.

d. Current Change Explanations --

(Ch-1) Demonstrated performance reflects production testing.

(Ch-2) Reflects increase in empty weight due to approved engineering changes.

(Ch-3) Reflects rating of transmission from 100 to 101 percent for true instrument reading of torque meter.

(Ch-4) Added to agree with technical and schedule parameters in approved baseline.

e. References --

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

Approved Program: DAE Baseline March 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	1317.7
(Initial Spares)	(26.0)	(61.7)	(61.7)
Total FY 75 Base -Year$	$ 882.5	$1404.0	$ 1404.0
Escalation	680.3	1917.8	1917.8
Development (RDT&E)	(22.5)	(27.2)	(27.2)
Procurement	(657.8)	(1890.6)	(1890.6)
Total Then-Year$	$ 1562.8	3321.8	$ 3321.8
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: FY 90/91
President's Budget.

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	3321.8	3037.6	3321.8
(2) Quantity	475	439	475
(3) Unit Cost	6.99	6.92	6.99
b. Current Procurement--	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	248.1	248.1 1/	326.6
Less CY Adv Proc	84.4	84.4	104.3
Plus PY Adv Proc	63.6	63.6	58.6
Net Total	227.3	227.3	280.9
(2) Quantity	48	48	48
(3) Unit Cost	4.74	4.74	5.85

1/ Adjusted to appropriated amount.

13. Cost Variance Analysis: CH-47D, December 31, 1988

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	98.6	1464.2	-	1562.8
Previous Changes:				
Economic	-	+ 164.4	-	+ 164.4
Quantity	-	+ 545.5	-	+ 545.5
Schedule	-	- 7.6	-	- 7.6
Engineering	-	-	-	-
Estimating	+ 14.9	+ 703.6	-	+ 718.5
Other	-	-	-	-
Support	-	+ 54.0	-	+ 54.0
Subtotal	+ 14.9	+1459.9	-	+1474.8
Current Changes				
Economic	-	+ 0.9	-	+ 0.9
Quantity	-	+ 203.5	-	+ 203.5
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	+ 9.5	-	+ 9.5
Other	-	-	-	-
Support	-	+ 70.3	-	+ 70.3
Subtotal	-	+ 284.2	-	+ 284.2
Total Changes	+ 14.9	+1744.1	-	+1759.0
Current Estimate	113.5	3208.3	-	3321.8

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	76.1	806.4	-	882.5
Previous Changes:				
Quantity	-	+ 154.7	-	+ 154.7
Schedule	-	+ 41.4	-	+ 41.4
Engineering	-	-	-	-
Estimating	+ 10.2	+ 195.8	-	+ 206.0
Other	-	-	-	-
Support	-	+ 29.4	-	+ 29.4
Subtotal	+ 10.2	+ 421.3	-	+ 431.5
Current Changes:				
Quantity	-	+ 71.6	-	+ 71.6
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	- 6.8	-	- 6.8
Other	-	-	-	-
Support	-	+ 25.2	-	+ 25.2
Subtotal	-	+ 90.0	-	+ 90.0
Total Changes	+ 10.2	+ 511.3	-	+ 521.5
Current Estimate	86.3	1317.7	-	1404.0

b. Previous Change Explanations --

RDT&E
Estimating: Reflects actual RDT&E program.

Procurement
Economic: Application of CH-47D historical, and OSD inflation guidance through February 3, 1988.

Quantity: ASARC/DSARC III decision added 75 aircraft. Program quantity increased from 361 to 436.

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

Estimating: 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.

Support: Refinement of prior estimate. Revised spares policy definition.

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E	N/A	N/A
(2) Procurement		
Revised December 22, 1988, escalation rates. (Economic)	N/A	+ 0.9
Additional 36 aircraft in FY 92 (Quantity)	+71.6	+203.5
Actual Contract MY II FY 90-92 less than estimated, Congressional Actions (Estimating).	- 6.8	+ 9.5
Spares increase for 36 additional quantity and simulator and other trainer upgrades (Support).	+25.2	+ 70.3

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

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	
4.29	+.35	+.58	-.02	-	+1.53	+.26	-	+2.70	6.99

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

a. Procurement --

Airframe	Initial Contract Price		
	Target Price	Ceiling	Qty
Boeing Helicopters, Ridley Park, PA,*	$1,172.7	N/A	240

DAAK50-85-C-A005, FFP,
5-year Multiyear Contract,
Award: April 8, 1985
Definitized: April 8, 1985

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$1,198.3	N/A	240	N/A	N/A

Current Target Price increase was for nonrecurring for approved Engineering Change Proposals.

*Corrects company name change from December, 1987, SAR.

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

Engine	Initial Contract Price		
	Target Price	Ceiling	Qty
TEXTRON Lycoming, Stratford, CT,*	$70.4	N/A	169

DAAJ09-85-C-A485, FFP
Award: September 30, 1985
Definitized: September 30, 1985

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$70.4		169	N/A	N/A

Contract is complete: All deliveries completed in May 1988. This contract will not be shown in next SAR.

*Corrects company name change from December, 1987, SAR.

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: 77.8 % (14 yrs/18 yrs)

(2) Percent Program Cost Appropriated: 74.7 % (2479.9/3321.8)

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

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	2366.4	326.6	259.9	255.4	3208.3
MILCON	-	-	-	-	-
Total	2479.9	326.6	259.9	255.4	3321.8

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

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY87 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	1/
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
Sub-total	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	307.6	3.4
1985	48	1.0	137.6	155.4	369.0	369.0	355.9	0.8
1986	48		113.0	114.8	273.3	273.3	262.9	0.0
1987	48		101.4	106.5	257.1	240.9	212.0	2.7
1988	48		90.4	99.6	244.5	213.7	17.7	3.1
1989	48		92.7	94.1	248.1	164.7	0.0	4.0
1990	48		106.9	120.3	326.6			3.6
1991	48		85.2	93.4	259.9			3.3
1992	48		77.2	87.6	248.9			2.8
1993				2.3	6.5			2.3
Sub-total	472	19.7	1188.1	1317.7	3208.3	2236.2	1810.3	
Total	475	19.7	1188.1	1404.0	3321.8	2349.7	1923.8	

1/ System Unique Indices 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	36
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	+ 78.9	1404.0	+ 44.2	1359.8
(TY $)	3224.4	+ 97.4	3321.8	+ 43.9	3277.9
PAUC (BY $)	3.02	- .06	2.96	+ .10	2.86
(TY $)	7.35	- .36	6.99	+ .09	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	N/A	10/81	N/A	10/81
Duration	156	-20	136	-21	115
End date	9/94	N/A	1/93	N/A	4/91

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	3/3
Procurement	240/240

e. Approved Design-to-Cost Goal --

	(Average Unit Flyaway Cost) Development Estimate	Current Estimate	Latest Approved Threshold
CH-47A			
Qty: 104			
Peak Rate: N/A			
FY 75 Base-Year$	2.764	N/A	N/A
Then-Year$	4.600	N/A	N/A
CH-47B			
Qty: 74			
Peak Rate: N/A			
FY 75 Base-Year$	2.357	N/A	N/A
Then-Year$	4.195	N/A	N/A
CH-47C			
Qty: 183			
Peak Rate: N/A			
FY 75 Base-Year$	1.567	N/A	N/A
Then-Year$	2.900	N/A	N/A
CH-47D			
Qty: 436			
Peak Rate: N/A			
FY 75 Base-Year$	N/A	2.62	2.63
Then-Year$	N/A	6.26	

Operating and Support Costs:

a. Assumptions and Ground Rules - - N/A

b. Costs - - N/A

c. Contractor Support Costs - -

(Then-Year Dollars in Millions)

	FY 1989 & Price 1/	FY 1990 Year	FY 1991 Year	Balance To Complete	Total
O&M	44.3	21.7	18.9	- -	84.9

1/ Includes FY 1988 & FY 1989

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SAR-88-011

N-9 C/MH-53E (3)

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

PROGRAM: C/MH-53E

AS OF DATE: December 31, 1988

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1. Designation and Nomenclature (Popular Name): CH-53E Heavy Transport/Assault 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 E. R. Seiffert
Assigned August 27, 1986
AV 222-3151; COMM (202) 692-3151

4. Program Elements/Procurement Line Items:

RDT&E: 0604260N
0640714N

PROCUREMENT: APPN: 1506 ICN 0148
0204453N, 0206122M, 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 HH-60D Night Hawk.

No Security Objection to Open Publication
OASD(PA) DFOISR 88-T-0572

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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, the 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 countermeasures devices. The CH-53E is similar to the basic CH-53D with the following exceptions: three T-64-GE-416 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 blades; 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. Full 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 of forty-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 (7) 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. Multiyear procurement for C/MH-53E was approved for FY 86 through FY 89 in the FY 85 DOD Appropriations Acts 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 completed in July 1984. The CH-53E final phase of FOT&E was completed 3 July 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. Increased procurement quantities will be addressed in POM 90. RDT&E efforts during FY 89 will include Helicopter Night Vision System development and development of an upgraded T-64-416 engine for the CH-MH-53E.

b. Significant Developments Since Last Report --

(1) On 24 October 1988 the the MH-53E received Approval from Assistant Secretary of the Navy (Shipbuilding & Logistics) for Full Rate Production.

7. Program Highlights: (Cont'd)

(1) On 1 August 1 1988 the west coast MH-53E squadron HM-15 stood up at NAS Alameda.

(2) The C/MH-53E is expected to meet all mission requirements approved in Decision Coordinating Paper #94.

c. Changes Since "As of Date" : None

8. Threshold Breaches Approval for Service Use milestone slipped from DCP #94 dated February 14, 1987. The program has also breached the February 1988 DAE baseline for the following milestone: Procurement objective Attained.

9. Schedule:

a. Milestones --	Development Estimate	Approved Program	Current Estimate
CH-53E			
Program Initiation	N/A	N/A	Jun 69
Milestone I (DSARCI) Concept Validation	N/A	MAY 73	May 73
First Navy Flight Development Prototype #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 Aircraft	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	FY 83
Procurement Objective Attained	9/90	Sep 90	Sep 94
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 Development 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 First Production Aircraft	N/A	N/A	Jun 86
Milestone IIIB Continue Ltd. Production	N/A	Nov 87	Nov 87
Milestone IIIC Full Scale Production	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 anomaly. 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.

c. Current Change Explanations -- None

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 February 1988.

10. Technical/Operational Characteristics:

	Dev Estimate	Approved Program	Demonstrated Performance	Current Estimate
a. Technical --				
Weight Empty (lbs)				
Maximum gross weight (lbs)				
Weight Empty (lbs)	34,000	33,326	33,226	33,226
w/Ext Payload, HIGE SL/90 deg F	73,500	73,500	73,500 CH-1	73,500

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

	Dev Estimate	Approved Program (6/Th)	Demonstrated Performance	Current Estimate
a. Technical --				
Dimensions (Spread/Folded configuration)				
Length	*99.0	60.5	99.5/60.5	99.5/60.5
Width	*79.0	28.5	79.0/28.5	79.0/28.5
Height	*28.4	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	170	170 CH-1	170
2. 56K lbs GW (Internal Load)	140	170	140 CH-1	140
3. 70K lbs GW (External Load)	100	100	100 CH-1	100
Rate of Climb (ft/min) One Engine Inop @ 69,750 lbs GW	150	200	200 CH-1	200
Radius/Range (NM)				
Range (NM)				
Internal payload (1000 cu. ft. cargo, not to exceed gross weight limits) with full internal and full external aux fuel tanks (10% reserve)	550	500	500 CH-1	500
Payload (lbs)				
Payload (lbs)				
External, 50 NM radius. S/L90 F, HIGE 20 min. fuel reserve) 3000' MSL 91.5oF, HOGE	32,000	32,000	32,000	32,000
Internal Payload (10% reserve) 500 NM Range	20,000	16,000	16,000	16,000
Reliability (%)				
Mission reliability 1 hr mission @ 90% confidence	.93	.93	.93 CH-1	.93
Aircraft MFHBA (1 hour mission)	13.7	13.8	13.8 CH-1	13.8
Aircraft MFHBF	.77	.70	.70 CH-1	.70
Maintainability				
Aircraft MMH/FH (org. corrective)	8.0	9.50	7.72	9.50
Availability	.85	.93	.93	.93
AMCM (MH-53E)				
Tow Tension (x 1,000 lbs.)	N/A	30.0	30.0	30.0
Time on Station (hrs.)	N/A	3.2	3.2	3.2

c. Previous Change Explanations -- Based on demonstrated performance the following 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.

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

d. Current Change Explanations --

(CH-1) Demonstrated Performance reflects current achievements to date.

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 February 1988.

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

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	$ 93.3	$ 182.4	$ 182.4
Procurement	371.1	1074.9	1074.9
Airframe	(250.2)	(722.4)	(722.4)
Engine	(46.9)	(119.0)	(119.0)
Avionics	(5.4)	(15.1)	(15.1)
Other GFE	(1.9)	(9.7)	(9.7)
Total Flyaway	(304.4)	(866.2)	(866.2)
Other Wpn Sys Cost	(29.4)	(117.0)	(117.0)
Initial Spares	(37.3)	(91.7)	(91.7)
Construction (MILCON)		2.8	2.8
Total FY 73 Base-Year $	464.4	1260.1	1260.1
Escalation	114.0	1705.5	1705.5
Development RDT&E	(7.0)	(101.2)	(101.2)
Procurement	(107.0)	(1599.7)	(1599.7)
Construction (MILCON)	-	(4.6)	(4.6)
Total Then-Year $	$578.4	$2965.6	$2965.6
b. Quantities --			
Development (RDT&E)	4	4	4
Procurement	70	152	152
Total	74	156	156

c. Foreign Military Sales -- N/A

d. Nuclear Cost -- None

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: FY 1990/1991 Presidents Budget

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

	Current Est (Dec 88 SAR)	Current Year UCR Baseline (Dec 87 SAR)	Budget Year UCR Baseline (Dec 88 SAR)
a. Program Acquisition --			
(1) Cost	2965.6	3001.1	2965.6
(2) Quantity	156	153	156
(3) Unit Cost	19.0	19.6	19.0
b. Current Procurement --			
	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	235.5	235.5	64.1
Less CY Adv Proc	-46.0	-46.0	-0.0
Plus PY Adv Proc	+48.2	+48.2	+46.0
Net Total	237.7	237.7	110.1
(2) Quantity	14	14	3
(3) Unit Cost	17.0	17.0	36.7

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	+5.7	-157.4	-	-151.7
Quantity	-	+2169.6	-	+2169.6
Schedule	+1.5	+63.9	-	+65.4
Engineering	+162.7	+294.6	-	+457.3
Estimating	+25.8	-719.8	0.2	-693.8
Other	+3.0	-	-	+3.0
Support	+18.6	+547.1	7.2	+572.9
Subtotal	+217.3	+2198.0	+7.4	+2422.7
Current Changes:				
Economic	+.1	-8.2	-	-8.1
Quantity	-	+125.6	-	+125.6
Schedule	-	-	-	-
Engineering	-	-.4	-	-.4
Estimating	-34.1	-8.0	-	-42.1
Other	-	-	-	-
Support	-	-110.5	-	-110.5
Subtotal	-34.0	-1.5	-	-35.5
Total Changes	+183.3	+2196.5	+7.4	+2387.2
Current Estimate	+283.6	2674.6	+7.4	+2965.6

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	93.3	371.1	-	464.4
Previous Changes:				
Economic	-	-	-	-
Quantity		+606.9	-	+606.9
Schedule	+1.6	+33.2	-	+34.8
Engineering	+77.1	+96.1	-	+173.2
Estimating	+9.8	-209.4	+.2	-199.4
Other	+2.4	-	-	+2.4
Support	+10.5	+170.3	+2.6	+183.4
Subtotal	+101.4	+697.1	+2.8	+801.3

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

	RDT&E	PROC	MILCON	TOTAL
Current Changes:				
Economic	-	-	-	-
Quantity	-	+28.7	-	+28.7
Schedule	-	-	-	-
Engineering	-	-.1	-	-.1
Estimating	-12.3	+6.4	-	-5.9
Other	-	-	-	-
Support	-	-28.3	-	-28.3
Subtotal	-12.3	+6.7	-	-5.6
Total Changes	+89.1	+703.8	+2.8	+795.7
Current Estimate	182.4	1074.9	+2.8	+1260.1

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. Decrease from 153 to 149.
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 $
(1) RDT&E		
Revised Dec 88 economic escalation indicies. (Economic)	N/A	+.1
Budget Reduction caused a delay of Composite Main Rotor Blade development (Estimating)	-12.3	-34.1
(2) Procurement		
Correction of current variances in December 1987 SAR to reverse prior procurement changes		
Revised Economic Escalation (Economic)		-5.7
Reduction of 4 aircraft in FY 90 (Quantity)	+32.0	+136.6
(Estimating)	-1.0	-36.5
Revised Flyaway Estimate (Estimating)	+ 5.4	+24.6
Revised Support in prior years (Support)	+13.1	+52.5
Corrected variances for December 1987 SAR		
Revised Economic Escalation (Economic)		+5.0
Reduction of 4 aircraft in FY 90	-34.1	-120.7
Deletion of 4 Aircraft (Quantity)	(-13.4)	(-44.0)
Engineering Changes (Engineering)	(-3.1)	(-10.2)
Estimating Changes (Estimating)	(-15.5)	(-49.9)
Reduction of Support (Support)	(-2.1)	(-16.6)
Congressional reduction of FY 1987 funds reduced support costs (support)	-3.1	-9.3
Refined estimate for follow-on support costs (support)	-13.5	-46.5
Adjustment for erroneous base year dollars derived from then year conversions in prior years (support)	+9.3	-
Adjustment for previous base year conversions (Estimating)	-8.1	-

Current procurement variances for this SAR - December 1988

Procurement		
Revised economic indices (Economic)		-7.5
Current and prior inflation offset (Estimating)	+3.2	+6.7
Addition of three aircraft in FY 90	+19.0	+62.0
Addition of 3 aircraft (Quantity)	(+10.1)	(+33.0)
Engineering changes 3 aircraft (Engineering)	(+3.0)	(+9.8)
Estimating changes 3 aircraft (Estimating)	(+5.9)	(+19.2)
Congressional Reduction of FY 89 funds caused a decrease of Non-Recurring engineering costs (Estimating)	-3.8	-12.1
Recategorization of FY 90 year funds		
Flyaway (Estimating)	+12.2	+40.0
Support (Support)	-12.2	-40.0
Decreased costs for spares requirements (support)	-13.5	-29.8
Decreased costs for follow-on support (support)	-6.3	-20.8
Adjustment for previous base year conversions (Estimating)	+8.1	-

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

a. Initial/Development Estimate to Current Estimate--

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
7.8	-1.0	+10.6	+0.4	+2.9	-4.8	+0.1	+3.0	+11.2	19.0

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 Award: April 30, 1985 Definitized: September 30, 1986	$644.2	N/A	56.0

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	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. N00019-84-C-0158/FFP Award: July 31, 1986 Definitized: December 31, 1986	$81.6	N/A	121.0

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$81.6	N/A	121.0	$81.6	$81.6

FFP Contracts - no variance analysis required

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

a. Program Status --

(1) Percent Program Completed: 77.3% (17 yrs/22 yrs)

(2) Percent Program Cost Appropriated: 97.5% ($2892.7/$2965.6)

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

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY 73-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY 92-94)	Total
RDT&E	275.5	8.1	-	-	283.6
Procurement	2609.7	64.1	.8	-	2674.6
MILCON	7.4	0.0	-	-	7.4
Total	2892.6	72.2	.8	-	2965.6

c. Annual Summary --

Fiscal Year	Qty	FY 73 Nonrec	Flyaway Dollars Rec	TOTAL Base Year	Total Then-Year Program	Obli-gated	Ex-pended	Escl Rate
Appropriation: RDT&E								
1973				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	12.4	12.1	7.6
1983				6.9	15.2	15.2	14.6	4.9
1984				12.6	28.7	28.7	28.7	3.8
1985				4.9	11.5	11.5	10.7	3.4
1986				0.8	1.9	1.9	1.2	2.8
1987				1.5	3.8	3.6	2.0	2.7
1988				4.2	10.9	10.7	2.7	3.1
1989				3.3	8.8	13.0	5.8	4.0
1990				2.9	8.1	0.0	0.0	3.6
1991				-	-	0.0	0.0	3.3
1992				-	-	0.0	0.0	2.8
1993				-	-	0.0	0.0	2.3
1994				-	-	0.0	0.0	1.8
Subtotal 4				182.4	283.6	279.7	260.5	

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	113.8	115.4	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	172.5	171.6	8.7
1980	13	0.0	82.5	104.7	211.0	177.0	173.7	11.8
1981	14	0.0	80.7	99.2	222.6	190.0	188.5	11.6
1982	14	0.0	71.8	93.5	227.9	205.1	201.8	14.3
1983	11	5.3	56.4	85.9	222.9	192.8	190.0	9.0
1984	11	2.2	51.7	72.8	196.4	173.0	163.5	8.0
1985	10	11.9	47.7	91.2	254.0	188.1	178.8	3.4
1986	14	1.0	69.1	89.4	255.8	207.7	195.0	2.8
1987	14	0.0	63.7	75.0	221.9	173.9	161.0	2.7
1988	14	2.9	67.1	81.7	250.5	187.5	0.5	3.1
1989	14	2.3	65.6	74.3	235.5	124.4	0.4	4.0
1990	3	16.0	19.0	19.6	64.1	0.0	0.0	3.6
1991	0	0.0	0.0	0.2	0.8	0.0	0.0	3.3
1992	0	0.0	0.0	0.0	0.0	0.0	0.0	--
1993	0	0.0	0.0	0.0	0.0	0.0	0.0	
1994	0	0.0	0.0	0.0	0.0	0.0	0.0	
Subtotal	152	67.1	799.1	1074.9	2674.6	2106.4	1836.7	--
Appropriation: MILCON								
1983				0.4	0.8		0.8	4.9
1984				0.0	0.0		0.0	3.8
1985				0.0	0.0		0.0	3.4
1986				1.3	3.4		3.4	2.8
1987				0.0	0.0		0.0	2.7
1988				1.1	3.2		3.2	3.1
Subtotal				2.8	7.4		7.4	
Total	156	67.1	799.1	1260.1	2965.6	2106.4	1836.7	

17. Production Rate Data:

a. Annualized Production Rates -- (NOTE: The Maximum Economic Production Rate was not attained until August 1978 and substained at two per month until program completion.) The attainment of Maximum Production Rate is limited by other services buys.

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1976	5			
1977	10	6	6	
1978	18	0	0	10
1979	20	14	14	24
1980	17	15	13	24
1981		14	14	24
1982			14	24
1983			11	24
1984			11	24
1985			10	24
1986			14	24
1987			14	24
1988			14	24
1989			14	24
1990			3	24

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)	Economic
Prog Acq Cost (BY $)	476.0	+798.9	1274.9	+ 87.6	1187.3
(TY $)	768.5	+2247.3	3015.8	+579.4	2436.4
PAUC (BY $)	9.0	-0.8	8.2	+0.5	7.7
(TY $)	14.5	+4.8	19.3	+3.7	15.6

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)	2/78	NA	2/78	N/A	2/78
Duration (in months)	43	108	151	+12	139
End Date (Mo/Yr)	9/81	NA	9/90	N/A	9/89

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	4/3*
Procurement	115/115

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

17. Production Rate Data: (Cont'd)

e. Approved Design to Cost Goal --

	(Average Unit Flyaway Cost) Dev Estimate/ DAR BASELINE	Current Estimate	Latest Approved Threshold
@ Qty: 49			
@ Peak Rate: 2/Mo			
FY 78 Base-Year $	(1)/8.4	6.4(2)	9.3
Then-Year $	(1)/9.9	12.3(2)	-

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

18. Operating and Support Costs:

(a) N/A

(b) N/A

(c) Contractor Support Costs --

(Then-Year Dollars in Millions)

	FY1989 & Prior	FY1990 Year	FY1991 Year	Balance To Complete	Total
O&MN	22.4	8.4	8.8	-	39.6

A-9 COPPERHEAD

[redacted]

SAR-88-081

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

PROGRAM: COPPERHEAD

AS OF DATE: December 31, 1988

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[redacted] MAR 05 1989 5

1. (U) Designation/Nomenclature (Popular Name): M712/155MM Cannon Launched Guided Projectile (COPPERHEAD)

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

3. (U) Responsible Office and Telephone Number:

Cannon Artillery Weapons Systems/
Joint Project Manager, Guided
Projectiles
Armament Research, Development and
Engineering Center
Picatinny Arsenal, New Jersey

PM: COL Joseph R. Cote

Assigned: July 1985

Autovon: 880-2572

4. (U) Program Elements:

RDTE: PE 64218 Project D073 (sunk)
Procurement: APPN 2034 SSN E67600

5. (U) Related Programs: Ground Laser Designator Program, AHIP, AH64 Designator.

[redacted]

[redacted]

[redacted] OASD(PA) DFOISR 88-T-0623

[redacted]

6. (U) Mission and Description: The 155mm Cannon Launched Guided Projectile Copperhead (CLGP) is an artillery projectile with terminal homing capability. It is compatible with current and developmental 155mm Howitzers and uses standard propelling charges. This projectile is employed in indirect fire by 155mm (M198 and M109) units to destroy or neutralize moving and stationary hard-point targets such as armored and mechanized vehicles and field fortifications. Point targets are to be illuminated with either a ground or airborne laser which will provide reflective energy to enable the projectile to home in on the target. The CLGP is included in the basic ammunition loads of appropriate field artillery units. The basic designator for the CLGP is the Ground Locator Laser Designator (GLLD) and the performance characteristics stated in the SAR relate to operation with that equipment.

7. (U) Program Highlights:

a. (U) Significant Historical Developments - - The 155mm Cannon Launched Guided Projectile was formally assigned to the Project Manager, Cannon Artillery Weapons Systems on 22 February 1971. Martin Marietta Aerospace and Texas Instruments Incorporated were selected in February 1972 for participation in Advanced Development (AD). The two contractors were authorized to enter into the Validation Phase of Advanced Development with different design concepts in September 1973. During the Validation Phase, each contractor built twelve projectiles for operational demonstration testing at White Sands Missile Range. DSARC II was held on 19 June 1975 resulting in authorization to enter Full Scale Engineering Development. Martin Marietta was awarded an Engineering Development Contract on 25 July 1975. DSARC III was held on 6 November 1979. Approval was received to enter production at a rate not to exceed 200 units per month until a threshold reliability of 0.8 had been demonstrated based on production validation test firings. Subsequently, OSD approved a request to substitute Lot Acceptance Test results as a more appropriate demonstration of COPPERHEAD Production Reliability in lieu of 75 round point estimate demonstration. The designator for COPPERHEAD is the Ground Laser Locator Designator (GLLD). The GLLD, managed by PM, HELLFIRE, was type classified in March 1979. Both the GLLD and COPPERHEAD were fielded concurrently in Jul 82 using a single Materiel Fielding Team. The First Unit Equipped (FUE) with COPPERHEAD/GLLDs was the 1st Battalion of the 73rd FA brigade at Ft. Bragg, North Carolina. COPPERHEAD/GLLD training at Ft. Bragg was completed in Aug 82. All required actions for the full release of COPPERHEAD were completed in July 1982 at which time the 1st Battalion 73rd FA Brigade became the first unit equipped with COPPERHEAD. The formal Full Release documentation was signed August 5, 1982. The final production buy for COPPERHEAD was FY 88.

b. (U) Significant Developments Since Last Report - - 4007 COPPERHEAD Projectiles were delivered by the contractor in the year ending 31 December 1988. Total delivery to date is 20477. The program/system is expected to satisfy the mission requirements. Previous production schedule delays relating to a gyro rotor adhesive problem have been fully resolved and deliveries are now on schedule. As of December 31, 1988, 90.3% of COPPERHEAD Program expenditures are completed. In accordance with provisions of section 2432, title 10, USC, the December 1988 SAR is the final SAR submission.

7. (U) Program Highlights (Cont'd)

(U) System cumulative point estimate reliability is 85% while cumulative weighted reliability is 90.4% based on 1982 thru 1987 calendar year Lot Acceptance Testing. The projectile reliability is defined as the probability that the projectile will function properly from the time of launch until it intercepts and impacts the target with the required accuracy.

(U) COPPERHEAD field firings confirm the Lot Acceptance Test results with a cumulative reliability (point estimate) since 1982 of 84%.

c. (U) Changes Since "As Of" Date -- This is the final SAR submission for COPPERHEAD since over 90% of the planned acquisition expenditures are completed.

8. (U) Threshold Breaches: None

9. (U) Schedule

	Development Estimate	Approved Program	Current Estimate
a. (U) Milestones			
(U) Award ED Contract	Jul 75	Jun 75	Jul 75
(U) Engineering Design Tests			
(1) Baseline Flight Test			
(A) Start	Apr 76	Mar 77	Mar 77
(B) Complete	Sep 76	Jul 78	Jul 78
(2) Safety/Warhead Fuze Qual			
(A) Start	Nov 76	Nov 76	Nov 76
(B) Complete	Mar 77	Nov 79	Jan 79
(3) System Qualification			
(A) Start	Oct 76	Apr 78	Apr 78
(B) Complete	Mar 77	Jan 79	Jan 79
(U) DT II/OT II			
(1) Start (DT II)	Jul 77	Mar 78	Mar 78
(OT II)	Sep 77	Feb 79	Feb 79
(2) Complete (DT II)	Jun 78	Dec 79	Dec 79
(OT II)	Nov 77	Jun 79	Jun 79
(U) Milestone IIIA (ASARC)	Feb 78	Sep 79	Sep 79
(DSARC)	Feb 78	Nov 79	Nov 79
(U) Initial Prod Deliveries	Mar 79	Oct 81	Oct 81
(U) Prod Validation Test			
(1) Start	Mar 79	Nov 81	Nov 81
(2) Complete	Aug 79	Aug 82	Aug 82
(U) Prod Reliability Test			
(1) Start	N/A	Nov 81	Nov 81
(2) Complete	N/A	Aug 82	Aug 82
(U) Initial Oper Capability (IOC)	Nov 79	Dec 82	Dec 82

9. (U) Schedule (Cont'd)

	Development Estimate	Approved Program	Current Estimate
(U) First Unit Equipped	N/A	Jul 82	Jul 82
(U) Milestone IIIB Full Production	N/A	Dec 83	Dec 83
(U) FY 86 Production Contract			
(1) Award Date	N/A	Jul 86	Jul 86
(2) First Delivery	N/A	Aug 87	Aug 87
(U) FY 87 Production Contract			
(1) Award Date	N/A	Oct 87	Oct 87
(2) First Delivery	N/A	Apr 89	Apr 89
(U) FY 88 Production Contract			
(1) Award Date	N/A	Feb 88	Feb 88
(2) First Delivery	N/A	Aug 89	Aug 89
(U) Second Source Effort			
(1) Issue RFP	N/A	Jun 87	N/A*
(2) Proposal Due Date	N/A	Sep 87	N/A*
(3) Contract Award	N/A	Feb 88	N/A*

* Second Source Evaluation was completed and forwarded to Congress on 10 Feb 88. In accordance with the FY86 appropriation language, the cost effectiveness analysis was performed and it showed that second source was not cost effective; therefore, a contract for 830 rounds was awarded to the current contractor (Martin Marietta) in lieu of a second source.

b. (U) Previous Change Explanations --

The difference in schedule milestones is due to: restructuring of program following Congressional cuts in FY76 and FY7T (see Jun 76 SAR), correction of hardware deficiencies (see Sep 77 SAR), delay in authority to obligate FY78 funds, problems in converting from hybrid to Large Scale Integrated Circuitry manufacture, design fixes of control actuating system problems (see Jun 78 SAR), partial stop work order issues to the contractor on 11 Jul 78 to allow time to resolve technical problems and increase reliability of projectiles in subsequent tests, delay of DSARC (Milestone III)

9. (U) Schedule (Cont'd)

from Sep 79 to Nov 79, extended production lead times for critical components, DSARC III decisions, extended negotiations with contractor and subsequent delay in first year production contract award, late prove-out of production facility IPF rounds, correction of manufacturing difficulties discovered in IPF prove-out, problems in fabricating components and subassemblies causing the contractor to slip one month in the projectiles for FAT/IPF, resulting in a delay in IPT completion. Scheduling difficulties at WSMR caused an additional month's slippage in Production Validation Test completion and the combined COPPERHEAD/GLLD Systems' IOC was reforecasted based on the availability of GLLDs.

c. (U) Current Change Explanations - - None

d. (U) References - -

Development Estimate: DCP No. 119 dated Sep 1975

Approved Program: DAE approved Baseline, 26 Feb 88.

10. (U) Technical/Operational Characteristics:

		Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
a. (U) Technical - -					
(U) Projectile Weight	(lbs)	96-150	138	137.7	138
	(kg)	43.5-68.0	N/A	62.4	62.6
(U) Projectile Length	(in) 3/	28-54	54.2	54.2	54.2
	(cm)	71.1-137.2	N/A	137.7	137.7
(U) Warhead Weight	(lbs)	49.6	N/A	48.8	48.8
	(kg)	22.5	N/A	22.1	22.1
(U) Explosive Weight	(lbs)	14.0	14.0	14.0	14.0
	(kg)	6.4	N/A	6.4	6.4

NOTE: No goals/thresholds are specified in approved baseline

b. (U) Operational

(b)(1)

(U) Minimum Range (km)					
(1) (U) High Angle		3.5	N/A	5.0	5.0
(2) (U) Low Angle		1.5-3.0	3.0	3.0	3.0

(b)(1)

Launch (P(L)) 4/	- -	N/A	.98	.98
(U) Oper Prob of Proper Des (P(D)) 4/	- -	N/A	.98	.98

AS AMENDED

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

c. (U) Previous Change Explanations - -

(U)

d. (U) Current Change Explanations - - None

e. (U) References - -

Development Estimate: DCP No. 119 dated September 1975

Approved Program: DAE approved Baseline, 26 Feb 88.

AMENDED

FOOTNOTES:

1/ (U) Projectile Effectiveness P(E), is defined as: (Probability of a Reliable Round) x (Probability of a Hit, Given a Reliable Round), x (Probability of a Kill (M or F), Given a Hit, with a reliable round).

2/ (U) The Single Shot Kill Probability (SSKP) - The SSKP is calculated at: SSKP = P(L) x P(E) x P(D) where P(L) = Operational Probability of Proper Launch, P(E) - Projectile Effectiveness, and P(D) = Operational Probability of Proper Designation.

3/ (U) Latest approved Materiel Need changes Projectile Length to 54.5 in/ 138.4 cm.

4/ (U) P(D) and P(L) could not be determined from data collected during OT II. DT II provided instrumental data which resulted in the values stated.

5/ (U) The SSKP against a specified target and all other known potential targets exceeds the required minimum.

COPPERHEAD, December 31, 1988

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

a. (U) Cost - -	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	109.3	134.6	134.6
Procurement	738.0	571.4	571.4
Total Flyaway	(731.6)	(556.5)	(556.5)
Other Wpn Sys Cost	(6.4)	(14.9)	(14.9)
Total: Const FY75 $	847.3	706.0	706.0
Escalation	393.4	531.7	531.7
Development	(8.9)	(15.9)	(15.9)
Procurement	(384.5)	(515.8)	(515.8)
Total Then-Year $	1240.7	1237.7	1237.7

b. (U) Quantities - -	Development Estimate	Approved Program	Current Estimate
Development	408	320	320
Procurement	132650	24545	24545
Total	133058	24865	24865

c. (U) Foreign Military Sales - - Direct sales to date total 25 projectiles to Japan (all fired in test). In addition, sales from Army stock included Jordan, 100 rounds, Bahrain, 50 rounds, and Eqypt, 20 rounds.

d. (U) Nuclear Costs - - None

e. (U) References - -

Development Estimate: DCP No. 119 dated September 1975

Approved Program: FY 90-91 President's Budget

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	1237.7	1237.7	1237.7
(2) Quantity	24865	24866	24865
(3) Unit Cost	.0498	.0498	.0498

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

		Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
b. (U)	Current Procurement	(FY 1989)	(FY 1989 APPN)	(FY1990)
(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: FY 88 was the last funded buy for COPPERHEAD.

13. (U) Cost Variance Analysis:

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

	RDTE	Proc	Milcon	Total
Development Estimate	118.2	1122.5	-	1240.7
Previous Changes:				
Economic	-4.2	57.7	-	53.5
Quantity	-2.2	-1042.7	-	-1044.9
Schedule	-9.6	340.3	-	330.7
Engineering	25.5	1.3	-	26.8
Estimating	6.5	603.4	-	609.9
Other	6.3	-	-	6.3
Support	10.0	4.7	-	14.7
Subtotal	32.3	-35.3	-	-3.0
Current Changes				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	0.0	0.0	-	0.0
Total Changes	32.3	-35.3	-	-3.0
Current Estimate	150.5	1087.2		1237.7

13. (U) Cost Variance Analysis: (Cont'd)
(FY75 Constant (Base Year) Dollars in Millions)

	RDTE	Proc	Milcon	Total
Development Estimate	109.3	738.0	-	847.3
Previous Changes				
Quantity	-1.7	-582.2	-	-583.9
Schedule	-8.8	158.2	-	149.4
Engineering	15.4	0.8	-	16.2
Estimating	7.8	253.7	-	261.5
Other	4.6	-	-	4.6
Support	8.0	2.9	-	10.9
Subtotal	25.3	-166.6	-	-141.3
Current Changes				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	0.0	0.0	-	0.0
Total Changes	25.3	-166.6	-	-141.3
Current Estimate	134.6	571.4	-	706.0

b. (U) Previous Change Explanations - -

(U) RDT&E

Economic: revised escalation indices
Quantity: reduction of ED units to offset contractor cost growth
Schedule: funding reductions and delays
Engineering: technical problem resolution; establishment of alternate fuze and components designs, enhanced warhead PIP, and DT II corrections
Estimating: additional DT III testing and TDP validation; elimination of 4th DTUPC award fee
Other: reprogramming to partially fund ED contract cost growth; provision for final DTUPC award fees
Support: increased FY 78 program to include 8" CLGP and Army/Navy testing; requirement subsequently waived.

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

b. (U) Previous Change Explanations - -

(U) Procurement

Economic: revised inflation indices
Quantity: reduction in quantity from 132,650 to 24,545; elimination of buys 89-92 (14,656 rds) due to budget deliberations
Schedule: revised procurement strategy; stretchout of IPF contract and expanded prove-out requirement; changes in delivery quantities; termination of FY 89-92 quantities due to zeroing out of program during budget deliberations
Estimating: additional facilities and tooling; re-estimation of procurement costs due to production rate change; termination of FY 89-92 quantities due to zeroing out of program during budget deliberations
Support: ancillary equipment for artillery battalions

(U) MILCON

None

c. (U) Current Change Explanations - -

None

14. (U) Program Acquisition Unit Cost (PAUC) History:

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	
.0093	+.0027	+.0079	+.012	+.0009	+.0164	+.0005	+.0001	+.0405	.0498

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

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
.0498	--	--	--	--	--	--	--	--	.0498

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

a. (U) RDT&E - None

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

b. (U) Procurement - -

Martin Marietta Aerospace, Orlando, FL
DAAA21-88-C-0231 (FFP)
Award: Jun 88

Initial Contract Price		
Target	Ceiling	Qty
$94.70	N/A	2770

Current Contract Price		
Target	Ceiling	Qty
$94.70	N/A	2770

Estimated Price at Completion	
Contractor	Program Manager
$94.70	$94.70

Martin Marietta Aerospace, Orlando, FL
DAAA21-88-C-0047
Award: Jul 88

Initial Contract Price		
Target	Ceiling	Qty
$27.40	N/A	830

Current Contract Price		
Target	Ceiling	Qty
$27.40	N/A	830

Estimated Price at Completion	
Contractor	Program Manager
$27.40	$27.40

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

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

a. (U) Program Status - -

(1) Percent Program Completed: 100.0% (18 yrs/18 yrs)
(2) Percent Program Cost Appropriated: 100.0% ($1237.7/$1237.7)

b. (U) Appropriation Summary - -

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY71-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-95)	Total
RDT&E	150.5	-	-	-	150.5
Procurement	1087.2	-	-	-	1087.2
MILCON	-	-	-	-	-
Total	1237.7	-	-	-	1237.7

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars) 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: RDT&E								
FY71				2.1	1.6	1.6	1.6	3.8
FY72				9.1	7.3	7.3	7.3	4.2
FY73				9.6	8.0	8.0	8.0	5.8
FY74	24			6.2	5.6	5.6	5.6	8.8
FY75				6.1	6.1	6.1	6.1	6.6
FY76				13.1	17.0	17.0	17.0	3.5
FY77				36.5	38.0	38.0	38.0	3.8
FY78				30.0	36.0	36.0	36.0	6.8
FY79	296			11.6	15.0	15.0	15.0	8.4
FY80				6.2	9.0	9.0	9.0	9.4
FY81				2.6	4.2	4.2	4.2	11.9
FY82				1.6	2.7	2.7	2.7	7.6
Subtotal				134.6	150.5	150.5	150.5	
Appropriation: Procurement 1/ 2/ 3/								
FY78		22.2		22.2	27.2	26.7	26.7	6.8
FY79		15.9	1.5	17.4	23.2	22.3	22.3	8.7
FY80	1114		52.4	52.4	76.5	75.9	75.9	9.7
FY81	2624		79.9	79.9	130.4	128.9	128.9	11.9
FY82	3857		86.7	86.7	154.5	154.5	154.5	7.6
FY83	1220		27.1	27.1	55.0	55.0	55.0	4.9
FY84	1580		34.7	34.7	73.7	73.7	73.7	3.6
FY85	5250		93.0	93.0	200.9	200.9	200.9	3.4
FY86	5536		98.3	98.3	210.1	210.1	210.1	2.8
FY87	494		8.1	8.1	17.9	14.0	1.9	2.7
FY88	2770		51.6	51.6	117.8	86.8	16.4	3.1
Subtotal	24545	38.1	533.3	571.4	1087.2	1059.8	967.3	
Total	24865	38.1	533.3	706.0	1237.7	1210.3	1117.8	

1/ The FY 86 and FY 87 quantities reflect an adjustment for competitive procurement.

2/ The FY 88 dollars reflect the $17.3M congressional plus up. This additional funding will be used for close-out and layaway.

3/ The FY 89 through 92 zero dollars and quantity reflect program termination.

COPPERHEAD, December 31, 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
1978	7125			
1979	3636			
1980	9600	2100	1114	1114
1981	21200	4300	2624	2624
1982	24000	3900	3957	3957
1983	36000	8400	1220	1220
1984	31090	8400	1580	1580
1985		8400	5250	16800
1986		8886	5536	16800
1987			494 1/	16800
1988			2770	16800

1/ USMC acquisition and/or combining of FY 86/FY 87 quantities should allow contractor to maintain production rate.

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 $)	618.3	+87.7	706.0	-0-	706.0
(TY $)	1114.9	+112.8	1237.7	-0-	1237.7
PAUC (BY $)	.0139	+.0146	.0284	-0-	.0284
(TY $)	.0249	+.0249	.0498	-0-	.0498

c. (U) Schedule Variance - -

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	3/78	+33	12/80	N/A	12/80
Duration (in Months)	80	+16	96	-0-	96
End Date (Mo/Yr)	11/84	+49	12/88	N/A	12/88

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

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

	To Date
RDT&E	320/320
Procurement	20477/20477

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

	(Average Unit Flyaway Cost) Development Estimate	Current Estimate	Latest Approved Threshold
@Qty:			
@Peak Rate: 3000/mo			
FY 75 Base-Year $	.0055/.0186	.0228	.0225
Then-Year $	.0082/.0385	.0444	.0490

18. (U) Operating and Support Costs:

a. (U) Assumptions and Groundrules - - N/A

b. (U) Costs - - N/A

c. (U) Contractor Support costs - -

(Then-Year Dollars in Millions)

	FY 1989 & Prior 1/	FY 1990 Year	FY 1991 Year	Balance To Complete	Total
O&M	.2	.1	.1	TBD	.4

NOTE:
1/ Includes FY 88-89.

(2) ~~SECRET~~ SAR-88-065

AF-10 DSCS III

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

AS OF DATE: December 31, 1988

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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:

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

Colonel Donald R. Walker
Assigned: October 21, 1987
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 ICN MS0777

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

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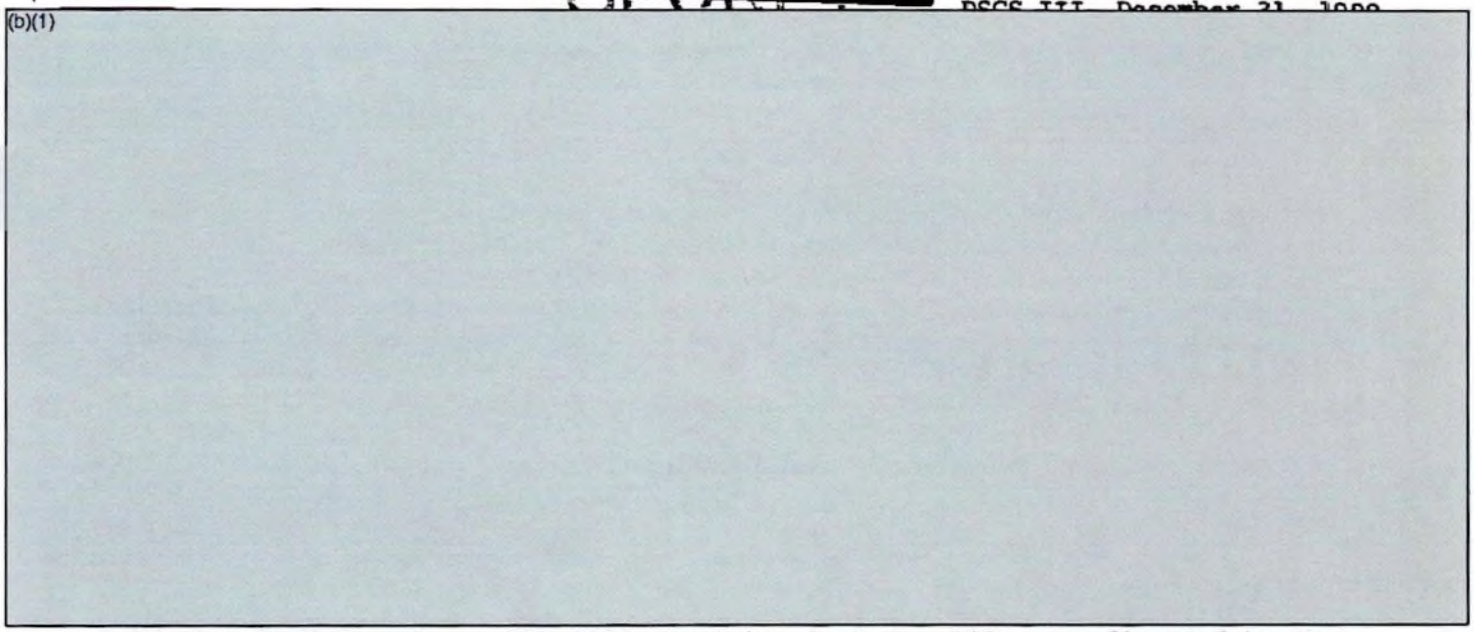
6.(U) Mission and Description: The Defense Satellite Communications System Phase III (DSCS III) provides Super High Frequency (SHF) satellite communications for secure voice and high data rate transmissions. DSCS supports unique and vital national security requirements for worldwide military command 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:

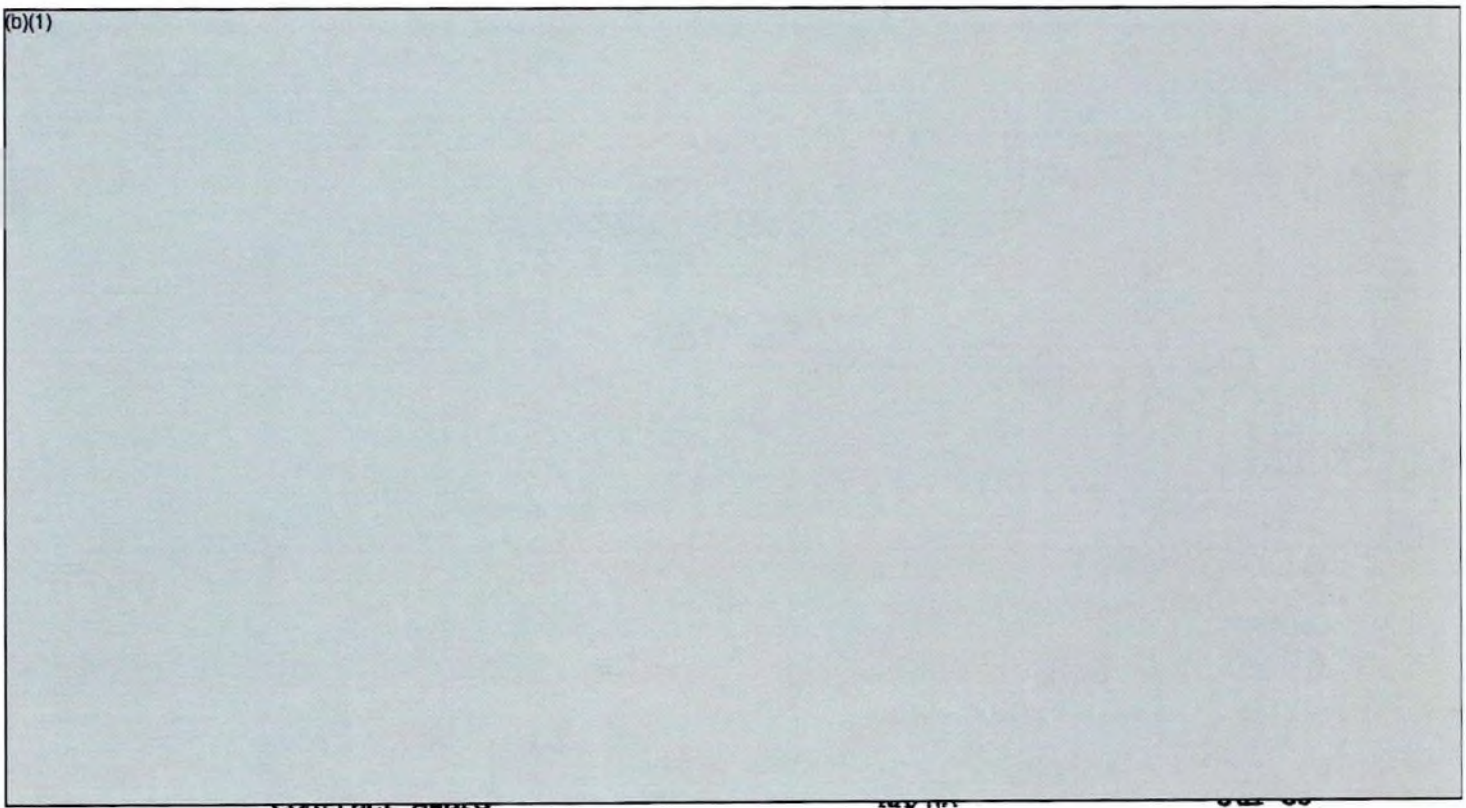
a.(U) Significant Historical Developments -- Planning was initiated in 1973 for the third generation of SHF defense communications satellites. The December 1974 DSARC I recommended a competitive DSCS III development program. DSARC II in December 1976 led to OSD approval for the Full Scale Development (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.

(b)(1)



8.(U) Threshold Breaches: DCP #144, Revision 4, 8 May 1981. As directed by the DSCS III (DSARC) Production Program Review, updated DCP cost goals and thresholds for the SHF DSCS III satellite acquisition program were submitted in January 1982 and subsequently approved. There are currently no DCP threshold breaches or DAE baseline (dated February 1988) breaches.

(b)(1)



Contract Award	NA/NA	
Preliminary Design Review	NA/NA	Dec 88
Critical Design Review	NA/NA	Jul 89
Initial Launch Capability	NA/NA	May 91
(U) DSCS Follow-on Milestones (Ch-4)		
Concept Definition Contract Award	NA/NA	May 88
Systems Review	NA/NA	Feb 89

9.(U) Schedule (cont'd): DSCS III, December 31, 1988

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 A1 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 State (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 direction, the second FSD launch was delayed due to nonavailability of boosters. The second FSD launch was again delayed due to launch vehicle failures.

(b)(1) [redacted]

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 dated February 1988

(b)(1) [redacted]

(U) 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.

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

a. (U) Technical —	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(Ch-1)
(U) Launch Vehicles (types)				
	Titan IIIC	T34D:Trnstg	N/A	T34D:Trnstg
	Titan IIID:IUS	T34D:IUS	N/A	T34D:IUS
	STS:IUS	STS:IUS	N/A	STS:IUS
	N/A	Titan IV:IUS	N/A	Titan IV:IUS
	N/A	Atlas II:IABS(Ch-2)	N/A	Atlas II:IABS(Ch-2)

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)

c. (U) Previous Change Explanation —

EIRP, Signal Gain to Signal Noise, and Nulling characteristics revised based upon A1 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.

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

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

d.(U) Current Change Explanations — (Ch-1) This is the contractor's latest estimate of the weight of the heaviest DSCS III satellite.

(Ch-2) The name of the booster to be used with the IABS, referred to as the MLV II in the last SAR, has since been named Atlas II.

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 dated February 1988.

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	$339.2
Procurement	496.8	$720.1	720.1
Satellites	(313.1)	(616.7)	(616.7)
Launch Vehicles	(183.7)	(103.4)	(103.4)
Construction (MILCON)	—	—	—
Total FY 77 Base-Year $	631.1	1059.3	1059.3
Escalation	262.5	935.1	935.1
Development (RDT&E)	(17.5)	(185.5)	(185.5)
Procurement	(245.0)	(749.6)	(749.6)
Construction (MILCON)	—	—	—
Total Then-Year $	$893.6	$1994.4	$1994.4
b.(U) Quantities —			
Development (RDT&E)	2	2	2
Procurement	12	13	13
Total	14	15	15

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:
FY 90-91 President's Budget.

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	1994.4	2006.1	1994.4
(2) Quantity	15	15	15
(3) Unit Cost	132.960	133.740	132.960
b.(U) Current Procurement —	(FY 1989)	*(FY 1989 APPN)	(FY 1990)
(1) Cost	53.9	53.9	49.1
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	53.9	53.9	49.1
(2) Quantity	0	0	0
(3) Unit Cost	N/A	N/A	N/A

* Differs from the December 87 SAR to reflect the FY 1989 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	-1.4	+88.2	—	+86.8
Quantity	-	+55.3	—	+55.3
Schedule	+29.8	+93.9	—	+123.7
Engineering	+274.9	+274.1	—	+549.0
Estimating	+74.4	+145.9	—	+220.3
Other	-	+77.4	—	+77.4
Support	-	-	—	-
Subtotal	+377.7	+734.8	—	+1112.5
Current Changes:				
Economic	-0.4	-0.4	—	-0.8
Quantity	-	-	—	-
Schedule	+0.4	+5.5	—	+5.9
Engineering	+6.0	-2.2	—	+3.8
Estimating	-10.8	-9.8	—	-20.6
Other	-	-	—	-
Support	-	-	—	-
Subtotal	-4.8	-6.9	—	-11.7
Total Changes	+372.9	+727.9	—	+1100.8
Current Estimate	524.7	1469.7	—	1994.4

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

(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	+16.3	+34.0	—	+50.3
Engineering	+145.4	+113.6	—	+259.0
Estimating	+45.6	+19.4	—	+65.0
Other	-	+38.4	—	+38.4
Support	-	-	—	-
Subtotal	+207.3	+226.7	—	+434.0
Current Changes:				
Quantity	-	-	—	-
Schedule	+0.2	+2.1	—	+2.3
Engineering	+3.0	-1.0	—	+2.0
Estimating	-5.6	-4.5	—	-10.1
Other	-	-	—	-
Support	-	-	—	-
Subtotal	-2.4	-3.4	—	-5.8
Total Changes	+204.9	+223.3	—	+428.2
Current Estimate	339.2	720.1	—	1059.3

b. Previous Change Explanations —

RDT&E

Economic: Revised economic escalation indices
Schedule: Production extension, Launch delays, III-A1 Storage
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
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

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
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, TLS Retrofit & 20 watt SSA.
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
Other: Signal Channel Transponder (SCT) hardware funding transfer, DSARC III (JRMB III) adjustment.

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

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised economic escalation indices (Economic)	N/A	-0.4
Reduction in IABS development cost estimates to reflect contractually negotiated amounts (Estimating)	-6.1	-11.8
Increased Follow-On development costs associated with the extension of study contracts (Engineering)	+2.9	+6.1
Increased storage/reactivation costs associated with a revised launch schedule (Schedule)	+0.2	+0.4
Costs for improvements to DSCS satellites necessary for wartime effectiveness (Engineering)	+16.0	+35.4
Deletion of SHF development costs (Engineering)	-15.9	-35.5
Program adjustments for testing/program risk (Estimating)	+0.5	+1.0
(2) Procurement		
Revised economic escalation indices (Economic)	N/A	-0.4
Adjustment to current/prior years escalation (Estimating)	-1.0	-2.3
Congressional cut resulting in increased program risk (Estimating)	-2.7	-5.9
Increased storage/reactivation costs associated with a revised launch schedule (Schedule)	+2.1	+5.5
Decreased costs associated with modifications and repairs to DSCS III satellites: Product Improvements, Telemetry Link Survivability, Optical Sun Sensor, ACE Augmented Nuller, Centralized Data Processing (Engineering)	-1.0	-2.2
Decreased IABS/ATLAS II conversion cost estimates (Estimating)	-3.9	-10.5
Increased costs associated with Aerospace Mission Technical Support (MTS) and potential launch related engineering change orders (Estimating)	+3.1	+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	+5.733	-0.569	+8.640	+36.854	+13.313	+5.160	-	+69.131	132.960

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

a. RDT&E —

IABS Development:*
General Electric Co, Space Systems Division
Philadelphia, PA
FO4071-84-C-0072, FPIF
Award: July 22, 1988
Definitized: July 22, 1988

Initial Contract Price		
Target	Ceiling	Qty
$53.6	$57.6	1.0

Current Contract Price		
Target	Ceiling	Qty
$53.6	$57.6	1.0

Estimated Price at Completion	
Contractor	Program Manager
$53.6	$53.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (11/27/88)	$0.0	$-0.4
Net Change	N/A	N/A

b. Procurement —

DSCS III Production B8-14:
General Electric Co., King of Prussia, PA
FO4701-84-C-0072, FFP,
Award: November 16, 1984
Definitized: September 14, 1984

Initial Contract Price		
Target	Ceiling	Qty
$423.0	N/A	7

Current Contract Price		
Target	Ceiling	Qty
$464.8	N/A	7

Estimated Price at Completion	
Contractor	Program Manager
$464.8	$464.8

CPR reporting is not required on this contract.

c. MILCON — None.

*This is the first SAR entry for this contract.

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

a. Program Status —

(1) Percent Program Completed: 63.6% (14yrs/22yrs)
(2) Percent Program Cost Appropriated: 74.9% ($1493.7/$1994.4)

b. Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY76-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-97)	Total
RDT&E	424.3	28.1	15.6	56.7	524.7
Procurement	1069.4	49.1	62.9	288.3	1469.7
MILCON	-	-	-	-	-
Total	1493.7	77.2	78.5	345.0	1994.4

c. Annual Summary —

Fiscal Year	Qty	FY 77 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Program	Obligated/1	Expended/1	Escl Rate (%)
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	5.4	4.0	2.8
1987	-	-	-	7.9	14.8	14.5	12.4	2.7
1988	-	-	-	22.1	43.3	42.9	15.4	3.1
1989	-	-	-	16.6	33.7	4.1	0.1	4.0
1990	-	-	-	13.4	28.1	-	-	3.6
1991	-	-	-	7.2	15.6	-	-	3.3
1992	-	-	-	7.1	15.7	-	-	2.8
1993	-	-	-	8.0	18.1	-	-	2.3
1994	-	-	-	6.4	14.8	-	-	1.8
1995	-	-	-	1.2	2.9	-	-	1.8
1996	-	-	-	1.2	2.9	-	-	1.8
1997	-	-	-	1.0	2.3	-	-	1.8
Subtotal	2	-	-	339.2	524.7	393.8	358.8	

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

c. Annual Summary (Cont'd) —

Fiscal Year	Qty	FY 77 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway						
		Nonrec	Rec	Total	Program	Obligated/1	Expended/1	
Appropriation: Procurement								
1978	-	35.8	-	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	40.7	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	109.1	74.5	139.3	139.3	139.3	9.0
1984	-	5.4	-	50.3	98.0	98.0	98.0	8.0
1985	2	11.7	100.9	112.5	224.8	224.2	217.4	3.4
1986	2	5.2	87.2	61.1	127.3	127.0	76.2	2.8
1987	2	2.7	88.9	49.2	106.5	105.4	5.0	2.7
1988	1	4.6	37.7	30.8	69.0	60.7	5.4	3.1
1989	-	3.9	-	23.3	53.9	5.6	-	4.0
1990	-	6.1	-	20.7	49.1	-	-	3.6
1991	-	6.0	-	25.9	62.9	-	-	3.3
1992	-	4.5	-	19.8	48.9	-	-	2.8
1993	-	6.4	-	20.2	50.8	-	-	2.3
1994	1	5.3	74.1	65.6	168.4	-	-	1.8
1995	-	1.5	-	3.5	9.2	-	-	1.8
1996	-	1.5	-	2.9	7.8	-	-	1.8
1997		0.9	-	1.2	3.2	-	-	1.8
Subtotal	13	103.4	616.7	720.1	1469.7	1010.8	791.9	
Total	15	103.4	616.7	1059.3	1994.4	1404.6	1150.7	

/1 Reflects program office records as of 31 Dec 88

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

18. (U) Operating and Support Costs:

a. N/A

b. N/A

c. Contractor Support Costs - N/A

SAR-88-018

~~CONFIDENTIAL~~

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

N-17 F-14D

AS OF DATE: December 31, 1988

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~~AS AMENDED~~

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~~MAR 0 9 1989~~

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)

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OASD(PA) DFOISR 88-T-0541

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 such that the total F-14D procurement quantity would increase from 304 to 527. To execute this direction in the most cost effective manner, the number of new production F-14D's was reduced from 304 to 127 and the number of remanufactured F-14D's raised to 400. 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.

b. Significant Developments Since Last Report -- 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)

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

c. Changes Since "As Of" Date -- Data included in NDCP signed 1/13/89 incorporated.

8. Threshold Breaches: There are currently no DAE baseline (dated Feb 88) breaches or NDCP (dated Jun 86) threshold breaches.

9. Schedule	Dev Est	Approved Program	Production/ Current Estimate
a. Milestones --			
(U) SECNAV Direction for F-14D	N/A	Jul 83	Jul 83
(U) FSD Contract Award	Jul 84	Jul 84	Jul 84
(U) DNSARC Review Milestone II	Mar 85	Mar 85	Mar 85
(U) Critical Design Review (HDWR)	Jun 85	Jun 85	Jun 85
(U) Critical Design Review (SFTWR)	Aug 85	Aug 85	Aug 85
(U) First F110 Test Flight	Aug 86	Sep 86	Sep 86
(U) F-14D Advance Acquisition Contract Award	Dec 86	Apr 87	Apr 87
(U) First Avionics/Radar Flight	Mar 87	Jan 88	Jan 88
(U) Pilot Production Long Lead Funding Approval	N/A	Mar 87	Mar 87
(U) NPDM (Pilot Production Approval)	Feb 88	Mar 88	Mar 88
(U) NPDM III A (Limited Prod Approval)	Mar 89	Oct 88	Oct 88
(U) Techeval	Apr 90	Apr 90	Apr 90
(U) NPDM III B (Limit Prod Approval)	Mar 90	Oct 89	Oct 89
(U) OPEVAL	Jun 90	May 90	May 90
(U) NPDM III C (Full Production Approval)	Oct 90	Sep 90	Nov 90(Ch-1)
(U) Deliver First Production F-14D	Mar 90	Mar 90	Mar 90
(U) BIS	Sep 90	Sep 90	Sep 90

(b)(1)

b. Previous Change Explanations --

First F110-GE-400 test flight was rescheduled from Aug 86 to Sep 86 due to afterburner development problems. Award of the FY-88 Advance Acquisition Contract was rescheduled from Dec 86 to Apr 87 due to delay in receipt of proposal, due to administrative backlog at Grumman. First avionics/radar flight rescheduled from Mar 87 to Jan 88 due to software development problems. These problems are being corrected and an independent software team has validated the corrective action. The delay to first flight will not impact OPEVAL or first delivery of the F-14D in March 1990. Pilot production approval rescheduled from Feb 88 to Mar 88 to accomodate formal report of Navy "quicklook" on radar and avionics flight tests. Milestone names DNSARC IIIA, IIIB, IIIC, changed to NPDM IIIA, IIIB, IIIC.

9. Schedule: (Con't)

c. Current Change Explanations --

(Ch-1) NPDM IIIC delayed from Sep 90 to Nov 90 to allow sufficient time for assessment of OPEVAL test data prior to requesting approval for full production.

d. References --

Development Estimate: NDCP was approved by the Assistant Secretary of the Navy (RE&S), 16 June 1986.
Production Estimate: NDCP was approved by the Assistant Secretary of the Navy (RE&S), 13 Jan 1989.
Approved Program: **DAE Baseline approved 17 February 1988.**

10. Technical/Operational Characteristics:

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

(U) a. Technical	Dev Est	Approved Program	Demon-strated Perf	Production/ Current Estimate
(U) Weight				
Empty no stores (lb)	41,210	41,700	N/A	41,977 (Ch-1)
Max T/O	72,467	72,467	N/A	72,234
(U) Length/Height/Span (ft)	62/16/64.1	62/16/64.1	N/A	62/16/64.1
(U) Spotting Factor (A7=1.0)	1.55	1.55	N/A	1.55
(U) Direct Maintenance Manhours per flight hours (unscheduled O-level)	6.4	6.4	N/A	6.4
(U) SDLM Cycle (mo.)	44	44	N/A	44
(U) MFHBF (Total Weapon System)	NA	1.8	N/A	1.8

(b)(1)

[redacted]

10. Technical/Operational Characteristics:

NOTES:
A/ (U) Aircraft configured with single chin pod and glove vanes.

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

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

c. Previous Change Explanations -- Approved program weight, length, spotting factor and direct maintenance hours incorporated to represent DAE baseline. Current Estimate weight change based on newly negotiated acceptable weight allowances.

d. Current Change Explanations --

(Ch-1) Changes are a result of rebaselining to represent the production estimate.

e. References --

Development Estimate: NDCP was approved by the Assistant Secretary of the Navy (RE&S), 16 June 1986.
Production Estimate: NDCP was approved by the Assistant Secretary of the Navy (RE&S), 13 Jan 1989.
Approved Program: DAE Baseline Approved 17 Feb 1988.

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

(U) Cost	Development Estimate	Approved Program	Production/ Current Estimate
a. Development	1464.9	1693.8	1693.8
Procurement	13627.5	17858.5	17858.5
Airframe	(7289.6)	(6994.9)	(6994.9)
Engine	(2144.6)	(2660.5)	(2660.5)
Avionics	(786.6)	(2012.9)	(2012.9)
Other Hardware	(836.2)	(2303.2)	(2303.2)
Total Flyaway	(11057.0)	(13971.5)	(13971.5)
Other Wpn Sys Cost	(1884.0)	(2760.8)	(2760.8)
Initial Spares	(686.5)	(1126.2)	(1126.2)
Construction (MILCON)	10.8	12.7	12.7
Total FY 86 Base-Year $	15103.2	19565.0	19565.0
*Adjustment FY-86 to FY-89 $	1528.4	1978.5	1978.5
Total FY-89 Base Year $	16631.6	21543.5	21543.5
Escalation	2588.2	3478.4	3478.4
Development (RDT&E)	(65.5)	(-20.8)	(-20.8)
Procurement	(2521.2)	(3498.0)	(3498.0)
Construction (MILCON)	(1.4)	(1.2)	(1.2)
Total Then-Year $	19219.8	25021.9	25021.9

* Adjustment factor used to rebaseline from BY-86$ to BY-89$ is 1.1012 for all appropriations.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars) (Con't)

b. (U) Quantities --			
Development (RDT&E)	0	0	0
Procurement	304	527	527
Total	304	527	527

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References --

Development Estimate: NDCP was approved by the Assistant Secretary of the Navy (RE&S), 16 June 1986.
Production Estimate: NDCP was approved by the Assistant Secretary of the Navy (RE&S), 13 Jan 1989; FY 1990-91 President's Budget.
Approved Program: FY 1990/91 President's Budget.

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

	Current Year		Budget Year
	SAR Current	UCR Baseline	UCR Baseline
	Dec 88 SAR	Dec 87 SAR	Dec 88 SAR
a. Program Acquisition --			
(1) Cost	25021.9	22994.6	25021.9
(2) Quantity	527	527	527
(3) Unit Cost	47.5	43.6	47.5
b. Current Procurement --	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	951.5	951.5	1227.9
Less CY Adv Proc	113.8	113.8	144.0
Plus PY Adv Proc	84.3	84.3	113.8
Net Total	922.0	922.0	1197.7
(2) Quantity	12	12	18
(3) Unit Cost	76.8	76.8	66.5

13. Cost Variance Analysis:
a. Summary -- (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1569.1	17637.6	13.1	19219.8
Previous Changes				
Economic	-9.2	174.0	0.0	164.8
Quantity	0.0	9561.8	0.0	9561.8
Schedule	0.0	-881.8	0.0	-881.1
Engineering	221.8	0.0	0.0	221.8
Estimating	57.5	-5321.5	63.5	-5200.5
Support	0.0	-91.3	0.0	-91.3
Other	0.0	0.0	0.0	0.0
Subtotal	270.1	3441.2	63.5	3774.8
Current Changes				
Economic	-5.0	-435.6	-1.1	-441.7
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	77.0	0.0	77.0
Engineering	0.0	8.5	0.0	8.5
Estimating	9.9	568.9	-60.4	518.4
Support	0.0	1865.1	0.0	1865.1
Other	0.0	0.0	0.0	0.0
Subtotal	4.9	2083.9	-61.5	2027.3
Total Changes	275.0	5525.1	2.0	5802.1
Production/Current Est	1844.1	23162.7	15.1	25021.9

(FY 1986 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1464.9	13627.5	10.8	15103.2
Previous Changes				0.0
Quantity	0.0	6852.8	0.0	6852.8
Schedule	0.0	-487.7	0.0	-487.7
Engineering	174.4	0.0	0.0	174.4
Estimating	45.4	-3936.7	48.7	-3842.6
Support	0.0	-91.8	0.0	-91.8
Other	0.0	0.0	0.0	0.0
Subtotal	219.8	2336.6	48.7	2605.1
Current Changes				0.0
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	50.7	0.0	50.7
Engineering	0.0	7.3	0.0	7.3
Estimating	9.1	428.3	-46.8	390.6
Support	0.0	1408.1	0.0	1408.1
Other	0.0	0.0	0.0	0.0
Subtotal	9.1	1894.4	-46.8	1856.7
Total Changes (FY86$)	228.9	4231.0	1.9	4461.8
Adjustment* (FY86 TO FY89)	171.1	1806.2	1.2	1978.5
Total Changes (FY89 $)	400.0	6037.2	3.1	6440.3
Production/Current Est	1864.9	19664.7	13.9	21543.5

15103.2
4461.8
19565.0

13. Cost Variance Analysis: (Con't)

b. Previous Change Explanations --

RDT&E
Economic: revised escalation rates
Engineering: operational requirement increases including AMRAAM/HARM integration and emerging technology, such as VHSIC insertion, automated multi-sensor correlation, etc. Congressional adjustments and partial funding of the equitable adjustment settlement between Grumman and the Navy.
estimating: assessment of outyear funding requirements less Congressional reduction.

Procurement:
Economic: revised escalation rates
Quantity: increase in the number of F-14D aircraft from 304 to 527
Schedule: FY-90 slip of 7 A/C to be procured FY-96 through FY-98
Estimating: reduction of 177 new production F-14Ds and an addition of 400 remanufactured aircraft at significantly lower unit cost; revised F-14D(R), APG-71 repricing.
Support: decrease required to offset F-14D(R) increases.

MILCON:
Estimating: revised to include avionics shop, maintenance hanger, aircraft parking apron, and aircraft acoustical enclosure.

c. Current Change Explanation --

	(Dollars in Millions) Base-Year FY-86$	Then-Year
(1) RDT&E:		
Revised Jan 89 economic escalation rate (Economic)	N/A	-5.0
Changes due to an increase of $33.6M in FY-90 to fund partial payment of the equitable adjustment settlement between the Navy and Grumman Corporation; increase of $16.7M in FY-90 and $9.9M in FY-91 represents a transfer of funding from PE 0604708N for F-14D trainers. (Estimating)	+9.1	+9.9
(2) Procurement:		
Revised Jan 89 economic escalation rate (Economic)	N/A	-435.6
Positive change due to slower build up of the F-14D program. (e.g. current schedule lags behind previous schedule by 6 A/C from FY-92 through FY-95, then by 8 A/C in FY-96) (Schedule)	+50.7	+77.0

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

Procurement: Positive increase due to non-recurring cost for engineering change proposals for 2 inch gauges NACES seat, dual chin pod and ASN-139. (Engineering)	+7.3	+8.5
Reflects business base impact at Grumman of A-6 program cancellation; reestimate of the F-14D(R) based on F-14A (PLUS) actuals. (Estimating)	+428.3	+568.9
Increases reflect additional funding required for CASS and previously reported unfunded support requirements. (Support)	+1408.1	+1865.1
(3) MILCON		
Revised Jan 89 economic escalation rate. (economic)	N/A	-1.1
Construction delayed due to funding shortfalls. (Schedule)	-46.8	-60.4

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

a. Initial SAR Estimate to Current Estimate

PAUC (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	
47.480									47.480

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

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

	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

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	Estimated Price At Completion Contractor	 Program Manager
431.0	N/A	7	431.0 1/	431.0

	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

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

15. Contract Information: (Then-Year Dollars in Millions) (Con't)

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

Target	Ceiling	Qty
N/A	492.0	12

Current Contract Price

Target	Ceiling	Qty
N/A	492.0	12

Estimated Price At Completion

Contractor	Program Manager
492.0	N/A 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

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

	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

FY-89 Engine AAC *
General Electric Corp
Evandale, OH F33657-84-C-2011 (AAC)*
Award: March 1988
Definitized: TBD

Target	Ceiling	Qty
N/A	79.6	24

Current Contract Price

Target	Ceiling	Qty
N/A	79.6	14

Estimated Price At Completion

Contractor	Program Manager
79.6	N/A 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

c. MILCON -- N/A

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

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

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

a. Program Status --

(1) Percent Program Completed: 44% (7 years/16 years).
(2) Percent Program Cost Appropriated: 12% ($2958.4/$25021.9)

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	1253.1	169.9	119.7	301.4	1844.1
Procurement	1698.3	1227.9	1347.6	18888.9	23162.7
MILCON	7.0	0.0	3.2	4.9	15.1
Total	2958.4	1397.8	1470.5	19195.2	25021.9

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	Then-Year $ Obligated	Then-Year $ Expended	Escal Rate (%)
Appropriation: RDT&E								
1983	0			7.7	6.5	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			376.4	347.6	347.6	343.2	2.80
1987	0			275.7	262.2	262.2	258.4	2.70
1988	0			170.7	168.0	167.7	147.0	3.10
1989	0			149.8	152.9	88.8	0.3	4.00
1990	0			160.9	169.9			3.60
1991	0			110.1	119.7			3.30
1992	0			108.9	121.4			2.80
1993	0			22.0	25.0			2.30
1994	0			25.8	29.9			1.80
1995	0			25.4	30.0			1.80
1996	0			25.0	30.0			1.80
1997	0			24.6	30.0			1.80
1998	0			28.2	35.1			1.80
Subtotal	0			1864.9	1844.1	1188.2	1058.9	

16. Program Funding Summary (Con't)

Fiscal Year	Qty	Flyaway FY 89 Dollars NonRec	Flyaway FY 89 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escal Rate (%)
Appropriation: APN								
1987	0	50.6	0.0	130.8	131.4	130.1	26.8	2.70
1988	7	130.4	318.2	601.4	615.4	535.2	117.0	3.10
1989	12	69.2	564.0	900.2	951.5	60.9	0.0	4.00
1990	18	159.2	743.3	1128.2	1227.9			3.60
1991	24	178.0	856.5	1208.6	1347.6			3.30
1992	36	177.1	1072.2	1624.0	1849.4			2.80
1993	60	256.8	1518.2	2275.7	2638.5			2.30
1994	72	278.9	1704.6	2503.6	2954.4			1.80
1995	72	280.5	1659.3	2451.6	2945.4			1.80
1996	72	275.8	1624.7	2436.4	2979.7			1.80
1997	77	273.7	1692.7	2523.9	3142.2			1.80
1998	77	249.5	1251.7	1880.3	2379.3			1.80
Subtotal	527	2379.7	13005.4	19664.7	23162.7	0.0	0.0	
Appropriation: MILCON								
1987				0.5	0.5			2.70
1988				6.4	6.5			3.10
1989				0.0	0.0			4.00
1990				0.0	0.0			3.60
1991				3.1	3.2			3.30
1992				0.0	0.0			2.80
1993				0.0	0.0			2.30
1994				3.8	4.9			1.80
1995				0.0	0.0			1.80
Subtotal				13.9	15.1	0.0	0.0	
TOTAL	527.0	2379.7	13005.4	21543.5	25021.9	1914.4	1202.7	

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 and FY-90.)

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1988	7	7	17	17
1989	18	12	14	14
1990	24	18	22	58
1991	36	24	24	60
1992	30	36	36	60
1993	30	60	60	60
1994	30	72	72	96
1995	30	72	72	96
1996	30	72	72	88
1997	30	77	77	
1998	39	77	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	0	21543.5	739.4	20804.1
(TY $)	25021.9	0	25021.9	1414.6	23607.3
PAUC (BY $)	40.880	0	40.880	1.404	39.476
(TY $)	47.480	0	47.480	2.684	44.796

c. Schedule Variance --

Item	Production Estimate	Variance (CE less Pd E)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	4/1987	0	4/1987	24	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 (Antecedent)
Personnel	9.93	9.15
O&S Consumables	5.28	5.32
Direct Depot Maintenance	8.85	8.50
Sustaining Investments	5.12	5.42
Other Direct Costs	N/A	N/A
Indirect Costs	N/A	N/A
Total	29.18	28.39

18.c. Contractor Support Costs --

	FY 1988 Actual	FY 1989 Year	FY 1990 Year	FY 1991 Year
O&M,N	4.1	3.6	5.7	5.7
Industrial Fund	2.6	4.3	5.3	5.7
Total	6.7	7.9	11.0	11.4

(3)

AF-12 F-15

SAR-88-052

~~CONFIDENTIAL~~

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

AS OF DATE: December 31, 1988

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

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

3. (U) Responsible Office and Telephone Number:

F-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:

RDT&E: PE 0207130F/0207134F
PE 0604739F/0604270F (Shared Funding)
PROCUREMENT: APPN 3010, ICN F015AD; 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

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OASD(PA) DFOISR 89-T-0296

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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 turnability, 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 2000lbs 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 responsiblity for all fielded F-15 aircraft was transferred to AFLC under the F-15 Program Management Responsiblity Transfer (PMRT) Agreement. AFSC still maintains responsiblity 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 F-100-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/Operation 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 responsiblity transfer for MSIP items in October 1987. The second F-15E first flew in May 1987 and entered flight test at Edwards AFB.

b. (U) Significant Developments Since Last Report: F-15 production has been delayed due to a wiring bundle rework and delay in delivery of critical electronic components. These delays have slowed production deliveries but McAir has continued to do workarounds which should still meet minimum training requirements at Luke AFB and ensure successful IOC at Seymour Johnson. The overall funded program has been 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.

The F-15 currently satisfies its mission requirement.

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

8. (U) Threshold Breaches: DCP #19, Revision C, 5 May 1977, as amended 21 February 1980. DCP Procurement Cost Threshold has been breached. There are no Defense Acquisition Executive (DAE) baseline (dated February 1988) breaches.

9. (U) Schedule:

a. (U) Milestones

	Development Estimate/ Approved Program	Current Estimate
F-15A/B/C/D		
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 F-15 MSIP Aircraft	N/A /May 88	Jun 89 (Ch-1)
F-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 (Ch-2)	Jan 87/N/A	Dec 86
Begin Flight Test	Jan 87/N/A	Dec 86
OT&E Start	May 88/N/A	Dec 88 (Ch-2)
OT&E Completion	Jun 89/N/A	Dec 89 (Ch-2)
IOC (F-15E) B/	Jun 89/Sep 89	Oct 89

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.

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 88.

9. (U) Schedule: (Continued)

c. (U) Current Change Explanations-- (CH-1) The last F-15 MSIP delivery changed from May 88 to Jun 89 because of a wire braid problem. (CH-2) not previously reported.

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 dated February 1988.

(U)(1)

(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	620
(U)	Lo-Lo-Lo-Lo	360	360/360	N/A	360

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

	Dev Est	Approved Program Goal/Threshold	Demonstrated a/ Performance	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	25950
(U) Take-Off Gross Weight (lbs)	62500	N/A/N/A	N/A	62500
(U) Design Mission Radius (NM)				
(U) Cruise	200	N/A/N/A	N/A	200
(U) Dash	215	N/A N/A	N/A	215
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	60%/80%		80% (CH-2)

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

	Dev Est	Approved Program Goal/Threshold	Demon-strated Performance	Current Estimate
b. (U) Operational				
(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	3590
(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	.84
(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	1.04
(U) Max Speed at Altitude, Sustained (Mach)	1.76	1.76/1.76	N/A	1.76
(U) Max Speed, Burst (Mach)	1.76	1.76/1.76	N/A	1.76
(U) Thrust to Weight Ratio at Take-Off	.67	N/A/N/A	N/A	.67
(U) Take-Off Distance/50 Ft Obstacle (Ft)	3520	N/A/ N/A	N/A	3520
(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	4.5
(U) Specific Excess Power (Ft/Sec)				
(U) 0.6M/5G/10000 Ft/Max	-700	N/A/N/A	N/A	-700
(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	200
(U) 0.9M/5G/30000 Ft/Max	-1650	N/A N/A	N/A	-1650
(U) 1.6M/5G/30000 Ft/Max	-980	N/A/N/A	N/A	-980
(U) 1.6M/1G/35000 Ft/Max	75	N/A/N/A	N/A	75
(U) 1.6M/5G/35000 Ft/Max	-1250	N/A N/A	N/A	-1250
(U) Full Mission Capable Rate	N/A	80%/80%		80% (CH-2)

10. (U) Technical/Operational Characteristics:
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

10. (U) Technical/Operational Characteristics:

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:

c. (U) Previous Change Explanations --

(U) The demonstrated performance and current estimate of the F-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 the previous SAR submission (31 December 1984).

d. (U) Current Change Explanations --

(U)(CH-1) Change in take-off gross weight due to revised estimate. (CH-2) Full Mission Capable Rate added to reflect DAE baseline.

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)/27130F/F-15, dated 19 September 1985. Air Force Estimates as a result of Source Selection and Contract Definitization.

(U) Approved Program:

DAE baseline dated February 1988.

(F-15, December 31, 1988)

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	$ 2452.6	$2452.6
Procurement	4333.2	9882.5	9882.5
Airframe	(1679.1)	(4035.5)	(4035.5)
Engines	(832.4)	(1984.0)	(1984.0)
Electronics	(866.8)	(1605.8)	(1605.8)
Armament	(111.8)	(91.6)	(91.6)
Other Hardware	(18.2)	(68.9)	(68.9)
Total Flyaway	(3508.3)	(7785.8)	(7785.8)
Peculiar Support	(449.2)	(1365.5)	(1365.5)
Initial Spares	(375.7)	(731.2)	(731.2)
Construction (MILCON) 1/	--	--	--
Total: FY 70 Base-Year $	5991.0	12335.1	12335.1
Escalation	1364.2	21198.2	21198.2
Development (RDT&E)	(120.8)	(1046.9)	(1046.9)
Procurement	(1243.4)	(20151.3)	(20151.3)
Total Then Year $	7355.2	33533.3	33533.3

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	1152	1152
Total	749	1172	1172

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)/27130F/F-15, dated 19 September 1985.

Approved Program:

FY90-91 President Budget.

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1)	Cost	33533.3	38694.0	33533.3
(2)	Quantity	1172	1286	1172
(3)	Unit Cost	28.612	30.089	28.612
b. (U)	Current Procurement--	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1)	Cost	1484.7	1484.7	1571.5
	Less CY Adv Proc	100.7	100.7	230.5
	Plus PY Adv Proc	154.2	154.2	100.7
	Net Total	1538.2	1538.2	1441.7
(2)	Quantity	36	36	36
(3)	Unit Cost	42.728	42.728	40.047

13. (U) Cost Variance Analysis:

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

	RDT&E	PROC	TOTAL
Development Estimates	1778.6	5576.6	7355.2
Previous Changes			
Economic	- 15.6	+ 654.9	+ 639.3
Quantity	+ 0.0	+14749.2	+14749.2
Schedule	+ 0.0	+ 3308.3	+ 3308.3
Engineering	+ 1101.2	+ 2949.4	+ 4050.6
Estimating	+ 160.6	+ 936.2	+ 1096.8
Other	+ 208.6	+ 559.1	+ 767.7
Support	+ 101.8	+ 6625.1	+ 6726.9
Subtotal	+ 1556.6	+29782.2	+31338.8
Current Changes			
Economic	- .8	- 225.2	- 226.0
Quantity	+ 0.0	- 1545.6	- 1545.6
Schedule	+ 0.0	- 1145.2	- 1145.2
Engineering	+ 94.0	- 838.5	- 744.5
Estimating	+ 78.8	- 779.8	- 701.0
Other	+ 0.0	+ 0.0	+ 0.0
Support	- 7.7	- 790.7	- 798.4
Subtotal	+ 164.3	- 5325.0	- 5160.7
Total Changes	+ 1720.9	+ 24457.2	+26178.1
Current Estimate	3499.5	30033.8	33533.3

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	+ 3365.7	+ 3365.7
Schedule	+ 0.0	+ 513.9	+ 513.9
Engineering	+ 500.0	+ 723.0	+ 1223.0
Estimating	+ 61.3	+ 77.6	+ 138.9
Other	+ 173.9	+ 445.2	+ 619.1
Support	+ 3.2	+ 1450.1	+ 1453.3
Subtotal	+ 738.4	+ 6575.5	+ 7313.9
Current Changes			
Quantity	+ 0.0	- 320.8	- 320.8
Schedule	+ 0.0	- 167.5	- 167.5
Engineering	+ 32.6	- 234.1	- 201.5
Estimating	+ 26.9	- 125.5	- 98.6
Other	+ 0.0	+ 0.0	+ 0.0
Support	- 3.1	- 178.3	- 181.4
Subtotal	+ 56.4	- 1026.2	- 969.8
Total Changes	+ 794.8	+ 5549.3	+ 6344.1
Current Estimate	2452.6	9882.5	12335.1

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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.

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) and RDT&E Estimating Methodology.

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.

(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.

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 Units.

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.

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/METS) 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.

13. (U) Cost Variance Analysis:

c. (U) Current Change Explanations--

	(Dollars in Millions) Base-Year $	Then-Year $
(1) (U) RDT&E		
Revised economic escalation indicies (Economic)	$ + 0.0	$ - 0.8
Development costs for integration of Expanded Weapons and addition of Nuclear Certification to the F-15E (Engineering)	+ 2.5	+ 7.1
Development costs for integration of Short Range Attack Missile (SRAM T) to the F-15E (Engineering)	+ 18.1	+ 52.4
Development costs for integration of new Low Altitude Navigation Target Infra Red for Night (LANTIRN) system capabilities, Standard Crash Survivable Data Recorder (CSDR), and other avionic capabilities to the F-15E (Engineering)	+ 6.1	+ 17.6
Development of new Improved Vertical Tail for the F-15E (Engineering)	+ 5.9	+ 16.9
Adjustment for current and prior years escalation indices change (Estimating)	- 0.1	- 0.3
Revised estimate for flight test and program office operations (Estimating)	+ 27.0	+ 78.0
Refinement of estimate for F-15E and Multi Stage Improvement Program (MSIP) (Estimating)	+ 8.0	+ 20.2
Revised estimate for ALQ-135, OFP Updates, and RF Compatibility (Estimating)	- 9.0	- 25.5
Revised estimate for avionics improvements and Improved Performance Engine (Estimating)	+ 1.0	+ 6.4
Deletion of Radar Module Test Stations (RMTS) from development funding and revised estimate for Tactical Electronic Warfare System (TEWS) Intermediate Support System & Mission Support Systems (MSS) (Support).	- 3.1	- 7.7

13. (U) Cost Variance Analysis:

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

	(Dollars in Millions) Base-Year $	Then-Year $
(2) (U) Procurement		
Revised economic escalation indices. (Economic)	$ + 0.0	$ - 225.2
Aircraft production quantity decrease	- 857.0	- 4150.6
- Deletion of 114 aircraft (Quantity)	(-320.8)	(-1545.6)
- Schedule changes applicable to 114 aircraft since baseline (Schedule)	(-167.5)	(-949.5)
- Engineering changes applicable to 114 aircraft since baseline (Engineering)	(-235.7)	(-846.5)
- Estimating changes applicable to 114 aircraft since baseline (Estimating)	(-25.3)	(-268.7)
- Reduction of support requirements due to deletion of 114 aircraft (Support)	(-107.7)	(-540.3)
Schedule acceleration from 30 to 36 aircraft per year and schedule completion date change from 1998 to 1994 (Schedule)	+ 0.0	- 195.7
Incorporation of Global Positioning System (GPS) Group A aircraft modifications (Engineering)	+ 0.3	+ 1.6
Incorporation of Short Range Attack Missile (SRAM II) adapters to the F-15E (Engineering)	+ 1.3	+ 6.4
Adjustment for current and prior year escalation indicies change (Estimating)	+ 4.3	+ 17.9

(F-15, December 31, 1988)

13. (U) Cost Variance Analysis:

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

	(Dollars in Millions) Base-Year $	Then-Year $
(2) (U) Procurement		
Revised estimate of F-15E nonrecurring costs (Estimating)	+ 9.6	+ 46.0
Revised estimate of F-15E program due to incorporation of Multi-year acquisition strategy (Estimating)	- 66.0	- 309.1
Revised estimate of F-15E recurring flyaway costs (Estimating)	- 48.1	- 265.9
Adjustment for current and prior years for escalation (Support)	+ 1.4	+ 5.9
Revised estimate of F-15E support requirements such as Weapon Systems Trainers and TFE-19 (Support)	- 72.0	- 256.3

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)
9.820	+0.353	+7.722	+1.846	+2.821	+0.337	+5.058	+0.655	+18.792	28.612

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

a. (U) RDT&E

	Initial Contract Price		
	Target	Ceiling	Qty
Multi-Staged Improvement Program (MSIP) Phase II	$ 341.8	$ N/A	N/A

McDonnell Douglas, St. Louis, MO.
F33657-83-C-0043/PZ0003, CPIF
Award: February 2, 1983
Definitized: December 2, 1983

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 382.3	$ N/A	N/A	$ 400.8	$ 401.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -16.5	$ - 11.3
Cumulative Variances to Date (11/30/88)	-20.9	- 15.6
Net Change	- 4.4	- 4.3

Explanation of Change:

(U) Major Subcontractor on FPI contract is going to ceiling. Impact: APG-70 Radar Software was one year late on delivery. Radar Hardware delivery did occur on schedule. Initial capability of the system was no less than the APG-63. Net changes have not caused any significant changes to the current contract target price. The program managers estimated price at completion continues to show a downward trend.

b. (U) Procurement

	Initial Contract Price		
	Target	Ceiling	Qty
Band III, Internal Countermeasures Set	$ 202.9	$ 220.6	65

Northrop Corporation, Rolling Meadows, IL
F33657-83-C-2149, FPIF
Award: September 13, 1983
Definitized: December 27, 1984

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 345.8	$ 376.1	65	$ 382.4	$ 425.0

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

b. (U) Procurement (continued)

Band III, Internal Countermeasures Set---------- (continued)

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -65.2	$ -21.8
Cumulative Variances to Date (11/30/88)	-68.3	-17.8
Net Change	- 3.1	+ 4.0

Explanation of Change:

(U) An Over Target Baseline (OTB) was implemented in Nov 85. Contract Change Proposal (CCP) 94 was added to the contract which resulted in an increase to the estimated price. The contractor's negative cost and schedule variances are continuing. This results from design problems being encountered in the CCP 94 effort.
Impact: The Pre-production Pre-planned Product Improvement (P3I) hardware deliveries were approximately seven months late. The original 65 Quick Reaction Capability (QRC) systems were delivered approximately one year late. The contract delivery schedule is being renegotiated. Contract at ceiling. No additional impact on program cost.

	Initial Contract Price		
	Target	Ceiling	Qty
FY86C/D/E Aircraft Buy----------	$1000.9	$ N/A	48

McDonnell Douglas, St. Louis, MO
F33657-86-C-2001, FFP
Award: January 4, 1985 (CPR or C/SSR not required)
Definitized: April 29, 1987

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$1000.9	$ N/A	48	$1000.9	$1000.9

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

b. (U) Procurement (continued)

	Initial Contract Price		
	Target	Ceiling	Qty
Engines Buy (Lot 14)	$ 896.9	$ N/A	78

United Technologies, Pratt & Whitney,
West Palm Beach, FL
F33657-84-C-2014, FFP
Award: February, 1984 (CPR or C/SSR not required)
Definitized: February, 1984

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 896.9	$ N/A	78	$ 896.9	$ 896.9

	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
$ 499.3	$556.9	N/A	$ 557.0	$ 556.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -63.8	$ -25.6
Cumulative Variances to Date (11/30/88)	-75.9	-26.2
Net Change	-12.1	- 0.6

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. 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)

b. (U) Procurement (continued)

	Initial Contract Price		
	Target	Ceiling	Qty
Band III, Internal Countermeasures Set (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	
Target	Ceiling	Qty	Contractor	Program Manager
$ 309.7	$ 351.8	129	$ 309.7	$ 351.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ - 7.1	$ + 0.6
Cumulative Variances to Date (11/30/88)	+ 1.7	+ 6.1
Net Change	+ 8.8	+ 5.5

Explanation of Change:

(U) The present cost and schedule variance are satisfactory. The contractor is currently using test equipment in the semi-manual modes of operation to sustain cost and schedule. The automatic test equipment is designed, built and currently being used as depot equipment. Software for full production use is still in development. Net changes have not caused any significant changes to the current target price or the program manager's estimated price at completion.

c. (U) MILCON -- NONE

(F-15, December 31, 1988)

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

a. (U) Program Status --

(1) Percent Program Completed: 76.7% (23yrs/30yrs)

(2) Percent Program Cost Appropriated: 78.2% ($26211.0M/$33533.3M)

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	$ 3134.8	$ 124.6	$ 101.8	$ 138.3	$ 3499.5
Procurement	$ 23076.2	$ 1571.5	$ 1528.5	$ 3857.6	$ 30033.8
MILCON	$ --	$ --	$ --	$ --	$ --
Total	$ 26211.0	$ 1696.1	$ 1630.3	$ 3995.9	$ 33533.3

(F-15, December 31, 1988)

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

c. (U) Annual Summary --

FISCAL YEAR	QTY	BASE-YEAR DOLLARS FLYAWAY FY70 DOLLARS NONREC	BASE-YEAR DOLLARS FLYAWAY FY70 DOLLARS REC	BASE-YEAR DOLLARS TOTAL BASE YEAR $	TOTAL THEN-YEAR DOLLARS PROGRAM	TOTAL THEN-YEAR DOLLARS OBLIGATED 1/	TOTAL THEN-YEAR DOLLARS 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	--	--	--	88.5	218.3	218.3	190.4	2.8
1987	--	--	--	61.7	157.1	157.1	104.3	2.7
1988	--	--	--	37.5	99.2	97.5	20.5	3.1
1989	--	--	--	31.9	87.6	38.6	.4	4.0
1990	--	--	--	44.0	124.6			3.6
1991	--	--	--	34.9	101.8			3.3
1992	--	--	--	17.4	51.9			2.8
1993	--	--	--	9.7	29.7			2.3
1994	--	--	--	8.2	25.5			1.8
1995	--	--	--	6.5	20.6			1.8
1996	--	--	--	3.3	10.6			1.8
1997	--	--	--	0.0				1.8
1998	--	--	--	0.0				1.8
SUBTTL	20	--	--	2452.6	3499.5	3084.1	2888.2	

1/ Reflects Program Office records as of 31 December 1988.

(F-15, December 31, 1988)

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

c. (U) Annual Summary --

FISCAL YEAR	QTY	BASE-YEAR DOLLARS FLYAWAY FY70 DOLLARS NONREC	BASE-YEAR DOLLARS FLYAWAY FY70 DOLLARS REC	BASE-YEAR DOLLARS TOTAL BASE YEAR $	THEN-YEAR DOLLARS PROGRAM	THEN-YEAR DOLLARS OBLIGATED 1/	THEN-YEAR DOLLARS EXPENDED 1/	ESCL RATE %
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	268.4	417.4	1467.7	1467.7	1467.7	9.0
1984	36	33.2	275.1	394.6	1446.0	1446.0	1446.0	8.0
1985	42	30.9	326.9	520.2	1969.3	1969.3	1657.4	3.4
1986	48	16.3	333.6	438.4	1706.4	1706.4	1272.7	2.8
1987	42	2.1	306.5	424.0	1709.2	1483.1	778.9	2.7
1988	42	0.7	299.7	361.7	1510.7	1258.3	63.1	3.1
1989	36	11.7	270.8	343.9	1484.7			4.0
1990	36	7.7	257.6	353.7	1571.5			3.6
1991	36	13.0	256.8	335.7	1528.5			3.3
1992	36	12.0	253.1	360.0	1673.5			2.8
1993	36	12.8	254.9	317.4	1502.5			2.3
1994	6	12.3	59.0	141.5	681.6			1.8
1995	0	0.0	0.0	0.0	0.0			1.8
1996	0	0.0	0.0	0.0	0.0			1.8
1997	0	0.0	0.0	0.0	0.0			1.8
1998	0	0.0	0.0	0.0	0.0			1.8
SUBTTL	1152	206.6	7579.2	9882.5	30033.8	21113.0	18468.0	
TOTAL	1172	206.6	7579.2	12335.1	33533.3	24197.1	21356.2	

1/ Reflects Program Office records as of 31 December 1988.

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
1973	30	30	30	30
1974	77	62	62	62
1975	144	72	72	72
1976	144	108	108	108
197T		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	72
1992		48	36	42
1993		48	36	
1994		48	06	
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.

17. (U) Production Rate Data:

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

Item	Production Estimate	Variance (Cur Est Less Prod Est)	Current Estimate	Variance (Cur Est Less Maximum)	* Maximum
Prog Acq Cost (BY$)	13167.2	-832.1	12335.1	+ 9.6	12325.5
Prog Acq Cost (TY$)	37978.5	-4445.2	33533.3	+ 119.5	33413.8
PAUC (BY$)	10.239	+0.286	10.525	+ 0.008	10.517
PAUC (TY$)	29.532	-0.920	28.612	+ .102	28.510

* Maximum production estimate based on annual procurement. EOQ funding information not available from contractor to estimate multiyear.

c. (U) Schedule Variance --

	Production Estimate	Variance (Cur Est Less Prod Est)	Current Estimate	Variance (Cur Est Less Maximum)	Maximum
Start Date (Mon/Yr)	Oct 1972	N/A	Oct 1972	N/A	Oct 1972
Duration (In Months)	284	10	274	22	252
End Date (Mon/Yr)	Apr 1996	N/A	Jul 1995	N/A	Sep 1993

Note: 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 in.

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

	To Date
RDT&E	20/20
Procurement	906/885*

e. (U) Approved Design to Cost Goal -- N/A

*Reflects program office records as of 31 December 1988.

18. (U) Operating and Support Costs --

a. N/A

b. N/A

18. (U) 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)	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

SAR-98-051

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

AF-13 F-16

PROGRAM: F-16

AS OF DATE: December 31, 1988

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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 Program Office
Aeronautical Systems Division
Wright-Patterson AFB, OH

PM: Maj Gen Robert D. Eaglet
Assigned: July 14, 1986
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 Derivative, Automatic Target Handoff System (ATHS).

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.

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to any possible troubled area of the world with minimum enroute support and with high reliability and simplified maintenance procedures to assure successful operations 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.

b. Significant Developments Since Last Report--A total of 640 F-16C/D aircraft have been delivered to the USAF by the end of CY88 and the F-16C/D is operational at thirteen USAF bases. The F-16 is now operated by air forces of 12 different friendly nations, including the original European Participating Governments and we have firm orders for deliveries to 2 others. The USAF F-16 world wide fleet surpasses 2.0M 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. We formally broke the three-digit radar reliability threshold in terms of Mean Flight Time Between Maintenance Actions in September with a three month moving average of 103 hours; October data indicated 110 hours and preliminary November information recorded an amazing 129 hours MFTBA. The F-16 System Program Office and General Dynamics/Fort Worth have signed up with Dr. Costello (Defense Under Secretary for Acquisition) to be the DOD flagship program for Total Quality Management (TQM). The first LANTIRN capable aircraft (Block 40) had its first flight and delivery in December.

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

The F-16 production rate has been set at 150 aircraft per year for Fiscal Year (FY) 1990 through 1995 in order to achieve greater production efficiencies and reduced unit costs.

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

8. Threshold Breaches:

There are currently no DCP (dated 10 March 1975) threshold 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 (CH-1)
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 (CH-1)
LANTIRN Nav Pod Inst	Oct 89/NA	Oct 89 (CH-1)
LANTIRN Tgt Pod Inst	Oct 90/NA	Oct 90 (CH-1)
First Blk 50 Delivery	Oct 91/NA	Oct 91 (CH-1)

b. Previous Change Explanations --

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

F-16C/D
Integration of F-16C/D (MSIP) milestones into SAR.

c. Current Change Explanations

(CH-1) Not previously reported.

d. References --

F-16A/B

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

F-16C/D

Development Estimate - F-16 Multinational Staged Improvement program baseline (December 1985).
Approved Program: - DAE baseline dated February 1988.

10. Technical/Operational Characteristics:

	Development Estimate	Approved Program Goals/ Thresholds	Demonstrated Performance	Current Estimate
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, 30,000 ft., Air-to-Air.				
Mach 1.2 (Deg per sec)	5.1	5.1	N/A	5.1
Mach 0.9 (Deg per sec)	7.3	7.3	N/A	7.3
(3) Sustained Turn Rate, 200 ft., Air-to-Ground.				
500 KTAS (Deg per sec) [3] [5]	6.6	6.6	N/A	6.6
b. Operational				
F-16A/B				
(1) Mission Reliability (%)	85	NA	91	91
(2) Mean Flight Time Between Maint Actions(MFTBMA) (Hrs)	1.75	NA	3.05	3.50(Ch-1)
(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
(7) Design Mission Combat Radius				
Air-to-Air (NM)	600	NA	655	655
Air-to-Ground (NM)	550	NA	666	666

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

		Development Estimate	Approved Program Goal / Threshold	Demonstrated Performance	Current Estimate
	F-16C/D				
(8)	Mean Flight Time Between Maint Action (MFTBMA)(Hrs.)	3.0	NA	5.1	4.5(Ch1)
(9)	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
(10)	Air-to-Air Mission [2]				
	No./wt. per AIM-9L	2/195	NA	2/195	2/195
	No./wt. per AMRAAM	2/328	NA		2/345
	No./wt. of Ammo	500/280	NA	500/280	500/280
(11)	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
(12)	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
(13)	Total Mission Radius (NM)				
	Air-to-Air [1] [5]	420	420/420	N/A	480
	Air-to-Ground: Hi-Lo-Lo-Hi [3] [5]	465	465/465	N/A	465
	Air-to-Ground: Lo-Lo-Lo-Lo [3] [5]	295	295/295		295
(14)	Max Speed, Air-to-Ground 200ft [3] [5]				
	with weapons (kts)	585	565/565	N/A	565
	without weapons (kts)	580	580/580	N/A	580

[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] Demonstrated performance to be determined upon completion of performance tests and analyses.

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) Operation Characteristic No. 10.b(2) changed to reflect improved hardware reliability from active program to minimize number of parts.

(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 inadvertantly 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.

d. Current Change Explanations --

- Change (1) Based on DO-56/MODAS failure and maintenance manhour data.

e. References

F-16A/B

Development Estimate - Decision Coordinating Paper (DCP) #143. 10 March 1975 (For Coordination)

Approved Program - DAE baseline dated February 1988.

F-16C/D

Development Estimate - F-16 Multinational Staged Improvement program Baseline (December 1985),
Approved Program - DAE baseline dated February 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	$ 1355.7
Procurement	3798.2	19756.7	19756.7
Airframe	(1375.4)	(6430.5)	(6430.5)
Engine	(911.3)	(3760.4)	(3760.4)
Electronics	(539.6)	(3900.2)	(3900.2)
Armament	(171.6)	(609.1)	(609.1)
Sys/Proj Mgt	(33.8)	(619.1)	(619.1)
Total Flyaway	(3031.7)	(15319.3)	(15319.3)
Peculiar Support	(435.2)	(2702.4)	(2702.4)
Other Weapon System Cost	(--)	(124.3)	(124.3)
Initial Spares	(331.3)	(1610.7)	(1610.7)
Construction (MILCON)	--	--	--
Total FY 75 Base-Year $	$ 4376.8	$ 21112.4	$21112.4
Escalation	1677.7	32658.0	32658.0
Development (RDT&E)	(80.5)	(1104.7)	(1104.7)
Procurement	(1597.2)	(31553.3)	(31553.3)
Construction (MILCON)	--	--	--
Total Then-Year $	$ 6054.5	$ 53770.4	$53770.4
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 @ $4,577.9M (Then Year) for Israel

(8) 36 @ $828.0M (Then Year) for Korea

(9) 51 @ $1,182.9M (Then Year) for Pakistan

(10) 160 @ $4,158.2M (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: FY90/91 President's Budget

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

	Current Year		Budget Year
	Current Est Dec 88 SAR	UCR Baseline Dec 87 SAR	UCR Baseline Dec 88 SAR
a. (U) Program Acquisition --			
(1) Cost	53770.4	47656.0	53770.4
(2) Quantity	3007	2737	3007
(3) Unit Cost	17.882	17.412	17.882
b. (U) Current Procurement --	(FY 1989)	(FY 1989)*	(FY 1990)
(1) Cost	3245.0	3299.3	3262.7
Less CY Adv Proc	- 462.7	- 380.9	- 556.1
Plus PY Adv Proc	646.1	646.1	309.1
Net Total	3428.4	3564.5	3015.7
(2) Quantity	180	180	150
(3) Unit Cost	19.047	19.803	20.105

* Adjusted to reflect FY89 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	+18.2	-2091.3		-2073.1
Quantity		+20357.7		+20357.7
Schedule	+0.1	+1723.4		+1723.5
Engineering	+539.4	+14549.1		+15088.5
Estimating	+78.3	-3476.2		-3397.9
Other	+20.6	+35.8		+56.4
Support	+154.9	+9691.5		+9846.4
Subtotal	+811.5	+40790.0		+41601.5
Current Changes:				
Economic	+0.2	-239.5		-239.3
Quantity		+2508.4		+2508.4
Schedule		+404.6		+404.6
Engineering	+930.0	+2613.2		+3543.2
Estimating	+59.6	-731.7		-672.1
Other				
Support		+569.6		+569.6
Subtotal	+989.8	+5124.6		+6114.4
Total Changes	+1801.3	+45914.6		+47715.9
Current Estimate	2460.4	51310.0		53770.4

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	578.6	3798.2		4376.8
Previous Changes:				
Quantity		+7285.7		+7285.7
Schedule		+297.3		+297.3
Engineering	+281.3	+4613.1		+4894.4
Estimating	+7.3	-1368.9		-1361.6
Other	+15.5	+24.6		+40.1
Support	+101.0	+3513.9		+3614.9
Subtotal	+405.1	+14365.7		+14770.8
Current Changes:				
Quantity		+767.4		+767.4
Schedule		+68.4		+68.4
Engineering	+351.9	+910.4		+1262.3
Estimating	+20.1	-310.4		-290.3
Other				
Support		+157.0		+157.0
Subtotal	+372.0	+1592.8		+1964.8
Total Changes	+777.1	+15958.5		+16735.6
Current Estimate	1355.7	19756.7		21112.4

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).
Estimating:	Refinement of estimates.
Other:	Congressional action on ICS, CIP, and FOT&E Funding.
Support:	Development of AIS.

Procurement

Economic:	Revised escalation indices.
Quantity:	Addition of 2079 aircraft.
Schedule:	Stretchout of FY82-85 and FY92-94 procurements 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	+0.2
Development of an F-16 Derivative Configuration. (Engineering)	+351.9	+930.0
Re-estimate and extension of test and mission requirements. (Estimating)	+25.0	+69.5
Adjustment for prior year escalation. (Estimating)	-0-	-0.1
Re-estimate of Avionics Upgrade Tasks. (Estimating)	+0.2	+3.1
Transfer of FY90-92 Seek Eagle Funding to a Discrete Program Element. (Estimating)	-5.1	-12.9

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

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

	(Dollars in Millions) Base-Year $	Then-Year $
(2) (U) Procurement		
Revised economic escalation indices. (Economic)	N/A	-239.5
Increased F-16 Aircraft Procurement.	+1928.3	+6303.4
--Addition of 270 aircraft. (Quantity)	(+767.4)	(+2508.4)
--Schedule change adjustment due to 270 additional aircraft. (Schedule)	(+ 68.4)	(+ 359.4)
--Engineering change adjustment due to 270 additional aircraft. (Engineering)	(+1061.6)	(+3033.9)
--Estimating change adjustment due to 270 additional aircraft. (Estimating)	(- 315.0)	(- 725.0)
--Peculiar support for 270 additional aircraft. (Support)	(+ 213.6)	(+ 688.7)
--Initial Spares for 270 additional aircraft. (Support)	(+ 132.3)	(+ 438.0)
Procurement schedule change due to decrease in production rate from 15 to 12.5 aircraft per month in FY90 and 91 and increase in production rate from 10 to 12.5 in FY93 and 94. (Schedule)	N/A	+ 45.2
Production incorporation of F-16 derivative configuration changes.	+ 57.8	+ 183.7
--Aircraft changes. (Engineering)	(+ 47.7)	(+ 151.7)
--Peculiar Support requirements. (Support)	(+ 10.1)	(+ 32.0)
Restructure of Airborne Self-Protective Jamming System (ASPJ) Program associated with retrofitting units for Block 40 (LANTIRN capable) aircraft. (Engineering)	- 198.9	- 572.4

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)		
Grassroots re-estimate of airframe cost. (Estimating)	- 4.8	- 31.6
Adjustment for prior year Escalation.	+ 11.6	+ 30.5
--Adjustment for flyaway elements. (Estimating)	(+ 9.4)	(+ 24.9)
--Adjustment for support elements. (Support)	(+ 2.2)	(+ 5.6)
Grassroots estimate resulted in decreased peculiar support requirements. (Support)	- 54.5	- 173.7
Re-estimate of initial Spares requirements. (Support)	- 146.7	- 421.0

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	
9.201	-.769	+.417	+.708	+6.196	-1.354	+.019	+3.464	+8.681	17.882

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

	Initial Contract Price		
	Target	Ceiling	Qty
a. RDT&E - None			
b. Procurement	$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
$1041.8M	$1159.5M	N/A	$1049.8M	$1057.6M

	Cost Variance	Schedule Variance
Previous Cumulative Variances 11/30/87	$-45.9M	$-42.4M
Cumulative Variances to date 10/31/88	$-71.8M	$-28.5M
Net Changes	$-25.9M	$+13.9M

Explanation of Change: The increase in the negative cum-to-date cost variance since the 31 December 1987 SAR is $25.9M. The most significant occurrences are: Block 30G and Block 40 initiatives being more complex than anticipated for hardware, software, and integration within the Avionic Integration Test Station. 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 $13.9M due to acceptance of previously scheduled Advanced Identification Friend-or-Foe (AIFF) hardware. The negative variance will not have an impact on the total program or the MSIP contract. Both the contractor and the program manager's estimate is above the contract target price. Actions are being taken in the F-16 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
$1,366.4M	$1,466.3M	144	$1,367.0M	$1,372.6M

	Cost Variance	Schedule Variance
Previous Cumulative Variances 11/30/87	$-38.5M	$-17.5M
Cumulative Variances to date 10/31/88	$-56.1M	$-20.1M
Net Change	$-17.6M	$- 2.6M

Explanation of Change: The increase in the negative cum-to-date cost variance since the 31 Dec 87 SAR is $17.6M. The most significant occurrence was due to disputed actual cost being released to an inappropriate WBS element. Also contributing to the cost variance was the transfer of material cost from inventory accounts into production work orders by GD/Electronics. We have budgeted additional funds for the anticipated impact of the negative cost variance on the contract cost at completion. The increase in the negative cum-to-date schedule variance of $2.6M is the result of late deliveries of hardware items within the Air Vehicle Kits WBS element by Delco. There will be no corrective action required and no impact to the total program is anticipated. The program manager's estimate remains 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
Forth Worth, Texas
F33657-82-C-2034 (FY85) FPIF
Award: N/A (Follow on Effort)
Definitized: 30 August 1983

Initial Contract Price		
Target	Ceiling	Qty
$697.4M	$754.8M	150

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$1,363.0M	$1,467.1M	150	$1,360.5M	$1,366.2M

	Cost Variance	Schedule Variance
Previous Cumulative Variances 11/30/87	$-46.2M	$-37.1M
Cumulative Variances to date 10/31/88	$-58.6M	$-18.6M
Net Change	$-12.4M	$+18.5M

Explanation of Change: The increase in the negative cum-to-date cost variance since the 31 Dec 87 SAR is $12.4M. The negative cum-to-date cost variance is due to significant occurrences as follows: 1) A classified task in Engineering/Research and Engineering; 2) A reassessment by GD/Electronics of the budget and the cost to complete for their remaining tasks; 3) An increase in the underrun at completion and a corresponding increase in earned budget for procurement/hardware. We have budgeted additional funds for the anticipated impact of the negative cost variance on the contract cost at completion. The negative cum-to-date schedule variance decreased $18.5M since the 31 Dec 87 SAR. The change is due to the underrun at completion and a corresponding increase in earned budget for procurement/hardware. We have budgeted additional funds for the anticipated impact of the negative cost variance on the contract cost at completion. Also contributing to the change was the late deliveries by Advanced Computer Techniques (Jovial Enhancements) and Honeywell (Digital Test Station). We anticipate no impact to the total program at completion. The program manager's estimate at completion remains above 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
Fort Worth, Texas
F33657-84-C-0247 (FY86) Multiyear II FFP
Award: N/A (Follow on Effort)
Definitized: September 1986

Initial Contract Price

Target	Ceiling	Qty
$1034.1M	N/A	180

Current Contract Price

Target	Ceiling	Qty
FFP $1197.9M	N/A	180

Estimated Price at Completion

Contractor	Program Manager
$1197.9M	$1197.9M

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 $1118.1M	N/A	180

Estimated Price at Completion

Contractor	Program Manager
$1118.1M	$1118.1M

Engines:

General Electric Corporation
Evendale, Ohio
F33657-84-C-2011 (FY87) FFP
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
$519.1M	N/A	172

Estimated Price at Completion

Contractor	Program Manager
$ 519.1M	$ 519.1M

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

a. (U) Program Status --

(1) Percent Program Completed: 65.2% (15 yrs/23 yrs)

(2) Percent Program Cost Appropriated: 53.9% (28976.3/53770.4)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY75-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-97)	Total
RDT&E	1375.6	33.5	177.0	874.3	2460.4
Procurement	27600.7	3262.7	3033.4	17413.2	51310.0
MILCON	---	---	---	---	---
Total	28976.3	3296.2	3210.4	18287.5	53770.4

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

c. (U) Annual Summary

Fiscal Year	Qty	FLYAWAY FY75 DOLLARS NonRec	FLYAWAY FY75 DOLLARS Rec	TOTAL BASE YEARS	TOTAL THEN-YEAR $ PROGRAM	TOTAL THEN-YEAR $ OBLIGATED	TOTAL THEN-YEAR $ EXPENDED	Escl Rate (%) *
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	51.1	2.8
1987				23.3	52.0	52.0	43.5	2.7
1988				10.9	25.1	11.7	4.8	3.1
1989				10.9	26.2	3.7	.4	4.0
1990				13.5	33.5			3.6
1991				69.4	177.0			3.3
1992				100.8	263.3			2.8
1993				88.2	235.1			2.3
1994				89.7	243.3			1.8

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

1995				31.9	88.0			1.8
1996				7.9	22.1			1.8
1997				7.9	22.5			1.8
SUBTOTAL	8	**	**	1355.7	2460.4	1339.7	1311.0	

* 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 NonRec	FLYAWAY FY75 DOLLARS Rec	TOTAL BASE YEARS	TOTAL THEN-YEAR $ PROGRAM	TOTAL THEN-YEAR $ OBLIGATED	TOTAL THEN-YEAR $ EXPENDED	Escl Rate (%) *
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	645.1	970.1	2312.8	2312.8	2312.8	8.0
1985	150	141.2	695.9	1064.1	2620.8	2620.8	2494.3	3.4
1986	180	137.2	750.7	1136.5	2877.7	2877.7	2419.3	2.8
1987	180	103.1	768.5	1110.4	2912.5	2734.5	1482.7	2.7
1988	180	42.2	790.5	1008.1	2740.0	2186.4	92.4	3.1
1989	180	145.4	860.0	1155.2	3245.0	754.8		4.0
1990	150	57.4	750.5	1128.6	3262.7			3.6
1991	150	25.5	775.9	1024.1	3033.4			3.3
1992	150	22.9	776.1	948.2	2867.3			2.8
1993	150	17.9	774.8	888.8	2737.5			2.3
1994	150	15.8	780.0	1025.2	3214.1			1.8
1995	150	12.2	804.5	994.5	3174.4			1.8
1996	120	5.6	738.0	891.2	2895.6			1.8

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

1997	120	5.6	712.3	763.1	2524.3			1.8
Subtotal	2999	1225.4	14093.9	19756.7	51310.0	24378.9	19693.4	
Total	3007	1225.4	14093.9	21112.4	53770.4	25718.6	21004.4	

* Since outlay rates are not shown, the escalation rates cannot be used to verify the composite index.

Obligated and expended amounts reflect program office records as of 30 November 1988.

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
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	150
1991	N/A	216	150	324
1992	N/A	216	150	324
1993	N/A	216	150	324
1994	N/A	216	150	18
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 *
Prog Acq Cost	(BY $)	N/A	N/A	21112.4	+661.3	20451.1
	(TY $)	N/A	N/A	53770.4	+2729.2	51041.2
PAUC	(BY $)	N/A	N/A	7.021	+.220	6.801
	(TY $)	N/A	N/A	17.882	+.908	16.974

17. (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	47	101
End Date (mo/yr)	5/96	--	5/99	N/A	6/95

d. (U) Deliveries (Plan/Actual)

	To Date
RDT&E	8/8
Procurement	
A/B	785/785
C/D	638/640

e. (U) Approved Design-to-Cost Goal -- None

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)	66.7	38.2	62.6	TBD	167.5
Industrial Fund	1.9	3.9	3.5	TBD	9.3
Total	68.6	42.1	66.1	TBD	176.8

(2) N-18 F/A-18

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SAR-88-022

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)
PROGRAM: HORNET (F/A-18)

AS OF DATE: December 31, 1988

~~AS AMENDED~~

~~CLEARED~~
~~FOR OPEN PUBLICATION~~

~~MAR 02 1989~~

~~DIRECTORATE FOR FREEDOM OF INFORMATION~~
~~AND SECURITY REVIEW (OASD-PA)~~
~~DEPARTMENT OF DEFENSE~~

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1. (U) Designation and Nomenclature: F/A-18 Naval Strike Fighter (HORN

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

~~No Security Objection~~
~~to Open Publication~~
~~(AS AMENDED)~~
~~Office of the Chief of~~
~~Naval Operations~~
~~Dept. of the Navy~~

5. (U) Related Programs: AMRAAM, ASPJ, ALR-67, LASER & IR Maverick, NACES Ejection Seat, ALQ-126B, HARM, HARPOON, SPARROW/SIDEWINDER, RECCE, AV-8B, F-15, A-6F, F404 Engine, Oxygen Generating System, AYK-14 (XN-6), ASN-130/139, ARC-182, and BRU-32.

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OASD(PA) DFOISR 89-T-0542

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6. (U) 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 currently used for training. 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 FY 1990, night attack capabilities (navigation FLIR, night vision goggles and integrated displays) will be delivered in both the F/A-18 C and D aircraft. In FY 1992, the Hornet will be configurable as a tactical reconnaisance aircraft with the installation of a sensor pallet in place of the gun system.

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 air-frame, engine, flight controls, and weapons systems are used for both fighter-attack missions, excellent fighter performance, self-defense, and increased survivability are inherent.

7. (U) 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 development 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 modified to operate the F/A-18. Canada, Australia and Spain have contracted for a total of 285 F/A-18's and have received 249 to date.

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 will be configured with an improved night attack capability featuring a Thermal Imaging Navigation Set (TINS), and an Integrated Night Vision System (INVS). Flight testing of this variant began in 1988.

7. (U) Program Highlights: (Continued)

b. Significant developments since last report.

Foreign interest in the F/A-18 increased markedly in 1988 with Kuwait signing a letter of acceptance for 40 aircraft and Switzerland choosing the F/A-18 for its 34 aircraft buy, pending subsequent parlimentary approval; both decisions were contingent upon provision of the enhanced performance engine (EPE). The United Arab Emirates and the Republic of Korea are considering procurement of the F/A-18.

Throughout 1988, U.S. Navy and DoD officials briefed European governments on upgraded version of the F/A-18 (Hornet 2000), including improved radar and avionics, enhanced survivability features, additional internal fuel, a larger wing, and increased performance engines. Considerable interest was appraised, but the problems of technology releasability and European political/industrial parochialism prevented positive decisions in 1988; the potential for co-development/co-production of Hornet 2000, however still exists.

529 F/A-18s had been delivered to the USN/USMC as of 31 Dec. These include the 11 Full Scale Development (FSD) aircraft plus one production aircraft provided by MCAIR as replacement for an FSD aircraft that crashed in 1980 while bailed to MCAIR.

Despite continuing problems with the F404 engine afterburner liner and high pressure compressor blades, the F/A-18 continued to establish records in readiness, 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. (U) Threshold Breaches: There are currently no DAE baseline (dated Feb 1988) breaches.

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9. (U) 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

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9. (U) 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 17 Feb 88;

10. (U) Technical/Operational Characteristics:

a. (U) Technical --

	Dev Est	Approved Prgm Goal/ Threshold	Demonstrated Performance	Current Estimate
Weight (lbs)				
(U) Empty VF	21649	23014	23014	23014
(U) Empty VA	21720	23014	23014	23014
(U) Take-off Gross Escort Mission	(b)(1)			
(U) Max Take-off Gross Interdiction Mission				
Dimensions (Ft)				
(U) Length	56	56	56	56
(U) Height	15.3	15.3	15.3	15.3
(U) Wing Span	37.5	37.5	37.5	37.5
Spotting Factor				
(U) A-7 Equivalent	1.2	1.2	1.2	1.2

b. (U) Operational

	Dev Est	Approved Prgm Goal/ Threshold	Demonstrated Performance	Current Estimate
Speed, At Altitude (Mach)				
(U) Combat Weight	1.7	1.7	1.7	1.7
Radius (NM)				
(U) Fighter Escort, Internal Fuel	400	362	362	362
(U) Strike Mission	550	575	575	575
Combat Ceiling VF (FT)	(b)(1)			
(U) Max Thrust				
(U) Military Thrust	48100	48000	48000	48000
Mission Reliability				
(U) VF @ 2500 hours	0.7	0.93	.89*	.93
System Maintenance, VF @ 2500 hours				
(U) Mean Flight Hours Between Failure, Fighter Configuration, Organizational Level	1.4	2.0	2.77*	2.1 (Ch-1)
(U) Unscheduled Direct Level Maintenance Manhours/Flight Hour	8.0	5.8	2.22	5.4 (Ch-1)
(U) Operating Factor, Maintenance	12	12		12
Maint Men per Aircraft, BIT				
(U) Development Completion	NA	100%	100%	100%
(U) False Indication Rate.	NA	28%	28%	28%
(U) Standard Depot Level Maintenance (Months)	48	48	48	48

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

Notes on Sec 10a.

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 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: 53600 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 McDonnel 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.

Unscheduled Direct Maintenance: 5.8 derived from 3M test data of May-Oct 86 Operational Squadron.

BIT Development Completion: Follow-on testing for BIT enhancement ongoing until approximately FY 88.

BIT False Indication Rate: 28% from Lot VII Aircraft, Fall '84 to Spring '86.

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

d. Current Change Explanations --

(Ch-1) Updated to reflect 3-M data from operational squadrons, Nov 87 thru Oct 88

e. References --

Development Estimate: DCP #141 dated 18 Nov 76
OSD Program Review Memorandum, 17 Mar 83.

Approved Program: DAE Baseline approved 17 Feb 88

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11. (U) 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	12,572.3
Airframe	(3,599.6)	(6,675.8)	(6,675.8)
Engines	(1,059.7)	(1,550.8)	(1,550.8)
Avionics	(198.8)	(369.8)	(369.8)
Arms/Other GFE	(61.3)	(1,437.4)	(1,437.4)
Total Flyaway	(4,919.4)	(10,033.8)	(10,033.8)
PGSE	(610.3)	(1,046.1)	(1,046.1)
Training/Other	(517.5)	(808.5)	(808.5)
Gross P-1	(6,047.2)	(11,888.3)	(11,888.3)
Initial Spares	(513.7)	(684.0)	(684.0)
Construction (MILCON)	18.0	21.6	21.6
Total FY 75 Base-Year $	8,016.6	14,246.2	14,246.2
Escalation	4,858.7	23,363.4	23,363.3
RDT&E	(396.7)	(751.3)	(751.3)
Procurement	(4,451.7)	(22,592.6)	(22,592.5)
Milcon	(10.3)	(19.5)	(19.5)
Total Then-Year $	$12,875.3	$37,609.5	$37,609.5

b. Quantities --

Development (RDT&E)	11	11	11
Procurement	800	1157	1157
Totals	811	1168	1168

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: FY 1990/1991 President's Budget

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

	Current Est (Dec 88 SAR)	Current Year UCR Baseline (Dec 87 SAR)	Budget Year UCR Baseline (Dec 88 SAR)
a. Program Acquisition -			
(1) Cost	37609.5	37265.4	37609.5
(2) Quantity	1168	1168	1168
(3) Unit Cost	32.200	31.905	32.200
b. Current Procurement --	FY 1989	FY 1989	FY 1990
(1) Cost (P1 Proc)	2498.8	2564.4	2683.4
Minus CY Advance Proc	138.8	139.4	579.2
Plus PY Advance Proc	141.3	141.3	138.8
NET TOTAL	2501.3	2566.3	2243.0
(2) Quantity	84	84	72
(3) Unit Cost	29.777 see note (2)	30.551 see note (1)	31.153

(1) The 1987 SAR baseline estimates for FY 1989 have been adjusted to reflect congressional appropriations which increased the procurement quantity from 72 to 84.

(2) Decrease reflects Congressional marks subsequent to appropriation.

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13. (U) 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	6001.3	-1.2	6190.8
Quantity	0.0	2471.7	0.0	2471.7
Schedule	14.6	5587.1	-0.6	5601.1
Engineering	55.6	2266.1	0.0	2321.7
Estimating	298.8	4025.0	15.1	4338.9
Other	6.5	0.0	0.0	6.5
Support	3.0	3457.8	-1.4	3459.4
Sub-Totals	569.2	23809.0	11.9	24390.1
Current Changes:				
Economic	0.0	-326.6	-0.1	-326.7
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	-29.9	0.0	-29.9
Engineering	0.0	480.8	0.0	480.8
Estimating	0.0	642.8	1.0	643.8
Other	0.0	0.0	0.0	0.0
Support	0.0	-423.9	0.0	-423.9
Sub-Totals	0.0	343.2	0.9	344.1
Total Changes	569.2	24152.2	12.8	24734.2
Current Estimate	2403.6	35164.8	41.1	37609.5

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	775.8	-0.9	784.3
Engineering	37.8	705.0	0.0	742.8
Estimating	161.4	1439.6	4.6	1605.6
Other	4.5	0.0	0.0	4.5
Support	1.5	1154.2	-0.5	1155.2
Sub-Totals	214.6	5842.7	3.2	6060.5
Current Changes:				
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	-3.1	0.0	-3.1
Engineering	0.0	146.5	0.0	146.5
Estimating	0.0	194.2	0.4	194.6
Other	0.0	0.0	0.0	0.0
Support	0.0	-168.9	0.0	-168.9
Sub-Totals	0.0	168.7	0.4	169.1
Total Changes	214.6	6011.4	3.6	6229.6
Current Estimate	1652.3	12572.3	21.6	14246.2

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

b. Previous Change Explanations --

RDT&E

Economic:	Revision to escalation rates
Schedule:	Slower 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 1157
Schedule:	Fluctuations in production rates and final production year. Rephase and accelerate program (+57 in FY 87-90) Program stretchout (208 procurred in FY 93-95)
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)
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
Support:	Changes in projected sites, aircraft distribution, increased aircraft quantity, decreased spares, adjusted allocation for support due to change in aircraft procurement schedule

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

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

c. Current Change Explanations -- (Dollars in Millions)

		Base Year	Then-Year
	(1) RDT&E -- None		
	(2) Procurement		
Economic:	Revision to escalation guidance	N/A	-326.6
Schedule:	Increased FY89 quantity by 12 (from 72 to 84) with a corresponding decrease in FY95 (from 64 to 52)	-3.1	-29.9
Engineer:	1) System upgrades: a) ASN-130 replaced by ASN-139 in FY89 b) ARC-182 replaced by ARC-210 in FY90 c) ALE-39 replaced by ALE-47 in FY90 d) KAPTON wire replacement 2) New systems added: FY89 a) Additional weapons capability (ECP-290) b) Provisions for Advanced Air Tactical Reconnaisance System (ATARS) FY90 a) Provisions for multi-mode landing system b) Deployable flight incident recorder FY91 a) Enhanced performance engine b) Integrated Night Vision System (INVS helmet) c) ATARS systems procurement FY92 a) Global positioning system	146.5	480.8
Estimating:	The current estimate corrects last year's requirements for outyear funding. Reflects updated historical cost data and FY88 contract settlement which included major operational capability improvements. The .9% program increase partially reflects the impact of major subcontractor overhead rates which are now projected above previous "should cost" estimates.	194.2	642.8
Support:	a) Funding for support has been substantially reduced reflecting some decrease in requirements and a challenge to reduce costs. b) Funding for spares was increased to support configuration changes and maintain readiness objectives.	-168.9	-423.9
	(3) MILCON		
Economic:	Revision to escalation guidance	N/A	-0.1
Estimating:	Increase based on updated historical data	0.4	1.0

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14. (U) Program Acquisiton 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	
15.876	5.021	-2.736	4.770	2.399	4.266	0.006	2.599	16.324	32.200

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15. (U) 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 88 AIRFRAMES:
McDonnell Douglas
N00019-86-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
1492.9	NA	84

Estimated Price at Completion	
Contractor	Program Manager
1492.9	1492.9

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

Explanation of Change: Not Required on FFP Contracts

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
1687.4	NA	84

Estimated Price at Completion	
Contractor	Program Manager
1687.4	1687.4

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

Explanation of Change: Increase in target price due to mods added for support,FLIR, and additional ancillary

---

FY 86 AIRFRAMES:
McDonnell Douglas
N00019-84-C-0270, FFP
Award: 31 Dec 84
Definitized: 30 Jun 87

Initial Contract Price		
Target	Ceiling	Qty
1234.8	NA	84

Current Contract Price		
Target	Ceiling	Qty
1620.4	NA	84

Estimated Price at Completion	
Contractor	Program Manager
1620.4	1620.4

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

Explanation of Change: Increase in target price due to mods added for support, FLIR, and additional ancillary

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15. (U) Contract Information (Continued)

FY 87 ENGINES:
Pratt & Whitney
N00019-85-C-0144, FFP
Award: 30 Jul 85
Definitized: 4 Jun 87

Initial Contract Price		
Target	Ceiling	Qty
171.0	189.0	90

Current Contract Price		
Target	Ceiling	Qty
171.0	189.0	90

Estimated Price at Completion	
Contractor	Program Manager
171.0	171.0

Previous Cumulative Variances — Cost Variance — Schedule Variance
Cumulative Variances To Date
Net Change
Explanation of Change: Not Required on FFP Contracts

FY 88 ENGINES:
General Electric
N00019-86-C-0247, FFP
Award: 17 Apr 87
Definitized: 19 Feb 88

Initial Contract Price		
Target	Ceiling	Qty
226.8	NA	141

Current Contract Price		
Target	Ceiling	Qty
226.8	NA	141

Estimated Price at Completion	
Contractor	Program Manager
226.8	226.8

Previous Cumulative Variances — Cost Variance — Schedule Variance
Cumulative Variances To Date
Net Change
Explanation of Change: Not Required on FFP Contracts

FY 87 ENGINES:
General Electric
N00019-86-C-0048, FFP
Award: 29 Jul 87
Definitized: 29 Jul 87

Initial Contract Price		
Target	Ceiling	Qty
140.5	NA	87

Current Contract Price		
Target	Ceiling	Qty
141.2	NA	87

Estimated Price at Completion	
Contractor	Program Manager
141.2	141.2

Previous Cumulative Variances — Cost Variance — Schedule Variance
Cumulative Variances To Date
Net Change
Explanation of Change: .7M added to target price for tech pubs

---

c. MILCON - none

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16. (U) Program Funding Summary:

a. Program Status --

(1) Percent Program Completed: 71.4%

15 Years Funds Appropriated
21 Total Program Years

(2) Percent Program Cost Appropriated: 67.7%

$25,465.5 Appropriated To Date (Mil)
$37,609.5 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 92-95	TOTAL
RDT&E	2403.6	0.0	0.0	0.0	2403.6
PROCUREMENT (APN)	23024.8	2683.4	2183.2	7273.4	35164.8
MILCON	37.1	4.0	0.0	0.0	41.1
Total	25465.5	2687.4	2183.2	7273.4	37609.5

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16. (U) Program Funding Summary (Contiued)
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	(I)
1975	0	NA	NA	19.5	20.0	20.0	20	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	6.8
1979	0	NA	NA	336.3	496.1	496.1	496.1	8.4
1980	0	NA	NA	192.8	314.8	314.8	314.8	10.59
1981	0	NA	NA	96.6	173.2	173.2	169.7	10.61
1982	0	NA	NA	100.1	190.5	190.5	194.2	7.6
1983	0	NA	NA	53.9	107.7	107.7	89.8	4.9
Subtotal	11	0	0	1652.3	2403.6	2403.6	2385.9	

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	(I)
1978	0	0.0	0.0	19.8	34.1	34.1	31.5	6.8
1979	9	0.0	230.9	338.1	590.6	591.2	593.7	8.7
1980	25	0.0	433.0	595.9	1181.4	1184.2	1063.7	11.8
1981	60	0.3	671.8	944.4	2063.2	2066.4	1964.4	11.6
1982	63	36.4	616.1	1032.0	2452.6	2257.6	2327.1	14.3
1983	84	48.4	704.7	1016.4	2567.2	2587.1	2573.2	9.0
1984	84	0.0	641.8	914.5	2400.7	2407.7	2223.1	8.0
1985	84	59.1	567.2	871.2	2359.5	2384.8	2257.0	3.4
1986	84	13.6	549.1	765.5	2130.8	2144.9	1943.8	2.8
1987	84	10.0	538.4	803.1	2309.1	2316.9	1212.8	2.7
1988	84	44.6	549.4	818.0	2436.8	2398.1	353.7	3.1
1989	84	34.9	562.8	811.4	2498.8	72.0	0.0	4.0
1990	72	18.5	456.2	839.9	2683.4	N/A	N/A	3.6
1991	72	3.5	432.1	669.3	2183.2			3.3
1992	72	7.6	441.3	575.4	1912.6			2.8
1993	72	0.0	451.5	572.1	1931.9			2.3
1994	72	0.0	443.5	526.3	1822.5			1.6
1995	52	0.0	354.9	458.9	1606.4			1.8
Subtotal	1157	276.7	8644.7	12572.3	35164.8	20445.0	16544.0	

16. (U) 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	4.1	5.5	6.4	6.4	10.6
1981	NA	NA	NA	0.2	0.4	0.4	0.4	10.6
1982	NA	NA	NA	6.8	12.8	10.3	10.3	7.6
1983	NA	NA	NA	2.9	5.6	4.6	4.6	4.9
1984	NA	NA	NA	4.7	9.4	7.0	7.0	3.8
1985	NA	NA	NA	0.4	0.8	0.9	0.9	3.4
1986	NA	NA	NA	0.3	0.6	1.1	1.0	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	3.1
1989	NA	NA	NA	0.0	0.0	0.0	0.0	4.0
1990	NA	NA	NA	1.3	4.0			3.6
1991	NA	NA	NA	0.0	0.0			3.3
1992	NA	NA	NA	0.0	0.0			2.8
Subtotal	0	0.0	0.0	21.5	41.1	31.7	31.6	
TOTAL	1168	276.7	8644.7	14246.2	37609.5	22880.3	18961.5	

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17. (U) Production Rate Data:

a. Annualized Production Rates

Fiscal Year	Production Rates (Quantity/Year) Development Estimate	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
1982	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			72	145
1991			72	145
1992			72	
1993			72	
1994			72	
1995			52	

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17. (U) 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	6229.6	14246.2	557.6	13688.6
Then-Year $	12875.3	24734.2	37609.5	2873.7	34735.8
PAUC					
Base Year $	9.9	2.3	12.2	0.4	11.8
Then-Year $	15.9	16.3	32.2	2.2	30.0

c. Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum
Start Date (Mo/Yr)	11/78	0	11/78	0	11/78
Duration (Months)	132	96 mos	228	48 mos	180
End Date (Mo/Yr)	11/89	8 yrs	11/97	4 yrs	11/93

d. Deliveries (Plan/Actual) --To Date 31 Dec 1988

RDT&E	11/11
Procurement	513/517

e. Approved Design to Cost Goal --
NOT APPLICABLE

18. Operating and Support Costs:

a. not applicable

b. not applicable

c. Contractor Support Costs:

(Then-Year Dollars in Millions)

	FY 1989 & prior	FY 1990 Year	FY 1991 Year	Balance to Complete	Total
O&M (A,N,AF)	37.1	15.7	16.0	not available	68.8
Industrial Fund	.1	.4	.4	not available	0.9
Total	37.2	16.1	16.4	not available	69.7

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SAR-88-079

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

PROGRAM: BRADLEY FIGHTING VEHICLE SYSTEMS (BFVS)

A-7 BRADLEY FVS

AS OF DATE: December 31, 1988

INDEX

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[redacted] DECLASSIFIED FOR OPEN PUBLICATION [redacted] MAR 07 1989 [redacted] DEPARTMENT OF DEFENSE [redacted]

1. (U) Designation and Nomenclature (Popular Name): M2/M2A1/M2A2, Infantry [redacted]ighting Vehicle (IFV); M3/M3A1/M3A2, Cavalry Fighting Vehicle (CFV); Bradley [redacted]ighting 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 William O. Coomer
Assigned: July 1, 1985
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

[redacted] 5. (U) Related Program: M790 Family of 25mm Ammunition; BFVS Improvement [redacted]Program; Multiple Launch Rocket System (MLRS); TOW-2 Subsystem

[redacted] Classified by: Multiple Sources [redacted] Declassify on: OADR

[redacted] Concur in Classification [redacted]

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OASD(PA) DFOISR 88-T- 0626

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 mechanized infantry units, armored cavalry units, and maneuver battalion scout squads. The IFV/CFV have swimming capability and are air transportable. The IFV carries a nine-man infantry squad, while the CFV carries a five-man scout section. The modified IFV/CFV versions retain the cross country mobility and major performance characteristics of the basic vehicles and incorporate improvements in missile performance, operations in an NBC environment, fightability, survivability, and in other functions. Vehicle armament consists of a fully stabilized, dual-feed, externally powered M242 25mm automatic gun as its primary weapon, a two-tube TOW missile launcher, and a M240C, 7.62mm coaxially-mounted machinegun. Supplementary armament for the IFV is the M231 firing port weapon. In the combined arms task force, the IFV/CFV meet all requirements for a companion vehicle to the Abrams main battle tank. 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. An 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 was initiated in July 1983 to improve IFV/CFV performance. The Army approved M2A1/M3A1 vehicle production in May 1985. The A1 significantly increased vehicle 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.

b. (U) Significant Developments Since Last Report: Bradley vehicle production and fielding remained on schedule during the report period. All technical problems which affected production of the TOW/T2SS were resolved. The government accepted the first A2 production vehicle in May 1988 and the first A2 vehicle with 30mm HS protection in September 1988. Upgrading the power train to 600 HP was approved and will go into production in May 1989. The FY90/91 President's Budget includes funds for multiyear procurement and a stabilized annual production rate of 600 vehicles per year. Bradley handoff stayed on schedule through year end. M2A1/M3A1 vehicle fielding to TRADOC and to 24ID was completed and additional fielding to the 3AD began. Worldwide operational readiness rates for BFVS are above the Army's goal.

The Bradley Fighting Vehicle System satisfies mission requirements.

c. (U) Changes since "As of" Date--None.

8. (U) Threshold Breaches: There are currently No DCP No. 30, dated April 1972, with Cover Sheet Revision dated September 1972 breaches, or SDDM, dated February 1980; threshold breaches. The program has breached the February 1988 DAE Baseline for numerous milestones.

9. (U) Schedule:

a. (U) Milestones --	Development Estimate	Approved Program	Current Estimate
(1) (U) MICV			
(A) (U) QMR Approved, MICV 20mm	Oct 68	NA	Oct 68
(B) (U) Concept Formulation Complete	Apr 72	NA	Apr 72
(C) (U) Milestone II (DSARC)	Mar 79	NA	Mar 75
(D) (U) Engineering Development Contract Awarded	Nov 72	NA	Nov 76
(E) (U) Terminate MICV 20mm Program	Mar 77	NA	Mar 77
(2) (U) M2/M3			
(A) (U) Milestone III (DSARC)	Jan 80	NA	Jan 80
(B) (U) Low Rate Initial Production Contract Awarded	Feb 80	NA	Feb 80
(C) (U) First Production Delivery	May 81	NA	May 81
(D) (U) Complete Initial Production Test	Apr 83	NA	May 83
(E) (U) Initial Operating Capability (IOC)	Dec 83	NA	Dec 83
(3) (U) M2A1/M3A1			
(A) (U) IPR Approval of M2A1/M3A1 Production	May 85	NA	May 85
(B) (U) First A1 Production Contract Award	Jul 85	NA	Jul 85
(C) (U) First Production Delivery M2A1/M3A1 Production	May 86	NA	May 86
(D) (U) Complete Initial Prod Test	Jul 87	NA	Sep 87
(E) (U) Initial Operating Capability (IOC) - M2A1/M3A1	Nov 88	NA	Nov 88

9. (U) Schedule:

			Development Estimate	Approved Program	Current Estimate
(3a)	(U)	2nd A2 Long Lead Item (LII) Contract Award (FY 88 Buy)	N/A	Nov 87	N/A
	(U)	3rd A2 Long Lead Item (LII) Contract Award (FY 89 Buy)	N/A	Nov 88	N/A
	(U)	4th A2 Long Lead Item (LII) Contract Award (FY 90 Buy)	N/A	Nov 89	N/A
	(U)	5th A2 Long Lead Item (LII) Contract Award (FY 91 Buy)	N/A	Nov 89	N/A
	(U)	5th A2 Production Contract Award (FY 91 Buy)	N/A	Jun 91	N/A

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	Apr 85
(B) (U) Engineering Development Contract Awarded - Phase II	NA	NA	Sep 86
(C) (U) Development test (PQT-G)			
Start	NA	NA	Dec 86
Complete	NA	NA	Aug 87
(D) (U) Milestone III (DA IPR)	NA	Sep 87	Sep 87
(E) (U) HS Production Contract Modification Award	NA	Oct 87	Oct 87 1/
(F) (U) 2nd A2 Veh Prod Contract Award (FY88 Buy)	NA	Jun 88	Jun 88 (Ch-1)
(G) (U) First A2 Vehicle Delivered (less 30mm HS protection)	NA	NA	May 88
(H) (U) Initial Production Testing:			
Start - 500 HP Engine	NA	Aug 88	Jun 88
Start - 600 HP Engine	NA	N/A	Sep 89 (Ch-2)
Completed - 500 HP Engine	NA	Mar 89	Jun 89 (Ch-3)
Completed - 600 HP Engine	NA	N/A	Jun 90 (Ch-2)
(I) (U) First A2 Veh Prod Delivery w/30mm HS Protection	NA	Jul 88	Sep 88 (Ch-4)
(J) (U) Instructor & Key Personnel Training Completed	NA	Sep 88	Sep 88 (Ch-1)
(K) (U) First A2 Veh Prod Delivery w/600 HP	NA	NA	May 89
(L) (U) 600 HP Engine IPR Decision	NA	Nov 88	Nov 88
(M) (U) 2nd A2 Veh 1st Prod Delivery-Full Prod Veh (FY88)	NA	May 89	May 89 (Ch-1)
(N) (U) 3rd A2 Veh Contract Award (FY89 Buy)	NA	Jun 89	Jun 89 (Ch-1)
(O) (U) First Comparison Prod Testing:	NA	Nov 88	NA
(P) (U) Armor Tile FAT	NA	N/A	TBD (Ch-6)
(Q) (U) Initial Operational Capability (IOC)	NA	Aug 89	Aug 89
(R) (U) 3rd A2 Veh Prod Delivery (FY89 Buy)	NA	May 90	May 90 (Ch-1)
(S) (U) 4th A2 Veh Prod Contract Award-FY90-FY94 Buys (MY)	NA	Jun 90	Jun 90 (Ch-1)

9. (U) Schedule - M2A2/M3A2 (cont'd)

	Development Estimate	Approved Program	Current Estimate
(T) (U) OCONUS Vehicle Retrofit (A1 to A2) Begins	NA	Sep 89	Sep 90 (Ch-1)
(U) (U) 4th A2 Veh 1st Prod Delivery for MY Contract	NA	N/A	May 91 (Ch-1)
(V) (U) Vehicle Hatch Upgrade Production Breakpoint	NA	Dec 89	Dec 92 (Ch-1)
(W) (U) CONUS Veh Retrofit (A1 to A2 Begins)	NA	Jul 91	Jan 93 (Ch-1)
(X) (U) First Unit Equipped (FUE)- A2 Vehicle:			
- Europe	NA	N/A	Apr 89
- CONUS	NA	Jul 91	Feb 94 (Ch-7)

b. (U) Previous Change Explanations--

(1) (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.

(2) (U) 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.

(3) (U) 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.

c. (U) Current Change Explanations--

(U) (Ch-1) Milestone was added.

(U) (Ch-2) Current estimate IPT (600 HP) start and completion dates were changed from Jun 89 and Jan 90, respectively, to Oct 89 and Jun 90 to reflect refinement of test schedule.

(U) (Ch-3) Current estimate milestone completion date was changed from Apr 89 to Jun 89 to accumulate additional test data for Material Release recommendations and to coincide with test priorities.

9. (U) Schedule - M2A2/M3A2 (cont'd)

(U) (Ch-4) Current estimate changed from Jul 88 to Sep 88 due to nonavailability of complete sets of A2 armor $\geq$ 1" thick caused by raw material shortages and low manufacturing yields.

(U) (Ch-6) Milestone was changed from Nov 88 to "to be determined", due to the Congressional decision to defer armor tile procurement to FY91.

(U) (Ch-7) First Unit Equipped (FUE)-A2 Vehicle-CONUS milestone in current estimate column was changed from Jul 91 to Feb 94. The change in FUE is based on draft revised BFVS Fielding Plan which incorporates a 600 per year vehicle multiyear procurement.

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: SDDM, 1 February 1980, Subject: Decision Memorandum on IFV/CFV DSARC III; Under Secretary of Defense Memorandum, February 2, 1981, Subject: Application of TOW 2 to Fighting Vehicle System; DA Memorandum, May 3, 1985, Subject: Approval of TOW-2 BFVS; DA Memorandum, September 30, 1987, Subject: Bradley Fighting Vehicle System (BFVS); DAE Baseline, February 1988.

e. (U) Footnote--

1/ (U) Corrects previously reported current estimate of Jan 88 which was in error.

BFVS, December 31, 1988

10. (U) Technical/Operational Characteristics:

a. (U) MICV/M2/M3 Configurations (500 HP Engine)

	Dev Est	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
(1) (U) Technical				
(A) (U) Weight (Combat (Loaded) - lbs.	35-38,000	NA/NA	49,987	50,000
(B) (U) Armor Protection @ 300M				
(U) Frontal				
(U) Side				
(U) Rear				
(2) (U) Operational				
(A) (U) Firepower				
25mm Gun				
(U) Stabilization Accuracy on a 4 mil. Target (% of Time Target)	80 to 90	80 to 90/ 80 TO 90	94.5	94.5
(U) Single Shot Accuracy to 1,000M (rd. to rd. std. dev.) (Stat) (Mils.) (AP)	.50	.50/.50	.50	.50
(U) Dispersion:				
(U) HE (Mils.) (500 rds/min)	.97	.97/.97	.97	.97
(U) AP (Mils.) (100 rds/min)	.59	.59/.59	.59	.59
(U) Receiver Life (rds.)	25,000	25,000/25,000	30,000	30,000
(U) Barrel Life (rds.)	3,750	13,000/13,000	13,000	13,000
TOW				
(U) Hit Prob Moving Targets 500-3,000M	NA	80-90%/80-90%		
(U) Hit Prob. Stat. Targets:				
(U) 500-2,000 Meters	NA	85-90%/85-90%		
(U) 2,000-3,000 Meters	NA	85-90%/85-90%		

(b)(1)

(b)(1)

[redacted] BFVS, December 31, 1988

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

			Dev Est	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
(2) (U) Operational (cont'd)						
(B)	(U)	Reliability				
	(U)	System (MMBF)	330	NA/NA	580	580
	(U)	25mm Gun (MRBS)	2,000	6,000/6,000	9,021	9,021
(C)	(U)	Maximum Speed (MPH)				
	(U)	Land	40-45	NA/NA	42.0	42.0
	(U)	Water	3.6	NA/NA	4.5	4.5
(D)	(U)	Acceleration 0-30 (MPH (sec)	18-22	NA/NA	18.5	18.5
(E)	(U)	Ground Pressure (p.s.i.)	7.0	NA/NA	7.8	7.8
(F)	(U)	Maintenance Ratio (Manhours/Oper. Hours)	.60	NA/NA	.40	.60

(3) (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.

(U) 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; 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.

(4) (U) Current Change Explanations -- N/A

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

(5) (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, and MN Annex May 25, 1982.

b. (U) M2A1/M3A1 Configuration (500 HP Engine)

	Dev Est	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
(1) (U) Technical 1/				
(A) (U) Weight (Combat loaded) - lbs.	50,404	NA/NA	50,404	50,404
(2) (U) Operational 1/				
(A) (U) Firepower:				
(U) 25mm Gun				
(U) Barrel Life (rds.)	4,000	13,000/13,000	13,000	13,000
(U) TOW (T2SS)				
Characteristics are unchanged for M2A1/M3A1				
(B) (U) Reliability:				
(U) System (MMBF)	580	NA/NA	841 2/	841 2/
(C) (U) Maximum Speed (MPH)				
(U) Land	38	NA/NA	38	38
(U) Water	4.5	NA/NA	4.5 3/	4.5. 3/
(E) (U) Ground Pressure (p.s.i.)	7.8	NA/NA	7.8	7.8
(F) (U) Maintenance Ratio (Manhours/Oper. Hours)	.60	NA/NA	.46 2/	.46 2/

(3) (U) Previous Change Explanations -- None

(4) (U) Current change Explanations -- None

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

(5) (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; Under Secretary of Defense Memorandum, February 2, 1981, Subject: Application of TOW 2 to Fighting Vehicle Systems; DA Memorandum, May 2, 1985, Subject: Approval of TOW 2 for the BFVS-action Memorandum. DAE Baseline, February 1988.

(6) (U) Footnotes --

1/ (U) The technical characteristics data shown in 10b(1) and operational characteristics data depicted in 10b(2) above reflect the M2A1/M3A1. These characteristics are the same as for the M2/M3 (basic vehicle) shown in 10a(1) and 10a(2), 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.

c. (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
(1) (U) Technical 1/				
(A) (U) Weight (combat loaded) - lbs.	NA	65,600/65,600	TBD 2/	67,000 (Ch-1)
(B) (U) Length (inches)	NA	258/258	TBD 2/	258
(C) (U) Width (inches)	NA	140/140	TBD 2/	141 (Ch-2)
(D) (U) Height (inches)	NA	119	TBD 2/	119
(E) (U) Armor Protection- ≥	(Ch-3)	AS AM	(b)(1)	
(1) Hull Front/60° Frontal ARC/30mm KE	NA			
(2) Hull Sides Above 1M/60° Frontal ARC/30mm KE	NA			
(3) Turret/60° Frontal ARC/30mm KE	NA			
(4) Hull & Turret-Areas Other Than Above - 14.5mm KE		AMEND		

Vehicle Survivability:
(U) Hand Held Anti-Tank Threat: NA
(% Reduction in K-Kill probability)

(2) (U) Operational 1/

(A) (U) Firepower

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(b)(1)

(b)(1)

(b)(1)

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

c. (U) Foreign Military Sales---None to date, however, a FMS case with Saudi Arabia is pending.

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:
FY90-91 President's Budget.

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1)	(U)	Cost	12052.8	9934.1	12052.8
(2)	(U)	Quantity	8485	6911	8485
(3)	(U)	Unit Cost	1.420	1.437	1.420
b. (U)	Current Procurement		(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1)	(U)	Cost	713.3	713.3	680.6
		Less CY Adv Proc	30.4	30.4	58.6
		Plus PY Adv proc	36.1	36.1	32.0
		Net Total	719.0	719.0	654.0
(2)	(U)	Quantity	581	581	600
(3)	(U)	Unit Cost	1.238	1.238	1.090

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	-439.7	-2.2	-443.6
Quantity	+18.0	+2657.8	-	+2675.8
Schedule	+22.1	+672.0	-	+694.1
Engineering	+166.9	+1590.7	-	+1757.6
Estimating	+31.7	+3457.9	+31.5	+3521.1
Other	+17.9	-	-	+17.9
Support	+135.6	+1138.7	-	+1274.3
Subtotal	+390.5	+9077.4	+29.3	+9497.2
Current Changes:				
Economic	-	-24.1	-0.2	-24.3
Quantity	-	+1459.5	-	+1459.5
Schedule	-	+75.4	-	+75.4
Engineering	+216.0	+268.5	+29.9	+514.4
Estimating	-.6	+78.1	+.2	+77.7
Other	-	-	-	-
Support	-	+16.0	-	+16.0
Subtotal	+215.4	+1873.4	+29.9	+2118.7
Total Changes	+605.9	+10950.8	+59.2	+11,615.9
Current Estimate	728.0	11265.6	59.2	12052.8

(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	+908.3	-	+919.4
Schedule	+13.8	+59.4	-	+73.2
Engineering	+82.1	+489.8	-	+571.9
Estimating	+25.5	+909.1	+11.0	+945.6
Other	+11.0		-	+11.0
Support	+65.1	+347.0	-	+412.1
Subtotal	+208.6	+2713.6	+11.0	+2933.2
Current Changes:				
Quantity	-	+314.8	-	+314.8
Schedule	-	+5.0	-	+5.0
Engineering	+80.8	+70.1	+9.0	+159.9
Estimating	-.3	+81.3	+.1	+81.1
Other	-	-	-	-
Support	-	+2.7	-	+2.7
Subtotal	+80.5	+473.9	+9.1	+563.5
Total Changes	+289.1	+3187.5	+20.1	+3496.7
Current Estimate	387.4	3414.8	+20.1	3822.3

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 (MICV configuration) to two-man weapon station with 25mm Gun and TCW Subsystem (IFV/CFV congiruation) which caused complete restructuring of R&D efort.
Engineering:	design effort associated with redirection of program to IFV/CFV configuration; additional design effort of A1 configuration.
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 indices.
Quantity:	addition of 5,700 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.
Engineering:	design changed to IFV/CFV, A1, and A2 configurations. Addition of high survivability requirements.
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.
Support:	changes in initial spares, peculiar support equipment, TMDE requirements, classroom spares, and incorporating BFVS training devices in SAR reporting structure.

MILCON

Economic:	revised escalation indices.
Estimating:	MILCON changes to cover BFVS unique sites.

13. Cost Variance Analysis (Cont'd)

c. (U) Current Change Explanations

	(Dollars in Millions) Base-Year	Then-Year
(1) (U) RDT&E		
Incorporation of vehicle/modification costs (project D332) into the SAR reporting (Engineering)	+80.8	+216.6
Prior year obligation adjustment (Estimating)	-0.3	- 0.6
(2) (U) Procurement		
Revised Dec 88 economic rates (Economic)	N/A	-24.1
Increase in vehicle quantity	+438.2	+2022.7
o Increase from 6890 to 8464 veh (Quantity)	(+314.8)	(+1459.5)
o Schedule changes applicable to increase in vehicle quantity (Schedule)	(+5.0)	(+66.2)
o Engineering changes applicable to increase in vehicle quantity (Engineering)	(+41.5)	(+156.6)
o Estimating changes applicable to increase in vehicle quantity (Estimating)	(+76.9)	(+340.4)
Changes in vehicle production schedule (Schedule)	---	+9.2
Improvements to optics, fire extinguishing system and track; the incorporation of Enhanced Position Location Reporting System (EPLRS), and electronic vs mechanical transmission controller (Engineering).	+28.6	+111.9
Changes in acquisition strategy from single year procurements to multiyear procurements for the prime contractor and the fire control components; changes due to incorporation of the most recent contractual data available (FY88 vs FY86/87); and delay in armor tile procurement from FY87 to FY91 (Estimating)	+ 4.4	-262.3
Revised estimates to spares and training devices requirements and TMDE to support increased quantities (Support)	+ 2.7	+16.0

13. Cost Variance Analysis (Cont'd)

	(Dollars in Millions) Base-Year	Then-Year
(3) (U) MILCON		
Revised Dec 88 Economic Rates (Economic)	N/A	-Ø.2
Storage facilities for A2 tiles (Engineering)	+9.Ø	+29.9
Prior year inflation offset (Estimating)	+Ø.1	+Ø.2

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	Spt	Other	Total	
.2Ø4	+.Ø98	---	---	+.Ø61	---	---	---	+.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	-.Ø55	+.175	+.Ø91	+.268	+.424	+.152	+.ØØ2	+1.Ø57	1.42Ø

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

a. (U) RDT&E -- No active major contracts

b. (U) Procurement --

IFV/CFV/MLRS Production (9th Year):
FMC Corporation
San Jose, California
DAAEØ7-88-C-AØ33, FFP
Award: June 3Ø, 1988
Definitized: June 3Ø, 1988

	Initial Contract Price Target	Ceiling	Qty
TOTAL:	$295.8	N/A	594
IFV/CFV ONLY:	$278.4	N/A	55Ø

	Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
TOTAL:	$3Ø5.Ø	N/A	624	$3Ø5.Ø	3Ø5.Ø
IFV/CFV Only:	$278.9	N/A	55Ø	$278.9	278.9

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

15. (U) Contract Information (cont'd)

IFV/CFV/MLRS Production (8th Year):
FMC Corporation
San Jose, California
DAAE07-87-C-A038, FFP
Award: June 30, 1987
Definitized: June 30, 1987

	Initial Contract Price		
	Target	Ceiling	Qty
TOTAL:	291.6	N/A	707
IFV/CFV ONLY:	273.5	N/A	662

	Current Contract Price			Estimated Price at Completion	
	Target	Ceiling	Qty	Contractor	Program Manager
TOTAL:	$390.8	N/A	708	$390.8	$390.8
IFV/CFV Only:	$363.0	N/A	662	$363.0	$363.0

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

Transmission Production (FY's 86/87):
GEOS
Pittsfield, Massachusetts
DAAE07-86-C-A023, FFP
Award: January 10, 1986
Definitized: January 10, 1986

	Initial Contract Price		
	Target	Ceiling	Qty
TOTAL:	$123.4	N/A	1524
IFV/CFV ONLY:	$ 57.9	N/A	716

	Current Contract Price			Estimated Price at Completion	
	Target	Ceiling	Qty	Contractor	Program Manager
Total	$202.6	N/A	2452	$202.6	$202.6
IFV/CFV Only:	$120.8	N/A	1436	$120.8	$120.8

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

Turret Drive System (FY's 85-87):
GEOS
Pittsfield, Massachusetts
DAAA09-85-C-0396, FFP
Award: January 31, 1985
Definitization: July 30, 1985

Initial Contract Price		
Target	Ceiling	Qty
$187.0	N/A	2046

(U) Contract Information (cont'd)

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$163.4	N/A	2097	$163.4	$163.4

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

15. (U) Contract Information (cont'd)

TOW-2 Production (FY87):
Hughes Aircraft Co.
El Segundo, CA
DAAH01-86-C-0909, FFP
Award: August 27, 1986
Definitized: September 29, 1987

Initial Contract Price		
Target	Ceiling	Qty
$89.3*	N/A	662

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$190.1	N/A	662	$190.1	$190.1

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

*Reflects a limitation of funds on FY87 production option.

TOW-2 Production (FY88)
Hughes Aircraft Co.
El Segundo, CA
DAAH01-87-C-0582
Award: April 24, 1987
Definitized: April 22, 1988

Initial Contract Price		
Target	Ceiling	Qty
$16.5*	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.

*Represents advance funding for long-lead items to preserve production schedule.

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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: 69.6% (8394.2/12,052.8

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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	Current & Prior Yrs (FY66-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-94)	Total
RDT&E	672.4	9.7	7.0	38.9	728.0
PROCUREMENT	7692.5	680.6	714.6	2177.9	11265.6
MILCON	29.3	-	-	29.9	59.2
TOTAL	8394.2	690.3	721.6	2246.7	12052.8

c. (U) Annual Summary ---

FISCAL YEAR	QTY	ROLLAWAY FY72 DOLLARS NCNREC	ROLLAWAY FY72 DOLLARS REC	TOTAL BASE YEAR $	TOTAL THEN YEAR $ PROGRAM	TOTAL THEN YEAR $ OBLI-GATED	TOTAL THEN YEAR $ EX-PENDED	ESCL RATE (%)
APPROPRIATION: RDT&E								
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	5.4
1971				5.3	5.2	5.2	5.2	5.1
1972				2.1	2.2	2.2	2.2	4.6
1973				9.2	10.1	10.1	10.1	4.3
1974	3			16.9	20.1	20.1	20.1	8.0
1975	3			12.9	16.6	16.6	16.6	10.9
1976	7			24.2	32.8	32.8	32.8	6.6
197T				5.8	8.2	8.2	8.2	2.9
2977				39.5	57.5	57.5	57.5	2.6
1978	8			31.8	49.9	49.9	49.9	6.8
1979				25.3	43.5	43.5	43.5	8.4

BFVS, December 31, 1988

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

FISCAL YEAR	QTY	ROLLAWAY FY72 DOLLARS NCNREC	ROLLAWAY FY72 DOLLARS REC	TOTAL BASE YEAR $	TOTAL THEN YEAR $ PROGRAM	TOTAL THEN YEAR $ OBLI-GATED	TOTAL THEN YEAR $ EX-PENDED	ESCL RATE (%)
APPROPRIATION: RDT&E (cont'd) 1/								
1980				20.4	38.7	38.7	38.7	10.6
1981				20.1	41.5	41.5	40.3	10.6
1982				41.9	92.3	92.3	88.4	7.6
1983				22.8	52.4	52.4	51.0	4.9
1984				12.6	30.1	30.1	28.5	3.8
1985				19.2	47.1	47.1	46.3	3.4
1986				7.9	19.9	19.9	17.9	2.8
1987				17.5	45.6	45.6	44.9	2.7
1988				8.0	21.6	21.6	8.7	3.1
1989				7.7	21.6	3.5	0	4.0
1990				3.4	9.7			3.6
1991				2.4	7.0			3.3
1992				1.2	3.7			2.8
1993				8.1	25.3			2.3
1994				3.1	9.9			1.8
SUBTOTAL	21			387.4	728.0	654.3	626.3	
APPROPRIATION: PROCUREMENT 1/ 2/								
1969		.4		.4	.4	.4	.4	2.7
1979		16.2	2.6	18.8	39.2	39.2	39.2	9.0
1980	100	17.6	92.9	118.4	276.7	268.6	268.3	11.8
1981	400	10.1	213.3	260.7	682.4	637.7	632.5	11.6
1982	600	1.4	279.1	317.2	889.2	833.3	823.3	14.3
1983	600	--	217.5	279.5	830.7	765.1	757.9	9.0
1984	600	12.2	220.8	300.8	930.8	853.8	845.2	8.0
1985	655	.6	235.9	285.9	905.4	834.6	811.5	3.4
1986	716	3.2	219.6	251.8	824.4	796.1	753.5	2.8
1987	662	1.5	237.4	258.7	874.3	775.3	501.4	2.7
1988	550	1.4	190.3	206.8	725.7	557.4	52.6	3.1
1989	581	1.2	185.8	196.8	713.3	60.9	0	4.0
1990	600	0	163.4	182.6	680.6			3.6
1991	600	0	176.0	187.1	714.6			3.3
1992	600	0	185.7	193.2	753.0			2.8
1993	600	0	180.8	186.6	740.3			2.3
1994	600	0	164.3	169.5	684.6			1.8
SUBTOTAL	8464	65.8	2965.4	3414.8	11265.6	6422.4	5485.8	

16. (U) Program Funding Summary (cont'd): (Current Estimate in Millions of $)

FISCAL YEAR	QTY	FY72 DOLLARS NCNREC	FY72 DOLLARS REC	TOTAL BASE YEAR $	TOTAL THEN YEAR $ PROGRAM	TOTAL THEN YEAR $ OBLI-GATED	TOTAL THEN YEAR $ EX-PENDED	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	1.7	3.1
1993				9.0	29.9	0	0	
SUBTOTAL				20.1	59.2	29.3	27.6	
TOTAL	8485	65.8	2965.4	3822.3	12052.8	7105.6	6139.7	

d. (U) Footnotes:

1/ Prior year programs were adjusted 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 system.

17. (U) Production Rate Data:

a. (U) Annual Production Rates -- (The annualized production rates shown differ from the annual funded buy quantities because the funded delivery period is 15 months for FY80 and 9 months for FY81.)

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		
1981		350	533	
1982		829	600	
1983		1080	600	
1984		1080	600	
1985		1080	655	
1986		1283	716	
1987			662	
1988			586	
1989			550	792
1990			600	792
1992			600	792
1992			600	792
1993			600	792 2/
1994			600	NA

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

FY88 & Prior production procurement are considered sunk; therefore, costing and scheduling for maximum economic production rate is only feasible for FY89 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$)	2374.4	+1447.9	3822.3	+ 28.1	3794.2
(TY$)	6959.1	+5093.7	12052.8	+ 163.2	11889.6
PAUC (BY$)	.344	+ .106	.450	+ .003	.447
(TY$)	1.008	+ .412	1.420	+ .019	1.401

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/	2/80	NA	2/80	NA	2/80
Durations (in Months)	119	+76	195	+6	189
End Date (Mo/Yr) 2/	12/89	NA	4/96	NA	10/95

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

	To Date
RDT&E	21/21
Procurement	4081/4082

e. 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 8464			
@ Qty Rate 72/mo			
FY80 Constant $	NA	.695	NA
Then-Year $	NA	1.189	NA

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

f. Footnotes -

1/ At present, MLRS Carrier production rate is only four (4) per month, which is low for existing capacity at FMC. If the IFV/CFV is produced at the maximum rate and MLRS production is increased beyond nine vehicles per month, there would be a production backlog of MLRS vehicles in the upper lower hull mate station and pre-paint installation station. Additional tooling and a change in shift basis would then be required to increase the maximum, economic production rate beyond 792 IFV/CFVs and nine MLRS carriers per month.

2/ The estimated maximum economic production rate for FY1993 and beyond, is 792 vehicles. However, at the maximum economic rate, only 413 more vehicles would be required in FY93 to complete the total procurement of 8,485 vehicles.

3/ Represents production vehicle deliveries only.

18. 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 1/	FY1990 YEAR	FY1991 YEAR	BALANCE TO COMPLETE 2/	TOTAL
O&M	58.9	35.2	36.1		130.2

d. Footnotes -

1/ Includes FY88-89.

2/ Includes BTC FYs

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SAR-88-088

SELECTED ACQUISITION REPORT (CRS: DD-COMP(Q&A)) (U)
PROGRAM: Ground Launched Cruise Missile, BGM-109G (U)

AF14 GLCM

AS OF DATE: December 31, 1988

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1. (U)Designation and Nomenclature (GLCM): BGM-109G/Ground Launched Cruise Missile (TOMAHAWK)

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

3. (U)Responsible Office and Telephone Number:

Ground Launched Cruise Missile
System Program Manager Office
Oklahoma City Air Logistics Center
Tinker AFB, OK 73145-5990

Lt Col R. Jayne

Assigned: June 1986
AV 336-7450
COMM (405) 736-7450

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

RDT&E: PE 64362F (No Shared Funding)
PROCUREMENT: APPN 3020 ICN M6LCM0 PE 27314F (No Shared Funding)
MILCON: PE 27314F (No Shared Funding)

5. (U)Related Programs: Air Launched Cruise Missile (ALCM) and Sea Launched Cruise Missile (SLCM)

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OASD(PA) DPOISR 89-T-0331

6. (U) Mission and Description: The GLCM system was developed to provide increased theater firepower. The system will also raise the theater nuclear threshold by releasing nuclear loaded aircraft for conventional tasks and increasing the survivability of the theater nuclear force. The primary elements of the GLCM system are the missile itself, a Transporter Erector Launcher (TEL), and a Launch Control Center (LCC). The missile is a variation of the Tomahawk (BGM-109) cruise missile developed by the U.S. Navy. It is jet powered and makes use of and inertial guidance system aided by Terrain Contour Matching (TERCOM) position updates. A solid propellant booster is used to obtain cruise speed. The TEL consists of a launcher containing four missiles which, along with associated electronic and power production equipment, is mounted on a semi-trailer. The LCC shelter, also mounted on a semi-trailer, houses the missile launch crew and the equipment necessary for communications, missile status monitoring and missile launch. The GLCM system is air transportable. It does not replace any existing USAF weapon system.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- The GLCM program resulted from the January 1977 DSARC II decision authorizing the development of the Sea Launched Tomahawk Cruise Missile. The decision also established the Joint Cruise Missile Project Office, with the Navy designated as lead service, to develop the Air, Ground, and Sea Launched Missiles with maximum commonality. In February 1977, the GLCM Required Operational Capability (ROC) document was published, followed in April 1977 by the Operational Concept for GLCM. The program began funded activities in October 1977 by contract go-ahead to General Dynamics. During 1978, conceptual trade studies were performed to establish configuration and technical requirements. In January 1979, a special AFSARC was held to review GLCM communications, mobility, and hardened shelter requirements. In December 1979, the NATO Foreign and Defense Ministers endorsed deployment of 464 U.S. GLCM's in five European countries with a late 1983 IOC. The first flight of a Tomahawk missile from an engineering model of the TEL was successfully conducted in May 1980. June 1980, Britain announced that GLCM would be deployed at two bases near London: Greenham Common and Molesworth, resulting in direction to plan for six Main Operating Bases (MOBs) versus five. In August 1981, Italy announced GLCMs would be deployed at an inactive airfield near Comiso on Sicily. In September 1981, the first German made M.A.N. tractor was delivered for testing at Aberdeen Proving Grounds. From February 1982, six flights were conducted. Four were successful, one was partially successful, and one was a failure.

(U)Program Highlights (Cont'd):

b.(U) During the course of the deployment of the GLCM weapon system nineteen (19) flights were dispersed to four (4) different countries. These flights were located at MOBs 1, Greenham Common, UK, with six (6) flights, 2, Comiso AS IT, with seven (7) flights, 3, Florennes AB BE, with one (1) flight, 4, Wueschheim AS GE, with four (4) flights, and 6, Molesworth UK, with one (1) flight.

c.(U) Significant Developments Since Last Report -- This is the final SAR submission due to production delivery being complete. The Intermediate Range Nuclear Forces (INF) Treaty was ratified 1 June 1988. MOB's 3, 5, and 6 were brought down and closed. Eighty-six (86) missiles and canisters, fourteen (14) launchers, thirty-five (35) training canisters, and eight (8) training launchers have been eliminated at the GLCM elimination site, Aerospace Maintenance and Regeneration Center (AMARC), Davis-Monthan AFB, AZ.

The GLCM System will meet mission requirements.

d.(U) Changes since as of date -- None.

8. (U)Threshold Breaches: There are currently no DCP breaches or threshold breaches. Executive Program Summary submitted in August 1981.

9. (U)Schedule:

a.(U) Milestones --	Development Estimate/ Approved Program	Current Estimate
1. DSARC I	NA/NA	NA
2. First Flight	NA/NA	NA
3. First Guided Flight	NA/NA	NA
4. DSARC II	Jan 77/N/A	Jan 77
5. First FSD Flight	Apr 78/N/A	May 80
6. IOT&E Start (First Flight)	Sep 80/N/A	May 82
7. First Operational Platform Launch	Jan 80/N/A	Feb 82
8. IOT&E Complete	Apr 81/N/A	Jul 83
9. AFSARC III	NA/NA	Oct 83
Capability (IOC)		
10. Initial Operational Capability (IOC)	May 82/N/A	Dec 83

(U)Schedule (Cont'd):

b. (U) Previous Change Explanations --

Schedule Milestone No. 5 - Adjusted due to test missile diversion for higher priority survivability tests, availability of refurbished missile assets from SLCM test program, and IOC decision during FY80 budget cycle. Revised due to late TEL engineering test unit.

Schedule Milestone No. 6,7,8 - Adjusted to reflect IOC decision during FY80 budget cycle. Revision in January 1981 due to six month slip in delivery of total Weapon Control System (WCS) software. Revision in Fall of 1981 due to several month slip in WCS software delivery. Milestone No. 8 also revised to satisfy Department of Energy (DoE) warhead test requirements to allow time for Quick Reaction Alert (QRA) testing, and to allow for slips due to climatic testing.

Schedule Milestone No. 8 - Revised to reflect actual competition of IOT&E flight tests.

Schedule Milestone No. 9 - Revised to reflect directed activity to revise availability/reliability results and projections.

Schedule Milestone No. 10 - Revised to reflect IOC decision during FY80 budget cycle, 29 August 1979, Amended Program Decision Memorandum.

c. (U) Current Change Explanations -- None.

d. (U) References --

Development Estimate: FY 1979 RDT&E Descriptive Summary (PE 64362F).

Approved Program: No DAE baseline has been approved for this program.

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(b)(1)

2. (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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	3285.1	3442.4	3285.1
(2) Quantity	565	565	565
(3) Unit Cost	5.814	6.093	5.814
b.(U) Current Procurement --	(FY 1989)	(FY 1989)	(FY 1990)
(1) Cost	.6	.6	0
Less CY Adv Proc	0	0	0
Plus PY Adv Proc	0	0	0
Net Total	.6	.6	0
(2) Quantity	0	0	0
(3) Unit Cost	0	0	0

13. (U)Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	88.7	1365.4	73.1	1527.2
Previous Changes:				
Economic	+17.7	+291.8	-29.4	+280.2
Quantity	-13.9	-202.4	-	-216.3
Schedule	+29.1	+100.2	+6.6	+135.9
Engineering	+4.6	+57.0	-	+61.6
Estimating	+249.3	+674.9	+68.5	+992.7
Other	-	+164.7	-28.0	+136.7
Support	+8.2	+282.2	+234.0	+524.4
Subtotal	+295.0	+1368.5	+251.7	+1915.2
Current Changes:				
Economic	-.1	+3.4	-1.0	+2.3
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	.1	-55.5	-55.3	-110.7
Other	-	-	-	-
Support	-	-48.9	-	-48.9
Subtotal	-	-101.0	-56.3	-157.3
Total Changes	+295.0	+1267.5	+195.4	+1757.9
Current Estimate	383.7	2632.9	268.5	3285.1

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

(FY 1977 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	74.8	927.6	51.2	1053.6
Previous Changes:				
Quantity	-9.4	-120.2	-	-129.6
Schedule	+18.0	-2.0	-	+16.0
Engineering	+3.5	+32.2	-	+35.7
Estimating	+165.3	+343.8	+25.7	+534.8
Other	-	+92.5	-16.9	+75.6
Support	+8.3	+144.3	+118.2	+270.8
Subtotal	+185.7	+490.6	+127.0	+803.3
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+0.1	-32.0	-31.2	-63.1
Other	-	-	-	-
Support	-	-17.0	-	-17.0
Subtotal	+0.1	-49.0	-31.2	-80.1
Total Changes	+185.8	+441.6	+95.8	+723.2
Current Estimate	260.6	+1369.2	+147.0	+1776.8

b. (U) Previous Change Explanations --

RDT&E

Economic: Revised economic escalation rates.
Quantity: Reduction of one development missile.
Schedule: Delays/slips in IOC.
Engineering: TEL/LCC design more complex than originally envisioned. Reduced test requirements; increased requirements for Regency Net, EMP testing, and reliability/maintainability. Transfer of procurement funds to continue Material Improvement Program in FY86 and FY87. Reprogramming from 3020 for Operational Test Launch Payload (OTLP). Addition of Nuclear Safety Cross-Check Analysis. Reduction to actual funding in prior year. Adjustment for site activation activities. Adjustment for prior year escalation.
Support: Support equipment requirements greater than expected. Deletion of Regency Net Upgrade in Missile Procedure Trainer.

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

Procurement

Economic: Revised economic escalation rates.

Quantity: Reduction of 136 missiles and deletion of 37 missiles.

Schedule: Delays/slips in IOC. Deferral of 25 backup missiles from FY86 to FY87 to rephase training assets and maintenance missiles. Deferral of backup (5) TELs and (7) LCCs from FY86 to FY87 in order to align with GLCM missile delivery schedule. Correction of error in 31 Dec 85 SAR.

Engineering: Due to unique warhead and different tractor for adequate mobility. Deletion of 37 missiles.

Estimating: Revised TEL/LCC estimates. Composite effect of rephasing 689 Navy missiles from FY85 through FY87 to the outyears due to Navy restructure of TOMAHAWK program. Composite effect of amortization funding of tooling and test equipment in FY84 through FY87 as directed by Congress; Air Force distribution of Congressional adjustment to FY83 Air Force procurement; and other Air Force FY85 budget decisions. Also includes revised estimate of missile, TEL and LCC cost based upon current contract experience and recent proposals. Effect on GLCM program due to TOMAHAWK (SLCM) schedule rephasing from FY89-92 to FY86-88. Reduction in missile recurring flyaway costs due to effects of contract competition. Reduction in backup TEL (1) and LCCs (2) due to reduction in requirements. No program impact anticipated. Congressional FY85 action reduced full funding. No program impact anticipated. Transfer of funds to RDT&E to continue Material Improvement Program (MIP). Reestimate of flyaway costs to cover rephase of Support Equipment. Classified program increase in FY85. Estimating changes applicable to 37 GLCMs. Reestimate of FY85 Advance Procurement. ECO funds reduction and reduction of classfied program funds. Reduction due to dual source competition savings. Reestimate of Advanced Procurement Requirements. Reestimate of ECO flyaway funds. Deletion of second GLCM Unique Turbine System procurement. Adjustments for prior year escalation. Deletion of 37 missiles.

Other: Reduction in SLCM quantities. Increase to comply with INF Treaty.

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

Support: Increased support equipment due to increase of bases from 3 to 6. Change in estimate of GLCM support requirements to capture actual experience of prior years; also captures effect of rephasing TEL and LCC procurements. Rephasing of support equipment due to deferral of missile buys. Reduction in FY86 initial spares due to across the board budget cuts. Reestimate of support requirements. Adjustment to Initial Spares. Additional European Repair Facility requirements. Reduction of support requirements due to compliance with the INF Treaty.

MILCON

Economic: Revised economic escalation rates.

Estimating: Revised estimate due to increased MOBs from 3 to 6. Adjustment of construction requirements to reflect Congressional decision in the FY84 Authorization/ Appropriation Acts to delete non-appropriated fund (NAF) facilities. Congressional action in FY85 to reduce funds form Main Operating Base (MOB 3) activation resulted in tighter FY86-88 construction schedule. No impact to activation date. Deletion of Community Support Facilities. Deletion of mission support facilities. Adjustment for prior escalation.

c.(U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1)RDT&E		
Revised Jan 89 economic escalation rates. (Economic)	--	-.1
Adjustment for prior year escalation. (Estimating)	+.1	+.1
(2)Procurement		
Revised Jan 89 economic escalation rates. (Economic)	--	+3.4
Revised Flyaway costs, cancellation of production contracts due to INF Treaty. (Estimating)	-30.8	-52.8
Adjustment for prior year escalation. (Estimating)	-1.2	-2.7
Revised Support costs, cancellation of production contracts due to INF Treaty. (Support)	-16.7	-48.2
Adjustment for prior year escalation. (Support)	-.3	-.7

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

(3) MILCON		
Revised Jan 89 economic escalation rates. (Economic)	--	-1.0
Adjustment for Foreign Currency Fluctuation account establishment and cancellation of contracts due to the INF Treaty. (Estimating)	-31.7	-56.3
Adjustment for prior year escalation. (Estimating)	+.5	+1.0

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	
2.175	.500	.145	.241	.109	1.560	.242	.843	3.639	5.814

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

a. (U) RDT&E -- NA

b. (U) Procurement -- The following contracts have been deleted from this report due to being over 90% complete:
N00032-84-C-4484 (FY85/86 AUR)
N00032-84-C-4485 (FY85/86 AUR)
N00032-86-C-5154 (FY85 TEL/LCC)
N00032-86-C-6100 (FY86 TEL/LCC)
N00032-86-C-6124 (FY87 AUR)
N00032-86-C-6126 (FY87 AUR)

c. (U) MILCON -- NA

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

a. (U) Program Status --

(1) Percent Program Completed: 100% (12 yrs/12yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 100% (3285.1/3285.1)
(Funds Appropriated To Date in Millions/Total Program Funding in Millions)

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

b.(U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY78-89)	Budget Year	Budget Year	Balance To Complete	Total
RDT&E	383.7	--	--	--	383.7
Procurement	2632.9	--	--	--	2632.9
MILCON	268.5	--	--	--	268.5
Total	3285.1	--	--	--	3285.1

c.(U) Annual Summary --

Fiscal Year	Qty	Flyaway FY77 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1978				17.0	18.7	18.7	18.7	7.6
1979				28.8	34.9	34.9	34.9	8.4
1980				44.1	59.4	59.4	59.4	9.4
1981				72.2	107.6	107.6	107.6	11.9
1982				50.3	80.1	80.1	80.1	9.2
1983				16.6	27.6	27.6	27.6	4.9
1984				20.6	35.6	35.2	35.1	3.8
1985				10.0	17.9	17.8	14.2	3.4
1986				1.0	1.9	1.9	1.9	2.8
1987				0.0			0.0	2.7
Sub-total	5			260.6	383.7	383.2	379.5	

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

Fiscal Year	Qty	Flyaway FY77 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: Procurement								
1979				15.2	20.2	20.2	20.2	8.7
1980				5.4	8.2	8.2	8.2	9.7
1981	11	7.9	45.5	98.9	164.1	164.1	164.1	11.9
1982	54	6.8	129.0	197.5	350.5	350.5	350.5	9.6
1983	84	5.7	201.1	242.4	455.4	448.1	436.4	9.0
1984	120	6.2	234.1	300.3	587.6	587.6	551.6	8.0
1985	120	2.5	248.1	288.7	579.8	559.8	515.5	3.4
1986	95	2.9	179.9	164.9	345.4	341.8	214.5	2.8
1987	76	2.6	52.8	53.8	117.0	98.0	58.4	2.7
1988				1.8	4.1	0.1	0.0	3.1
1989				0.3	0.6	0.0	0.0	4.0
Sub-total	560	34.6	1090.5	1369.2	2632.9	2578.4	2319.4	
Appropriation: MILCON								
1981				2.4	3.8	3.8	3.8	11.9
1982				34.1	58.6	58.3	54.0	9.2
1983				38.0	67.9	67.7	53.0	4.9
1984				28.5	52.5	52.4	46.0	3.8
1985				8.6	16.1	16.1	13.3	3.4
1986				18.1	35.1	34.3	32.2	2.8
1987				17.3	34.5	21.3	8.2	2.7
Sub-total				147.0	268.5	253.9	210.5	
Total	565	34.6	1090.5	1776.8	3285.1	3215.5	2909.4	

17. (U)Production Rate Data:

a.(U) Annualized Production Rates -- (NOTE: The max prod rate shown below is not currently attained due to the participation of other customers in production program.)

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1980	45			
1981	120	11	11	11
1982	120	54	54	54
1983	120	120	84	84
1984	120	120	120	120
1985	120	120	120	120
1986	51	120	95	95
1987		15	76	113
1988				

b.(U) Cost Variance -- Dollars in Millions (NOTE: The costs associated with the max prod rates are subject to the limitations noted in "a" above.)

Item		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY $)	1780.0	-3.2	1776.8	0	1776.8
	(TY $)	3307.3	-22.2	3285.1	0	3285.1
PAUC	(BY $)	3.150	-.005	3.145	0	3.145
	(TY $)	5.854	-.040	5.814	0	5.814

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

c.(U) Schedule Variance -- (NOTE: Current Estimate is equal to Maximum Economic data because FY87 buy of 76 missiles will complete PMD direction.)

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less PdE)	Maximum Economic
Start Date (Mo/Yr)	4/82	N/A	4/83	N/A	4/83
Duration (in Months)	61	-8	53	0	53
End Date (Mo/Yr)	5/87	N/A	9/87	N/A	9/87

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

	To Date
RDT&E	5/5
Procurement	
All-Up-Round	451/365
TEL	121/119
LCC	69/76
MILCON	N/A

e.(U) Approved Design-to-Cost Goal -- N/A

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18. (U) Operating and Support Cost: 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)	46.5	23.0	12.7	TBD	82.2
Industrial Fund	2.0	0	0	TBD	2.0
Total	48.5	23.0	12.7	TBD	84.2

UNCLASSIFIED

A-19 MLRS

SAR-88-104

~~CONFIDENTIAL~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: MULTIPLE LAUNCH ROCKET SYSTEM (MLRS)

AS OF DATE: December 31, 1988

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1. (U) Designation/Nomenclature (Popular Name): HC/Launcher: M270 (Multiple Launch Rocket System (MLRS))

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

3. (U) Responsible Office and Telephone Number:

MLRS Project Office
Program Management Division
Redstone Arsenal, AL 35898-5700

PM: COL William F. Hecker, Jr.
Assigned: 21 September 1987
AUTOVON: 746-1195
Commercial: 205-876-1185

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

RDT&E: PE 64314A Project D564 (SUNK)
PROCUREMENT: PE 2032 SSN C67600/CA0257
MILCON: Project Codes (446, 447, 763, 448, 445)

5. (U) Related Programs: M77 Munitions, Bradley Fighting Vehicle, 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.

~~CLASSIFIED BY: MLRS with M77 Warhead~~
~~Security Classification Guide~~
~~dated 08 July 1988~~
~~DECLASSIFY ON: OADR~~

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OASD(PA) DFOISR SET- 0631

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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 with a dual-purpose improved conventional submunition warhead will provide an all-weather, indirect fire capability 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, chemical, and ballistic missiles.

b. (U) The system consists of a launcher, two disposable pods containing six rockets each, fire control system, and an azimuth/position reference unit. Rockets are loaded in the launch pods at the factory, shipped and stored in the pods, and fired from the pods. Fuze settings are accomplished automatically by the fire control system. The carrier is a derivative of the Bradley Fighting Vehicle (BFV) which uses the same engine, transmission, and other mechanical systems. The carrier, when configured for MLRS, is designated M993.

(b)(1)

7. (U) Program Highlights:

AMENDED

a. (U) Significant Historical Developments --

(1) (U) The Department of the Army (DA) approved a letter of agreement (LOA) for MLRS in September 1975. The Defense System Acquisition Review Council I (DSARC I) was held in January 1977 with a decision that MLRS would enter validation with two competitive contractors and an option to later enter maturation/low rate production (LRP) with either one or two primes. The validation phase consisted of competitive development contracts signed in September 1977 with Boeing, Seattle and Vought, Dallas for 29 months competitive development efforts. This phase was extended to a 32-month effort with the Secretary of the Army authorization in January 1978 to incorporate design changes so that the MLRS could 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 DSARC III held in May 1980 gave approval for MLRS to proceed into maturation/LRP with Vought as the prime contractor. Contracts were signed with Vought Corporation in April 1980 for continued development/maturation, LRP, and initial production facilitization. This was a 35-month phase leading to 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) (U) 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 MLRS multiyear contract was awarded in September 1983 to LTV Aerospace and Defense Company (LTVAD). The contract was a 5-year firm fixed price contract (with economic price adjustment clause) with a negotiated two year option (FY88/FY89). The multiyear contract, with options, covered all launchers and rockets for the life of the program which were approved at that time.

(3) (U) The Comptroller General issued a decision 21 December 1984 prohibiting the Army from exercising the MLRS Multiyear Contract (FY85 Option) to provide advance materials without specific enabling legislation. The enabling legislation was developed by the Army General Counsel's Office and transmitted to the Office of Management and Budget (OMB) from the Deputy Secretary of Defense. The enabling legislative language was included in the Fiscal FY86 DOD Authorization Act and allowed execution of the FY85 procurement obligation plan for the $56.6M advance materials.

(4) (U) A strike on 22 June 1986 against LTV Aerospace and Defense Company (LTVAD) by the United Auto Workers Local Union # 2216 officially ended 2 May 1987. A decertification election was held on 30 April 1987 and 1 May 1987 resulting in the union terminating their representation of the company employees.

b. (U) Significant Developments Since Last Report --

(1) (U) The fly-to-buy program continues to successfully provide adequate ammunition to support program requirements and MLRS fieldings. Process manufacturing problems were resolved in the areas of fin restraint and motor case burn through. Test related problems were resolved or investigated in the areas of Fire Control Unit; W19 and 6W5 cables; and a launcher related problem associated with monolithic flights. Thirty-three lots were successfully tested and accepted by the Government. Overall reliability demonstrated during 1988 was .97.

(2) (U) MLRS fieldings are being accomplished on schedule. Three batteries were fielded in FY88: two National Guard (NG), one of which was a Headquarters, Headquarters, and Service Battery, and one POMCUS battery in Europe.

(3) (U) Present data available indicate that all mission requirements can be achieved.

(4) (U) MLRS is expected to satisfy the mission requirement.

c. (U) Changes since "As of" Date: None.

8. (U) Threshold Breaches:

(U) There are currently no DAE Baseline Breaches, DCP (dated 15 May 79) breaches or SDDM (dated 14 Apr 83) threshold breaches.

9. (U) Schedule:

a. (U) Milestones --

	Planning Est	Approved Prog	Current Estimate
Milestone I (DAB)	Jan 77	N/A	Jan 77
Validation Contract Awards (2)	Sep 77	N/A	NA CH-1
DT/OT I (Government)			
Start	Nov 79	N/A	Nov 79
Complete	Feb 80	N/A	Feb 80
Milestone IIIa (DAB)	May 80	N/A	May 80
Maturation Contract Award	May 80	N/A	NA CH-1
Low Rate Production Contract Award	May 80	N/A	NA CH-1
Initial Production Delivery			
(Rocket)	Jan 82	N/A	May 82
(Launcher)	Feb 82	N/A	Sep 82
Production Qualification Test			
Start	Jan 82	N/A	NA CH-1
Complete	Sep 82	N/A	NA CH-1
OT III			
Start	Jun 82	N/A	Oct 82
Complete	Sep 82	N/A	Mar 83
Milestone IIIb (ASARC)	Nov 82	N/A	NA CH-1
Milestone IIIb (DAB)	Nov 82	N/A	NA CH-1
Milestone IIIb (GOPR)	N/A	Mar 83	Mar 83
Initial Operational Capability (IOC) (nine launchers fielded with 60 rockets per launcher)	Nov 82	Mar 83	Mar 83
TRADOC Deployment (FUE)	N/A	Feb 83	Feb 83 CH-2
FORSCOM Deployment (FUE)	N/A	Mar 83	Mar 83 CH-2
USAREUR Deployment (FUE)	N/A	Aug 83	Aug 83 CH-2
Full- Scale Production Contract Awd (Multiyear Procurement I) (83-89)	N/A	Sep 83	Sep 83 CH-2
EUSA Deployment (FUE)	N/A	Jun 84	Jun 84 CH-2
First Delivery MYP I	N/A	Feb 85	Feb 85 CH-2
USACEGE Deployment (FUE)	N/A	Mar 86	Mar 86 CH-2
MYP-I Option III Award	N/A	Dec 87	Dec 87 CH-2
ARNG Deployment (FUE)	N/A	Sep 89	Sep 89 CH-2
MYP-I Option IV Award	N/A	Nov 88	Nov 88 CH-2
First Delivery MYP-I Option III	N/A	Jun 89	Jun 89 CH-2
First Delivery MYP-I Option IV	N/A	Jun 90	Jun 90 CH-2
MYP-II Contract Award (FY89-93)			
FY1 Award	N/A	Mar 89	Mar 89 CH-2
Option I Award	N/A	Mar 89	Mar 89 CH-2
FY2 Award	N/A	Oct 89	Oct 89 CH-2
FY3 Award	N/A	Oct 90	Oct 90 CH-2
FY4 Award	N/A	Oct 91	Oct 91 CH-2
FY5 Award	N/A	Oct 92	Oct 92 CH-2
First Delivery MYP-II FY1	N/A	Dec 90	Dec 90 CH-2
First Delivery MYP-II FY2	N/A	Apr 91	Apr 91 CH-2
First Delivery MYP-II Option I	N/A	May 91	May 91 CH-2
First Delivery MYP-II FY3	N/A	Apr 92	Apr 92 CH-2
First Delivery MYP-II FY4	N/A	Apr 93	Apr 93 CH-2
First Delivery MYP-II FY5	N/A	Apr 94	Apr 94 CH-2

9. (U) Schedule (Continued)

b. (U) Previous Change Explanations --

(1) (U) The maturation and LRP contracts were awarded 1-month earlier than planned. 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.

(2) (U) Army delegated management review authority of MLRS. ASARC IIIb downgraded to a GOPR, which satisfied Milestone IIIb requirements.

(3) (U) Schedule Milestone Initial Launcher Delivery was 1-month later than planned due to problems encountered with production start-up.

c. (U) Current Change Explanations --

CH-1: SAR value no longer applicable. These values will be deleted in the next SAR

CH-2: DAE Program Baseline, Mar89.

d. (U) References --

Planning Estimate: DCP No. 165, 15 May 1979.

Approved Program: DAE Program Baseline, approved 2 March 1989.

10. (U) Technical/Operational Characteristics:

	Planning Est	Appr Prog Goal/Thres	Demo Perf	Current Est
a. (U) Technical --				
~~(S)~~ System Accuracy (Mils)	(b)(1)			
(U) Maximum Range (km)	35	NA/NA	31.8	31.8
b. (U) Operational --				
(U) Reliability				
Rocket Preflight, Launch, & In-flight	.97	.97/.96	.94	.96
Launcher	.92	.92/.87	.87	.87
Mean Fire Cycle Between Failure (MFCBF)	250	250/250	NA	NA
Mean Kilometers Between Failure (MKBF)	750	750/750	NA	NA
(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

~~AS AMENDED~~

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

	Planning Est	Appr Prog Goal/Thres	Demo Perf	Current Est
(U) Availability				
Operational	NA	.78/.78	.78	.78
Essential Unscheduled Maintenance Actions Per 1000 Hours of Launcher Module Operation	NA	23/23	23	23
Percent of Items Removed with no Evidence of				

AS AMENDED

(b)(1)

[redacted]

c. (U) Production Hardware Acceptance Criteria —

(U) Rockets - Fly-to-Buy (FTB)1/

(U) Reliability	NA	.89/.89	Contin	.94

(b)(1)

[redacted]

1/ 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).

2/ Precision error standard deviation of a ripple firing of 6 rockets.

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

	Planning Est	Appr Prog Goal/Thres	Demo Perf	Current Est
(U) Launchers - Production Reliability Acceptance Test (PRAT)1/	NA	40/40 Fire Missions w/o Failure	Contin	40 Fire Missions w/o Failure

d. (U) Previous Change Explanations --

(1) (U) Maximum range decrease of 3 km (35 km to 32 km) meets the system threshold. It is not cost effective to go from 32 km to 35 km because 16.5% of the munitions must be given up to reach only 1.9% more targets.

(b)(1)

e. (U) Current Change Explanations -- ~~[redacted]~~ DAE Program Baseline, Mar 89.

f. (U) References --

Planning Estimate: Draft DCP, 15 May 1979.

Approved Program: DAE Program Baseline approved 2 March 1989.

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

	Planning Estimate	Approved Program	Current Estimate
a. (U) Cost --			
Development (RDT&E) 2/	261.0	267.7	267.7
Procurement	1971.3	2545.8	2545.8
M77	(1624.6)	(1617.7)	(1617.7)
Practice Rounds	(97.9)	(126.9)	(126.9)
Launchers	(118.9)	(666.1)	(666.1)
Total Flyaway	(1841.4)	(2410.7)	(2410.7)
Other Weap Sys Cost	(123.0)	(20.6)	(20.6)
Initial Spares	(6.9)	(114.5)	(114.5)
Construction (MILCON)	0	44.7	44.7
Total FY78 Base Year $	2232.3	2858.2	2858.2

1/ Approved Program based on production contract Launcher PRAT Acceptance Requirements.

2/ Does not include $37.6 (escalated) funding by MOU participants.

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

	Planning Estimate	Approved Program	Current Estimate
Escalation	1221.7	2977.9	2977.9
Development (RDT&E)	(39.2)	(66.6)	(66.6)
Procurement	(1182.5)	(2870.5)	(2870.5)
Construction (MILCON)	(0)	(40.8)	(40.8)
Total Then-Year $	3454.0	5836.1	5836.1

b. (U) Quantities --

Development (RDT&E)			
Rounds	654	504	504
Launchers	10	10	10
Procurement			
M77 Rounds	362832	500322	500322
Practice Rounds	27648	46992	46992
Launchers	173	677	677
Total			
Rounds	391134	547818	547818
Launchers	183	687	687

c. (U) Foreign Military Sales -- Sales to date to codevelopment partners, Netherlands, Turkey, NATO Maintenance and Supply Agency (NAMSA) and Special Defense Acquisition Fund (SDAF) equal $345,850,293.

d. (U) Nuclear Costs -- None.

e. (U) References --

Planning Estimate: Draft DCP No. 165, 15 May 1979

Approved Program:
FY1990-91 President's Budget.

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

	Current Year		Budget Year
	Current Est (Dec 88 SAR)	UCR Baseline (Dec 87 SAR)	UCR Baseline (Dec 88 SAR)
a. (U) Program Acquisition --			
(1) Cost	5836.1	5108.4	5836.1
(2) Quantity	687	602	687
(3) Unit Cost	8.5	8.5	8.5
b. (U) Current Procurement --	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	445.7	445.7	336.2
Less CY Adv Proc	- 20.8	- 20.8	-63.4
Plus FY Adv Proc	+ 56.6	+ 56.6	+20.8
Net Total	481.5	481.5	293.6
(2) Quantity	44	44	41
(3) Unit Cost	10.9	10.9	7.2

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	3454.0
Previous Changes:				
Economic	+18.2	+ 739.3	+ 2.2	+ 759.7
Quantity		+1405.6		+1405.6
Schedule		- 2.0		- 2.0
Engineering				
Estimating	+ 6.9	- 588.8	+78.0	- 503.9
Other	+ 9.5	+ 9.1		+ 18.6
Support		- 23.6		- 23.6
SUBTOTAL	+ 34.6	+1539.6	+80.2	+1654.4
Current Changes:				
Economic		+ 3.2		+ 3.2
Quantity		+ 522.2		+ 522.2
Schedule				
Engineering				
Estimating	- 0.5	+ 107.5	+ 5.3	+ 112.3
Other				
Support		+ 90.0		+ 90.0
SUBTOTAL	- 0.5	+ 722.9	+ 5.3	+ 727.7
TOTAL CHANGES	+34.1	+2262.5	+85.5	+2382.1
Current Estimate	334.3	5416.3	85.5	5836.1

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

(FY 1978 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	261.0	1971.3	0	2232.3
Previous Changes:				
Quantity		+ 605.3		+ 605.3
Schedule		- 27.5		- 27.5
Engineering				
Estimating	+ 3.5	- 264.6	+41.9	- 219.2
Other	+ 3.5	+ 6.5		+ 10.0
Support		- 26.5		- 26.5
SUBTOTAL	+ 7.0	+ 293.2	+41.9	+ 342.1
Current Changes:				
Quantity		+ 205.7		+ 205.7
Schedule				
Engineering				
Estimating	- 0.3	+ 41.4	+ 2.8	+ 43.9
Other				
Support		+ 34.2		+ 34.2
SUBTOTAL	- 0.3	+ 281.3	+ 2.8	+ 283.8
TOTAL CHANGES	+ 6.7	+ 574.5	+44.7	+ 625.9
Current Estimate	267.7	2545.8	44.7	2858.2

b. (U) Previous Change Explanations --

RDT&E

Economic: Revised escalation indices through December 1986.

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 (Continued):

Procurement

Economic: Revised escalation indices through December 1987.

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, 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.

Other: 11-week strike at FMC resulting in 4-month slip in the program schedule.

Support: Refinement of funding requirement for initial spares.

MILCON

Economic: Revised escalation indices through December 1987.

Estimating: Addition of MCA funding requirements to SAR reporting; revised estimate, increase in construction requirements. Revised December 1987 economic escalation rates. Refinement of MILCON requirements.

c. (U) Current Change Explanations --

(Dollars in Millions)

(1) RDT&E	Base-Year	Then-Year
Correction of prior year funding to match reprogramming actions and adjustment of base year dollars. (ESTIMATING)	-0.3	-0.5

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

(2) Procurement		
Revised December 1988 economic escalation rates. (ECONOMIC)	N/A	+3.2

c. (U) Current Change Explanations --

(Dollars in Millions)

	Base-Year	Then-Year
Change due to:	+205.7	+522.2
Additional 48,000 M77 Tactical Rockets	(+172.0)	(+433.4)
Additional 84 Launchers	(+28.5)	(+72.0)
Additional 1,932 Practice Rkts (QUANTITY)	(+5.2)	(+16.8)
Change due to:	+41.4	+107.5
Decrease in FY86 1/	(-6.5)	(-13.3)
Net Budget changes FY88-92	(-34.8)	(-52.3)
Expansion of MLRS Force Structure (ESTIMATING)	(+82.7)	(+173.1)
Increase in Initial Spares (SUPPORT) 2/	+34.2	+90.0
(3) MILCON - Revised Estimates (ESTIMATING)	+2.8	+5.3

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

a. (U) Planning Estimate to Current Baseline Estimate

PAUC (Planning Estimate)	Changes (Then Year Dollars in Millions)								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
$18.9	+1.110	-11.067	-.003	-	-.570	+.097	+.027	-10.4	$8.5

1/ To reflect error correction in FYDP.
2/ Program quantity of launchers increased which necessitated an increase in initial spares.

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

a. (U) RDTE -- Contracts complete.

b. (U) Procurement --

Launchers/Tact Rckt Pods/Prac Rckt Pods	Initial Contract Price Target	Ceiling	Qty
*LTV Aerospace & Defense Co., Dallas, TX	MYP-1 $ 89.9	N/A	0/229/110
DAAH01-83-C-A107, FFP	MYP-2 $415.0	N/A	76/6000/658
Award: September 1983	MYP-3 $316.8	N/A	44/8412/658
Definitized: September 1983	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			Estimated Price At Completion	
	Target	Ceiling	Qty	Contractor	Program Manager
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	229.0	N/A	0/12000/658	229.0	229.0
OPT-3	236.6	N/A	0/12000/658	236.6	236.6
OPT-4	111.5	N/A	0/5085/660	111.5	111.5

LAUNCHERS

*LTV Aerospace & Defense Co., Dallas, TX
DAAH01-87-C-0220
Award: June 1987 (Basic); January 1988 (OPTION)
Price: $78.2
Qty: 70

	Target	Ceiling	Qty
Initial Contract Price	$41.3	N/A	44/0/0
Current Contract Price	$78.2	N/A	70/0/0
Estimated Price at Completion	$78.2	N/A	70/0/0

*Firm fixed price contracts. Cost and schedule variances are not applicable.

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

a. (U) Program Status --
(1) (U) Percent Program Completed: 73.7% (14 yrs/19 yrs)
(2) (U) Percent Program Cost Appropriated: 70.1% ($4092.4/$5836.1)

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

b. (U) Appropriation Summary --

Appropriation	Prior Yrs (FY76-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-94)	Total
RDT&E 1/	334.3	0	0	0	334.3
Procurement	3672.6	336.2	326.2	1081.3	5416.3
MILCON	85.5	0	0	0	85.5
TOTAL	4092.4	336.2	326.2	1081.3	5836.1

c. (U) Annual Summary --

Fiscal Year	Qty Rnds/ Launch	FY Base-Year Dollars: Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars: Program	Obligated	Expended	Escl Rate (%)
Appropriation: RDT&E 1/								
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
1978				44.9	46.4	46.4	46.4	7.0
1979				62.2	70.9	70.9	70.9	8.4
1980				54.2	67.8	67.8	67.8	9.4
1981				50.4	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				1.1	1.8	1.8	1.4	3.4
Subtotal	504/10			267.7	334.3	334.3	333.3	

1/ Does not include $37.6 (escalated) funding by MOU participants.

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

c. (U) Annual Summary (Cont'd) —

Fiscal Year	Qty Rnds/ Launch	FY Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Program	Obligated	Expended	
		Nonrec	Rec					
Appropriation: Procurement								
1980	1374/ 12	14.7	33.0	49.0	66.9	65.5	65.3	9.70
1981	2340/ 32	16.4	59.1	77.4	117.9	114.5	113.8	11.90
1982	2496/ 68	10.0	90.2	108.3	189.8	172.7	170.8	14.30
1983	23640/ 72	11.6	201.5	231.0	436.1	421.4	418.5	9.00
1984	36000/ 76		269.8	277.4	537.0	507.7	487.5	8.00
1985	50472/ 44		249.7	262.5	527.5	491.5	385.0	3.40
1986	72000/ 44		220.6	232.1	477.5	470.5	352.8	2.80
1987	72000/ 44		206.2	213.1	455.6	445.1	210.4	2.70
1988	72000/ 24		178.2	188.8	418.6	411.5	53.7	3.10
1989	48000/ 44		183.1	194.9	445.7	5.4		4.00
1990	24000/ 41		133.1	143.1	336.2			3.60
1991	24000/ 44		130.7	135.7	326.2			3.30
1992	24000/ 44		127.6	138.0	338.7			2.80
1993	24000/ 44		137.4	146.9	367.2			2.30
1994	24000/ 44		137.8	147.6	375.4			1.80
S-TOTAL	500322/ 677	52.7	2358.0	2545.8	5416.3	3105.8	2257.8	

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

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

Fiscal Year	Qty	FY Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Program	Obligated	Expended	
		Nonrec	Rec					
Appropriation: MILCON								
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				0.0	0.0			2.7
1988				0.0	0.0			3.1
1989				1.6	3.7			4.0
1990				0.0	0.0			3.6
Subtotal				44.7	85.5			
TOTAL	500826/ 687	52.7	2358.0	2858.2	5836.1			-

17. (U) Production Rate Data:

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

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1980	36	12	12	36
1981	48	32	32	48
1982	68	68	68	68
1983	72	72	72	72
1984	76	76	76	72
1985	48	44	44	72
1986	70	29	44	72
1987		0	44	72
1988		33	24	72
1989		27	44	72
1990			41	21
1991			44	
1992			44	
1993			44	
1994			44	

Note: FY85 was last year for receipt of RDT&E funds.

17. (U) Production Rate Data (Contined):

a. (U) Annual Production Rates (M77 Rounds) --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1980	1832	1374	1374	1832
1981	2552	2340	2340	2552
1982	3328	2496	2496	3328
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	72000
1990			24000	72000
1991			24000	22498
1992			24000	
1993			24000	
1994			24000	

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

Item - Launchers	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost (BY $)	2216.0	642.2	2858.2	-0-	2858.2
(TY $)	4302.7	1533.4	5836.1	-0-	5936.1
PAUC (BY $)	5.5	- 1.3	4.2	-0-	4.2
(TY $)	10.7	- 2.2	8.5	-0-	8.5

c. (U) Schedule Variance --

Item - Launchers	Production Estimate	Variance (CE v s PdE)	Current Estimate	Variance (CE v s Max)	Maximum Economic
Start Date (Mo/Yr)	4/80	N/A	4/80	N/A	4/80
Duration (in months)	92	+96	188	-0-	188
End Date (Mo/Yr)	12/87	N/A	12/95	N/A	12/91

17. (U) Production Rate Data (Continued)

c. (U) Schedule Variance (Continued)

Item - M77 Rounds	Production Estimate	Variance (CE vs PdE)	Current Estimate	Variance (CE vs Max)	Maximum Economic
Start Date (Mo/Yr)	4/80	N/A	4/80	N/A	4/80
Duration (in months)	126	+62	188	-0-	188
End Date (Mo/Yr)	10/90	N/A	12/95	N/A	12/92

d. (U) Deliveries (Plan/Actual) —

	To Date
RDT&E	
(U) Rockets	504/470 1/
(U) Launchers	10/10
Procurement	
(U) Tactical Rockets	229,380/245,832
(U) Practice Rockets	17,820/14,838
(U) Launchers	346/345

e. (U) Approved Design to Cost Goal —

(Average Unit Flyaway Cost)

		Plng Estimate (FY78 $)/	/Approved Program (FY 80 $)	Current Estimate (FY 80 $)	Latest Approved Threshold (FY80 $)
	M77 Rd	Pract Rd	Launcher		
Qty Total:	362,832	27,648	393		
Peak Rate:	6,000	330	10		
M77 Rd:	Constant $		0.005/0.004	0.004	0.007
	Then-Year $		0.008/0.008	0.007	
Pract Rd:	Constant $		0.004/0.003	0.003	
	Then-Year $		0.006/0.005	0.006	
Launcher:	Constant $		0.687/1.249	1.198	1.499
	Then-Year $		1.089/1.980	2.006	

1/ LTV deleted 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. (U) Operating and Support Costs: N/A

a. (U) Assumptions and Ground Rules -- N/A

b. (U) Costs -- N/A

c. (U) Contractor Support Costs --

(Then-year Dollars in Millions)

	FY1989 1/ & PRIOR	FY1990 YEAR	FY1991 YEAR	BALANCE TO COMPLETE	TOTAL
O&M	14.4	11.4	13.9	TBD	39.7

1/ Includes FY88-89.

N-20 HARM

SAR-88-024

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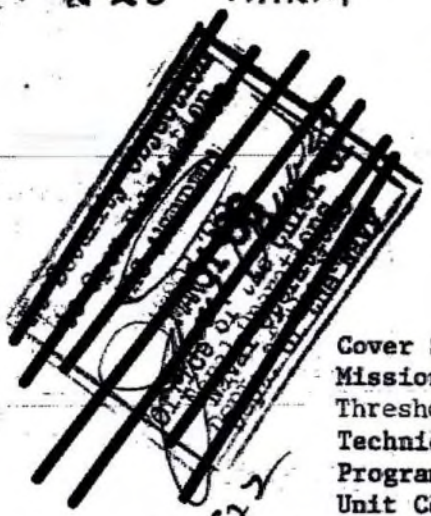

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: HARM (AGM-88A/B/C)

AS OF DATE: December 31, 1988

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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 W. E. Newman, USN
Assigned: 2 July 1987
AUTOVON 222-7563
Commercial: (202) 692-7563

4. (U) Program Elements:

RDT&E: 0603313N (W1188, W1189); 0603363N (WSH07) (Shared funding)
0604360N (WO553, W1240); 0205601N (W1780) (Shared funding)
0603320N (W1807); 0603303N (W1807) (Shared funding)
0207162F 0603320F
Procurement: 0204162N ICN 302227 APPN: 1507
0207162F APPN 3020 ICN M88AAG
0207317F APPN 3020 ICN M88AAG

~~AS AMENDED~~

5. (U) Related Programs: None.

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~~Classified by: OPNAVINST 5513.2A-20~~
~~Review On: OADR~~

OASD(PA) DFOISR 88-T-0582

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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:

(b)(1)

(U) The results of operational testing together with a plan for bringing on a second production source for HARM were presented to a DSARC III on 30 March 1983. The Secretary of Defense on 20 April 1983 approved full-scale production, directed a single source acquisition strategy to include implementation of vendor-level competition, and directed that the HARM production program be complemented with an accelerated RDT&E effort to develop a lower cost seeker for HARM, through unconstrained competition. FY 84 Congressional action affirmed the SECDEF position and directed the initiation of the HARM Low Cost Seeker (LCS) program.

(b)(1)

(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). Air Force AGM-88A missiles were subsequently retrofitted into AGM-88B configuration. A Navy retrofit program is currently being structured.

(U) A Block III software upgrade, which will further address minor performance deficiencies and improve performance against advanced threats, is currently undergoing development and testing. Block III forms the software baseline for planned improvements as discussed below.

(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) which proposed to both 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. A minimum of 6,000 of the improved performance HARMs was planned beyond 1990 using 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. Approximately 34% of the hardware has been modified. 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. Under NAVWPNCEN management, the design goal was initially to reduce production costs via insertion of advanced microwave and signal processing technology. FY87 Congressional language directed that NAVAIRSYSCOM assume program management of LCS. PMA 242 restructured the program to increase LCS performance to competitive levels per the HIP. Block IV will be introduced in FY 91 with head-to-head competition against LCS in 1992, assuming equivalent performance of both designs. Initial production of LCS is planned in FY 90 with two years of directed buys.

b. Significant Developments Since Last Report -- (U) Two contractors competed for Full Scale Development of LCS. The winner, 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. Concurrent developmental and operational testing is projected to start in Mar 1990.

(U) Texas Instruments completed and successfully qualification tested demonstration Block IV guidance sections. Block IV CTE has commenced with one of five firings successfully completed -- four firings remain. Operational testing is projected to start in Mar 1990.

(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.

(b)(1)

c. (U) Changes since "As Of" Date -- The FY1989 hardware buy was awarded on 31 January 1989.

8. (U) Threshold Breaches:

a. (U) DCP 93 was approved on 19 July 1972. It was revised on 10 July 1978 as DCP 93A to reflect the HARM DSARC II guidance and was forwarded to OSD for approval on 30 August 1978. DCP 93 Revision B was forwarded to OSD for approval on 1 December 1982 and approved by the Secretary of Defense DSARC III Decision Memoranda of 20 April 1983 and 16 June 1983.

b. (U) The approved design to cost (DTC) threshold was $200K for the flyaway unit cost based upon the average cost in FY78 dollars of the first 5000 missiles produced after the initial production of 80 missiles and according to the production profile established in DCP 93B.

9. (U) Schedule:

a. Milestones -- (U)	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 II	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	Apr 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)	Oct 81	Nov 83	Nov 83
Air Force IOC (F-4G)	Aug 82	Sep 84	Sep 84
IOC on F/A-18 Aircraft (Navy)	Sep 84	Jan 85	Jan 85
IOC on EA-6B Aircraft (Navy)	Aug 86	Aug 86	Aug 86
IOC on A-6E Aircraft (Navy)	N/A	Jul 88	Jul 88
NPDM II (LCS)	N/A	Nov 87	Jan 88
NPDM IIIA (LCS)	N/A	Jul 90	May 91(Ch-1)
NPDM IIIB (LCS)	N/A	Jul 92	May 92(Ch-2)
NPDM III (Block IV)	N/A	Nov 91	Apr 91(Ch-3)
IOC (LCS/Block IV)	N/A	Apr 92	Jun 92(Ch-4)

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.

c. Current Change Explanations --

(CH-1) - Current Estimate of NPDM IIIA (LCS) revised from July 1990 to May 1991 per FSED contract schedule for hardware delivery by FORD, allowing required time for operational testing.

(CH-2) - Current Estimate of NPDM IIIB (LCS) revised from July 1992 to May 1992 per FSED contract schedule for hardware delivery by FORD, allowing required time for operational testing.

(CH-3) - Current Estimate of NPDM III (Block IV) revised from November 1991 to April 1991; change due to operational testing completion projected for December 1990.

(CH-4) - Current Estimate of LOC (LCS/Block IV) revised from April 1992 to June 1992; change due to projected completion date of December 1990 for operational testing.

d. References --

Development Estimate: DCP 93A dated 10 July 1978. NDCP dated 6 August 1987.
Approved Program: DAE Baseline dated 17 February 1988.

(b)(1)

(b)(1)

c. Previous Change Explanations --

Technical -- (U) Weight (lbs), Demonstrated Performance: Change 780 to 807. Incorporation of hardware to facilitate DSARC II direction to expand capability (EXCAP) in frequency and aerodynamic maneuverability.

(U) Changes to approved program were reflected in DCP 93B of 1 December 1982 and approved at DSARC III on 30 March 1983. Changes to Demonstrated Performance and Current Estimate are demonstrations from NTE, OPEVAL/IOT&E, inventory usage, and estimated performance was demonstrated during FOT&E.

(b)(1)

(b)(1)

(U) Maintainability, Mean time to fault locate using BIT (sec), Demonstrated Performance: Change TBD to 14. Current Estimate: Change 20 to 14. Interim results of operational testing indicates Demonstrated Performance and Current Estimate of performance is better than Development Estimate.

(U) Maintainability, Mean time to repair (min), Avionics "O" level, Demonstrated Performance: Change TBD to 30. Current Estimate: Change 55 to 30. Interim results of operational testing indicated Demonstrated Performance and Current Estimate of performance is better than Development Estimate.

(U) Maintainability, Mean time to repair (min), Missile "O" level, Demonstrated Performance: Change TBD to 20. Extrapolated from performance of Maintainability Demonstration testing.

(U) Maintainability, Mean time to repair (min), Missile "I" level, Demonstrated Performance: Change TBD to 55. Extrapolated from performance of Maintainability Demonstration testing.

(U) Maintainability, Mean time to repair (min), Missile "I" level, Current Estimate: Change 60 to 55. Interim results of operational testing indicates Current Estimate of performance is better than Development Estimate.

d. Current Change Explanations -- None.

e. References --

Development Estimate: DCP 93A dated 10 July 1978.
Approved Program: DAE Baseline dated 17 February 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	$ 478.1
Procurement	1455.0	2855.2	2855.2
Hardware	(1064.7)	(2378.8)	(2378.8)
Prod Support	(220.9)	(282.6)	(282.6)
Total Flyaway	(1285.6)	(2661.4)	(2661.4)
Fleet Support	(80.5)	(126.7)	(129.7)
Initial Spares	(88.9)	(64.0)	(64.0)
Construction (MILCON)	0.0	4.3	4.3
Total FY 78 Base-Year $	1681.8	3337.6	3337.6
Escalation	728.1	3539.1	3539.1
Development (RDT&E)	(12.1)	(185.1)	(185.1)
Procurement	(716.0)	(3349.6)	(3349.6)
Construction (MILCON)	0.0	4.2	4.2
Total Then-Year $	$2409.9	$6876.7	$6876.7

11. (U) Program Acquisition Cost (Cont't):

b. Quantities --

Development (RDT&E)	99	99	99
Procurement	13754	22058	22058
Total	13853	22157	22157

c. (U) Foreign Military Sales --

Federal Republic of Germany:

Contracts: 1) FMS contract with Texas Instruments, Inc. N00019-84-C-0341 was delivered for 27 test and training missiles. Contract type, FFP; $5,466,000. 2) FY 86 purchase of 180 tactical missiles, spares, and ground support equipment under Texas Instruments, Inc. contract N00019-85-C-0447 (FFP) --- $55,600,000. 3) FY 87 purchase of 188 tactical missiles and spares under Texas Instruments, Inc. contract N00019-86-C-0326 (FFP) -- $40,276,000. 4) FY 88 purchase of 180 tactical missiles and spares procured under Texas Instruments, Inc. contract N00019-86-C-0326 (FFP) as an option to the FY 87 contract -- $36,700,000.
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. The first 368 of the missiles procured under the FY 86 and FY 87 contracts shown above. FMS Case GY-P-AJP, accepted on 30 April 1987, provides for additional spare components and support equipment items. Case value is $550,608.
Other: 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 Case SP-P-A-Js was submitted to the Spanish Government in response to a Planning & Review Request. It is anticipated that a P&A request will be forthcoming leading to a signed LOA in calendar year 1989, total initial missile sale estimated to be 100 tactical missiles. The Country of Italy plans to sign an LOA for 200 to 300 missiles in calendar year 1990.

d. Nuclear Costs -- None.

e. References --

Development Estimate: DCP 93A dated 10 July 1978.
Approved Program: FY 1990/1991 President's Biennial Budget.

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	6876.7	4983.5	6876.7
(2) Quantity	22157	14537	22157
(3) Unit Cost	.310	.343	.310
b. Current Procurement --	(FY89)	(FY89*)	(FY90)
(1) Cost	523.6	523.6	379.7
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	523.6	523.6	379.7
(2) Quantity	2200	2200	1488
(3) Unit Cost	.238	.238	.255

* Reflects FY 1989 Appropriations Act.

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	-6.3	+362.0	-	+355.7
Quantity	-	+ 66.7	-	+ 66.7
Schedule	+28.5	+1791.0	-	+1819.5
Engineering	+250.6	-	-	+250.6
Estimating	+116.2	-42.8	-	+73.4
Other	-	-	-	-
Support	0.0	+7.7	-	+7.7
Subtotal	+389.0	+2184.6	-	+2573.6
Current Changes:				
Economic	-0.1	-10.2	-	-10.3
Quantity	-	+1487.5	-	+1487.5
Schedule	-	+35.5	-	+35.5
Engineering	-	+14.0	-	+14.0
Estimating	+35.6	+221.5	+8.5	+265.6
Other	-	-	-	-
Support	-	+100.9	-	+100.9
Subtotal	+35.5	+1849.2	+8.5	+1893.2
Total Changes	+424.5	+4033.8	+8.5	+4466.8
Current Estimate	+663.4	+6204.8	+8.5	+6876.7

(FY 1978 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	226.8	1455.0	-	1681.8
Previous Changes:				
Quantity	-	+62.0	-	+62.0
Schedule	+20.0	+570.7	-	+590.7
Engineering	+148.9	-	-	+148.9
Estimating	+64.0	+10.0	-	+74.0
Other	-	-	-	-
Support	-	+4.6	-	+4.6
Subtotal	+232.9	+647.3	-	+880.2
Current Changes:				
Quantity	-	+602.0	-	+602.0
Schedule	-	+14.0	-	+14.0
Engineering	-	+7.1	-	+7.1
Estimating	+18.4	+88.8	+4.3	+111.5
Other	-	-	-	-
Support	-	+41.0	-	+41.0
Subtotal	+18.4	+752.9	+4.3	+775.6
Total Changes	+251.3	+1400.2	+4.3	+1655.8
Current Estimate	+478.1	+2855.2	+4.3	+3337.6

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.

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.
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.
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.
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 FY87 the FY91 for depot initiatives.

MILCON -- None.

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

c. Current Change Explanations --

	(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E		
Revised escalation rates. (Economic)	N/A	-0.1
Increase funding for Low Cost Seeker and HARM Improvement Program. (Estimating)	+18.4	+35.6
(2) Procurement		
Revised escalation rates. (Economic)	N/A	-10.2
Addition of HARM C program.	+641.1	+1550.9
o Baseline (DE) value of increasing 7620 missiles to meet inventory requirements. (Quantity)	(+602.0)	(+1487.5)
o Schedule changes applicable to 7620 missiles since Baseline. (Schedule)	(+38.4)	(+62.3)
o Estimating changes applicable to 7620 missiles since Baseline. (Estimating)	(+0.7)	(+1.1)
Revised procurement: (Schedule)	-24.4	-26.8
Increase resulted from retention of development estimate being applied to the HARM C program. (Estimating)	+88.1	+220.4
Increase in program estimate due to procurement of Improved HARM Warhead FY90-FY94. (Engineering)	+7.1	+14.0
Increase in spares requirements in FY 87 and fleet support in FY89 through FY91 for depot initiatives. (Support)	+41.0	+100.9
(3) MILCON		
Increase in storage requirements. (Estimating)	+4.3	+8.5

	85	86	87	88	89	90	91	92	93	94
Prior	1684	2150	2398	2411	2200	1911	450	0	0	0
New	1684	2151	2504	2297	2200	1488	1600	2300	2300	2300

d. Reference --
Development Estimate: DCP 93A dated 10 July 1978.

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	+.015	+.005	+.084	+.012	+.015	+.005	---	+.136	.310

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

a. RDT&E -- None.

b. Procurement -- HARM All-Up-Round

Texas Instruments, Inc. (FY87 Buy)
Lewisville, TX
N00019-86-C-0326, FFP
Award/Definitization: June 19, 1987

Initial Contract Price		
Target	Ceiling	Quantity
$556.0	N/A	2,575

Current Contract Price		
Target	Ceiling	Quantity
$556.0	N/A	2,575

Estimated Price At Completion	
Contractor	Program Manager
$556.0	$556.0

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	2,428

Current Contract Price		
Target	Ceiling	Quantity
$545.4	N/A	2,604

Estimated Price At Completion	
Contractor	Program Manager
$545.4	$545.4

16. (U) Program Funding Summary:

a. Program Status --
(1) Percent Program Completed: 75.0% (18 yrs/24 yrs)
(2) Percent Program Cost Appropriated: 63.7% ($4383.8/6876.7)

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

Appropriation	Current & Prior Yrs (FY72-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete FYDP (FY92-94)	Balance to Complete Beyond FYDP (FY95)	Total
RDT&E	603.0	27.5	10.2	22.7	0.0	663.4
Procurement	3777.6	379.7	401.4	1646.1	0.0	6204.8
MILCON	3.1	2.9	0.0	2.5	0.0	8.5
Total	4383.7	410.1	411.6	1671.3	0.0	6876.7

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	2.0	2.0	2.0	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				40.5	46.9	46.9	46.8	8.4
1980	45			51.6	65.7	65.7	65.5	10.5
1981				59.3	82.3	82.3	82.1	10.6
1982				18.1	26.5	26.5	26.4	7.6
1983				6.9	10.5	10.4	10.2	4.9
1984				30.6	48.4	48.4	48.2	3.8
1985				22.3	36.4	36.3	36.2	3.4
1986				23.5	39.5	39.5	39.2	2.8
1987				35.1	60.7	60.6	39.3	2.7
1988				17.6	31.5	24.1	9.2	3.1
1989				13.5	25.0			4.0
1990				14.3	27.5			3.6
1991				5.2	10.2			3.3
1992				3.7	7.4			2.8
1993				3.7	7.6			2.3
1994				3.7	7.7			1.8
Subtotal	99			478.1	663.4	570.4	532.6	
Appropriation: Procurement								
1981	80	7.8	57.4	75.0	120.2	120.2	120.2	11.6
1982	236	20.1	82.5	121.3	211.5	207.4	207.4	14.3
1983	283	3.0	74.5	89.1	164.2	157.6	156.6	9.0
1984	635	35.4	128.6	193.2	370.6	363.3	362.9	8.0
1985	1684	23.7	254.0	298.6	591.2	580.5	569.7	3.4
1986	2151	10.4	281.7	300.7	614.1	611.3	551.5	2.8
1987	2504	1.6	275.5	292.3	617.7	606.7	129.7	2.7
1988	2297	1.0	244.4	257.7	564.4	531.8	58.6	3.1
1989	2200	1.0	218.5	231.6	523.6	6.4	0.0	4.0
1990	1488	4.9	150.2	163.1	379.7			3.6
1991	1600	3.0	159.1	168.3	401.4			3.3
1992	2300	3.4	206.3	232.7	566.6			2.8
1993	2300	2.1	225.3	236.3	586.1			2.3
1994	2300	2.1	183.9	195.4	493.3			1.8
Subtotal	22058	119.5	2541.9	2855.2	6204.8	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			4.0
1990				1.5	2.9			3.6
1991				0.0	0.0			3.3
1992				1.2	2.5			2.8
Subtotal				4.3	8.5			
TOTAL	22157	119.5	2541.9	3337.6	6876.7	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	10.5
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	24.3	2.7
1988				9.1	16.2	13.2	7.2	3.1
1989				4.6	8.6			4.0
1990				9.0	17.3			3.6
1991				5.2	10.2			3.3
1992				3.7	7.4			2.8
1993				3.7	7.6			2.3
1994				3.7	7.7			1.8
Subtotal	99			404.2	543.4	481.6	457.8	
Appropriation: Procurement								
1981	80	7.8	57.4	75.0	120.2	120.2	120.2	11.6
1982	118	10.5	42.2	64.1	111.7	111.7	111.7	14.3
1983	160	0.0	42.2	47.7	88.0	88.0	88.0	9.0
1984	318	18.6	63.7	102.2	196.0	196.0	196.0	8.0
1985	813	10.8	122.8	144.6	286.1	286.1	278.1	3.4
1986	767	1.0	100.3	105.6	215.5	215.5	201.5	2.8
1987	994	0.7	110.6	117.6	248.3	247.5	98.1	2.7
1988	766	0.3	81.7	89.1	195.1	186.9	55.0	3.1
1989	1307	0.6	128.9	134.3	304.1	6.4	0.0	4.0
1990	1162	3.9	117.4	127.1	295.9			3.6
1991	1400	2.6	141.7	149.3	356.5			3.3
1992	1900	2.3	171.0	192.3	468.2			2.8
1993	1500	1.4	144.3	151.3	375.2			2.3
1994	1500	1.4	127.2	128.2	323.7			1.8
Subtotal	12785	62.0	1445.9	1628.1	3584.5	1458.3	1148.6	

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			4.0
1990				1.5	2.9			3.6
1991				0.0	0.0			3.3
1992				1.2	2.5			2.8
Subtotal				4.3	8.5			
TOTAL	12884	62.0	1445.9	2132.3	4136.4	1939.9	1606.4	

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	4.8	4.7	4.5	4.9
1984				6.1	9.6	9.6	9.4	3.8
1985				2.9	4.8	4.7	4.6	3.4
1986				10.4	17.5	17.5	17.3	2.8
1987				10.9	18.8	18.7	15.0	2.7
1988				8.6	15.3	10.9	2.0	3.1
1989				8.8	16.4			4.0
1990				5.3	10.1			3.6
Subtotal	0			73.8	120.0	88.8	74.9	
Appropriation: Procurement								
1982	118	9.5	40.3	57.2	99.8	95.7	95.7	14.3
1983	123	3.0	32.0	41.2	76.2	69.6	68.6	9.0
1984	317	16.9	64.9	90.9	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	195.1	398.5	395.8	350.0	2.8
1987	1510	0.9	164.9	174.7	369.4	359.2	31.6	2.7
1988	1531	0.7	163.3	168.7	369.3	344.9	3.6	3.1
1989	893	0.4	89.5	97.0	219.5			4.0
1990	326	1.1	32.1	36.0	83.8			3.6
1991	200	0.4	17.5	19.0	45.3			3.3
1992	400	1.1	35.4	40.4	98.4			2.8
1993	800	0.6	80.3	85.0	210.9			2.3
1994	800	0.7	62.4	67.2	169.6			1.8
Subtotal	9273	57.6	1095.2	1228.0	2620.4	1726.9	1008.0	
TOTAL	9273	57.6	1095.2	1301.8	2740.4	1815.7	1082.9	

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(3)
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	2297	2477
1989		3084	2200	2380
1990		1778	1488	1668
1991		0	1600	1636
1992		0	2300	2300
1993		0	2300	2300
1994		0	2300	2300

Note (1) -- Not Available.
Note (2) -- Current estimate includes Navy and Air Force quantities.
Note (3) -- Present production is at maximum economic rate (two shifts, eight hours per shift, five days per week).

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	+126.5	3337.6	0	3337.6
(TY $)	6363.4	+513.3	6876.7	0	6876.7
PAUC (BY $)	.183	-.032	.151	0	.151
(TY $)	.363	-.052	.311	0	.311

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	+48	168	0	168
End date (Mo/Yr)	11/92	+48	11/96	0	11/96

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	99/99
Procurement	5628/5695

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

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	174.0	200.0
Then-Year $	127.8/372.1	336.0	375.2

18. (U) Operating and Support Costs:

a. N/A

b. N/A

c. Contractor Support Costs --

(Then Year Dollars in Millions)

	FY 1988	FY 1989	FY 1990	FY 1991	TOTAL
O&M,N	.9	.2	.2	.2	1.5
Industrial Fund (NIF)	0	0	0	0	0
Total	.9	.2	.2	.2	1.5

SAR-88-1025 AS AMENDED

N-21 HARPOON

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DIRECTORATE FOR FREEDOM OF INFORMATION

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

PROGRAM: HARPOON (AGM/RGM/UGM-84A/C/D)

as of: December 31, 1988

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89 C0494

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

5. Related Programs: TOMAHAWK

OASD(PA) DFOISR 89-T-0536

~~Classified by: OPNAVINST S5513.2 (21)~~
~~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.

(b)(1)

(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) The Harpoon Missile has met or exceeded all mission requirements.

b. Significant Developments Since Last Report: 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 AWEW-13 Advanced Data Link (ADL) Pod. Improved Harpoon Program Management Proposal approved by the Undersecretary of the Navy 25 Nov 88.

c. Changes Since "As Of" Date - None

8. Threshold Breaches - There are currently no DAE baseline breaches or NDCP (dated May 13, 1978) threshold breaches.

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(CH-1)
Milestone IIIA	NA	May 86	May 86
Milestone IIIB	NA	May 88	May 88
Milestone IIIC	NA	Jan 89	Oct 89(CH-2)

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

c. Current Change Explanations -
CH-1 = Data was entered incorrectly in Dec 1987 SAR.
CH-2 = ALP received 5/88. Milestone slip does not affect IOC date for the SLAM .

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 dtd Feb 17, 1988

(b)(1)

(U) Reliability

Missile (Free flt %)	90	90/90	92	90
Missile (Ready storage, ship 6 mo)	.90	.90/.90	.93	.90
A/C C&L sys (MTBF hrs)	150	251/251	253	251
Ship C&L sys (MTBF hrs)	100	500.5/500.5	500.5	500.5
Missile (Air carry MTBF hrs)				
P-3	250	250/250	250	250
A-6	250	250/250	250	250

(b)(1)

b. (U) Previous change explanations - Variances are due to results of captive-carry program, other tests and actual fleet experience.

c. (U) Current Changes Explanations - NONE

d. (U) References -

Development Estimate: Decision Coordinating Paper No 77 dated May 16, 1973 amended by DSARC IIB June 25, 1984 and DSARC IIIB dated Sep 1977.

Approved Program: DAE baseline dated Feb 17, 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	287.8
Procurement	523.0	1429.6	1429.6
Fly-a-way	(457.6)	(1192.0)	(1192.0)
Fleet Support/Spares	(65.4)	(237.6)	(237.6)
Construction	0.0	2.5	2.5
Total Constant FY 70$	795.0	1719.9	1719.9
Escalation	236.8	2719.6	2719.6
Development (RDT&E)	(43.9)	(105.7)	(105.7)
Procurement	(192.9)	(2607.6)	(2607.6)
Construction	(0.0)	(6.3)	(6.3)
TOTAL THEN YEAR $	1031.8	4439.5	4439.5
b.Quantities			
Development (RDT&E)	52	52	52
Procurement	2870	4397	4397
TOTAL	2922	4449	4449

(b)(1)

d. Nuclear Costs - - None

e. References -

Development Estimate: Decision Coordinating Paper No. 77 of May 16, 1973 amended by DSARC IIB June 25, 1984 and DSARC IIIB Sep 1977.

Approved Program: FY 1990-91 President's Budget.

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

	Current Year (FY-88)		Budget Year (FY-89)
	Current Est. (DEC 88 SAR)	UCR Baseline (DEC 87 SAR)	UCR Baseline (Dec 88 SAR)
a. Program Acquisition			
(1) Cost	4439.5	3824.6	4439.3
(2) Quantity	4449	4023	4449
(3) Unit Cost	.998	.951	.998
b. Current Procurement -			
	(FY-1989)	(FY-1989)	(FY-1990)
(1) Cost	169.4	169.4	219.9
Less CY Adv Pr	N/A	N/A	N/A
Plus PY Adv Pr	N/A	N/A	N/A
Net Total	169.4	169.4	219.9
(2) Quantity	119	119	190
(3) Unit Cost	1.424	1.424	1.157

13. Cost Variance Analysis:
    a. Summary - (Current (Then Year) Dollars in millions)

Baseline Estimate (DE)	RDT&E	PROC	MILCON	TOTAL
Previous Changes	315.9	715.9		1031.8
Economics	+0.1	+127.6		+127.7
Quantity		+852.5		+852.5
Schedule		-5.8		-5.8
Engineering	+73.3	+2.1		+75.4
Estimating	+5.0	+1219.1		+1224.1
Other				+0.0
Support		+518.2	+0.7	+518.9
Subtotal	+78.4	+2713.7	+0.7	+2792.8
Current Changes				
Economics		-12.4		-12.4
Quantity		+146.3		+146.3
Schedule		+341.0		+341.0
Engineering		+40.8		+40.8
Estimating	-0.8	+35.1		+34.3
Other				
Support		+56.8	+8.1	+64.9
Subtotal	-0.8	+607.6	+8.1	+614.9
Total Changes	+77.6	+3321.3	+8.8	+3407.7
Current Estimates	393.5	4037.2	8.8	4439.5

(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		+280.4		+280.4
Schedule				
Engineering	+14.3	+0.6		+14.9
Estimating	+1.7	+299.7		+301.4
Other				
Support		+171.9	+0.3	+172.2
Subtotal	+16.0	+752.6	+0.3	+768.9
Current Changes				
Quantity		+36.7		+36.7
Schedule		+89.0		+89.0
Engineering		+11.0		+11.0
Estimating	-0.2	+4.9		4.7
Other				
Support		+12.4	+2.2	+14.6
Subtotal	-0.2	+154.0	+2.2	+156.0
Total Changes	+15.8	+906.6	+2.5	+924.9
Current Estimate	287.8	1429.6	2.5	1719.9

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
Schedule:	Revision of procurement to earlier FY.
Engineering:	Added Reliability/quality Assurance Requirements. Increased Seeker Improvements. Implemented Product Improvements. Incorporation of -4 Seeker ECP (PMP #84-1)
Estimating:	Increase due to under estimation of Rate Tooling. Increase in Government in-house 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)
Support:	Spares/Fleet support changes due quantity change of missiles.
Milcon:	Building modification at NWS, Concord in FY 1979.

c. Current Changes Explanations -

(1) RDT&E	Base Year	Then Year
Estimating	-0.2	-0.8

(2) PROCUREMENT

Economics - Revised Escalation Rates	-0-	-12.4
Quantity - Addition of 426 missiles due to increased inventory objective	+36.7	+146.3
Schedule - 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.	+89.0	+341.0
Engineering - Improved Harpoon program engineering changes. Implementation of Product Improvements	+11.0	+40.8
Estimating - Underestimation of SLAM engineering costs. Underestimation of ECP costs. Increased requirement in Govt.-in-house and Govt. Testing	+4.9	+35.1
Support - Increase due to: 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)	+12.4	+56.8

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	Changes (Then Year Dollars in Millions)								PAUC
(Development Estimate)	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	(Current Estimate)
..353	.026	.104	.075	.026	.283	.131		.645	.998

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)
Awarded: Feb 1987
Definitized: Feb 1987

Initial Contract Price

Target	Ceiling	Qty
$33.4	N/A	0

Current Contract Price

Target	Ceiling	Qty
$50.9	N/A	0

Estimate Price at Completion

Contractor	Program Manager
50.9	50.9

	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

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Missile
McDonnell Douglas Missile Systems Company
St. Charles, Mo.
NOOO19-87-C-0103/FFP
Awarded: June 1988
Definitized: June 1988

Initial Contract Price

Target	Ceiling	Qty
$81.0	N/A	68

Current Contract Price

Target	Ceiling	Qty
$84.2	N/A	68

Estimate Price at Completion

Contractor	Program Manager
$84.2	$84.2

	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.

Missile
McDonnell Douglas Missile Systems Company
St. Charles, Mo.
NOOO19-86-C-0308/FFP
Awarded: July 1987
Definitized: July 1987

Initial Contract Price

Target	Ceiling	Qty
$200.1	N/A	260

Current Contract Price

Target	Ceiling	Qty
$61.8	N/A	82

Estimate Price at Completion

Contractor	Program Manager
$61.8	$61.8

	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.

Missile
McDonnell Douglas Missile Systems Company
St. Charles, Mo.
NOOO19-86-C-0415/FFP
Awarded: June 1986
Definitized: June 1986

Initial Contract Price

Target	Ceiling	Qty
$285.0	N/A	404

Current Contract Price

Target	Ceiling	Qty
$298.9	N/A	395

Estimate Price at Completion

Contractor	Program Manager
$298.9	$298.9

	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.

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16 Program Funding Summary:

a. Program Status Summary

(1) Percent Program Complete: 80.8% (21/26 Yrs)

(2) Percent Program Cost Appropriated: 72.7% ($3229.0/$4439.5)

APPROP	PRIOR YRS (FY71-89)	BUDGET YEAR (FY-90)	BUDGET YEAR (FY-91)	BALANCE OF FYDP (FY92-94)	TO COMP BEYOND FYDP	TOTAL
RDT & E	$393.5	--	--	--	--	$393.5
PROCUREMENT	$2,834.8	$219.9	$233.0	$749.5	--	$4,037.2
MILCON	$0.7	$3.5	--	$4.6	--	$8.8
TOTAL	$3,229.0	$223.4	$233.0	$754.1	--	$4,439.5

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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	Flyaway Rec	Total	Program	Obligated	Expended	%
Appropriation: RDT&E								
1970	--	--	--	5.0	5.1	5.1	5.1	5.51
1971	12	--	--	18.1	19.3	18.9	18.9	5.14
1972	--	--	--	38.1	42.3	42.3	42.3	4.61
1973	--	--	--	61.6	71.8	71.8	71.7	4.35
1974	40	--	--	74.0	92.0	91.9	91.8	7.97
1975	--	--	--	51.7	69.1	69.1	68.7	10.94
1976	--	--	--	13.9	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	14.9	2.70
1988	--	--	--	10.7	31.5	31.5	25.4	3.10
1989	--	--	--	7.3	22.3	21.6		4.00
1990	--	--	--		0.0			3.60
TOTAL	52	0	0	287.8	393.5	392.3	357.0	
Appropriation: Procurement								
1975	100	7.0	49.8	58.6	82.8	82.4	82.2	8.81
1976	170	7.4	76.0	88.6	134.8	133.2	130.8	6.59
197T	66	1.0	23.6	27.3	43.6	43.9	43.9	3.56
1977	220	--	78.4	89.3	150.7	150.8	148.4	3.78
1978	234	--	63.6	73.7	139.2	139.1	136.5	6.80
1979	240	--	59.4	65.9	137.0	137.4	134.3	8.72
1980	240	--	56.2	64.1	147.0	145.2	145.2	11.80
1981	240	--	61.0	82.9	211.9	216.8	209.9	11.60
1982	240	--	67.7	81.6	226.4	227.2	199.2	14.30
1983	223	--	60.7	77.3	226.8	230.8	191.0	9.00
1984	315	--	77.8	94.4	288.3	287.6	263.9	8.00
1985	354	--	78.5	94.3	297.0	297.8	247.1	3.40
1986	395	6.1	83.3	92.0	299.1	291.0	196.3	2.80
1987	96	3.9	28.2	38.7	130.1	121.1	98.8	2.70
1988	109	3.2	34.9	43.3	150.9	138.8	50.0	3.10
1989	119	6.7	36.8	47.0	169.4	20.3		4.00
1990	190	2.4	47.2	59.3	219.9			3.60
1991	184	3.4	47.2	61.4	233.0			3.30
1992	233	4.2	56.9	68.8	266.8			2.80
1993	229	5.4	56.3	64.8	255.8			2.30
1994	200	3.2	48.4	56.4	226.9			1.80
TOTAL	4397	53.9	1192.0	1429.6	4037.2	2663.4	2277.5	
Appropriation: Miloon								
1979	--	--	--	0.3	0.7	0.7	0.7	9.31
1990				1.0	3.5			3.60
1992				1.2	4.6			2.80
TOTAL	0	0	0	2.5	8.8	0.7	0.7	

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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
1989	N/A	NOTE 1	119	540
1990			190	615
1991			184	
1992			233	
1993			229	
1994			200	

*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$)	795.0	+924.9	1719.9	+38.7	1681.2
	(TY$)	1031.8	+3407.7	4439.5	+287.4	4152.1
PAUC	(BY$)	0.272	+0.115	0.387	+0.009	0.378
	(TY$)	0.353	+0.645	0.998	+0.040	0.933

c. Schedule (Subject to the limitations on production rates above)
(Data based on procurement year 1986-1982)

	Production Estimate	Variance CE less PdE	Current Estimate	Variance DE less Max	Maximum Economic
Start Date (MO/YR)	Dec-75	N/A	Dec-75	N/A	Dec-75
Duration (In Months)	84	165	249	58	191
End Date (MO/YR)	Dec-82	N/A	Sep-96	N/A	Nov-91

d. Deliveries (plan/actual)-- To Date

RDT&E	52/52
Procurement	3271/2906

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)	30.2	13.1	14.6	0	57.9
Industrial Fund	0.2	0.1	0.1	0	0.4
Total	30.4	13.2	14.7	0	58.3

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SAR-88-526

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: LAMPS MK III

22 LAMPS MK III

AS OF DATE: December 31, 1988

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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

AS AMENDED

MAR 08 1989

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

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5. (U) Related Programs: Army UH-60A BLACK HAWK; Army EH-60A Quickfix; Air Force HH-60A [illegible]GHT HAWK combat SAR Helicopter; Kidd Class Guided Missile Destroyer (DDG-993 Class); [illegible]leigh Burke Class Guided Missile Destroyer (DDG-51 Class); Perry Class Guided Missile [illegible]igate (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.

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 [illegible]tiated in 1969 with the requirement for a manned helicopter aboard destroyer-class [illegible]ps 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 [illegible]4.

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

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.

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.

b. Significant Developments Since Last Report -- As of December 31, 1988, the Navy has accepted a total of 123 production SH-60B airframes, 112 full avionics populated SEAHAWKS, and 90 HLSs for ship installation. Based on current projections, LAMPS MK III is expected to fulfill all mission requirements. For SAR reporting purposes, the SRQ-4 and SQQ-28 were transferred to PMS-411 and are reported in SQQ-89. Twelve aircraft were configured with ALQ-156 Pulse Doppler Radar by December 1988.

c. Changes Since "As Of" Date -- N/A

8. (U) Threshold Breaches:

a. The program is approved in accordance with the December 8, 1982, SDDM.

b. The LAMPS MK III mission requirements are contained in DCP No. 85 of June 4, 1982, and were presented to the Office of the Secretary of Defense during the June 29, 1982, DSARC III presentation.

c. No technical thresholds have been breached. The funding threshold reflected in the baseline program reported to Congress in the December 1981 Selected Acquisition Report (SAR) were breached as a result of extending the aircraft procurement from a four year profile (18-48-64-74) to an eleven year profile (18-27-21-18-18-18-18-18-18-18-12). FY 1984 Congressional action changed the eleven year profile to 18-27-21-24-18-18-18-18-18-6. The FY 1987 Congressional Budget changed the procurement estimate to a fourteen year profile (18-27-21-24-18-17-6-6-6-12-12-12-12-13). The Secretary of Defense Decision Memorandum of December 8, 1982, authorized the LAMPS MK III program to proceed with production in FY 1983. Decisions on the total procurement objective and annual phasing for the LAMPS MK III program will be examined at future program and budget reviews. The Amended FY 1988/89 Biennial Budget changed the procurement estimate to a fifteen year profile (18-27-21-24-18-17-6-6-6-6-12-12-12-12-7).

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
DSARC IIC	Feb 78	Feb 78	Feb 78
First Prototype Aircraft Flight	N/A	Dec 79	Dec 79

9. (U) Schedule Cont'd:

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: USD(A) Memo of 17 Feb 88 Approval of Major Program Baselines. DAE Baseline signed 17 February 1988.

10. (U) Technical/Operational Characteristics:

a. (U) Technical --	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
(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

(b)(1)

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

b. (U) Operational (Cont'd) --	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate	
(b)(1)					
(Air Vehicle Avionics)	2.0	2.3/2.3	1.6	10.1	(Ch-1)
(U) Maintainability					
(U) Direct Maintenance Man-Hours/ Flight Hour SH-60B SEAHAWK (O-Level Total)	N/A	15.9/15.9	8.1	16.7	(Ch-2)
(U) Mean Time to Repair (Hrs) (Elapsed Maintenance Time/ Maintenance Action)					
Air Vehicle	1.0	2.0/2.0	1.3	2.0	
(b)(1)					
(U) Aircraft Performance					
(b)(1)					

c. (U) Previous Change Explanations --

The increase in aircraft maximum gross weight is the result of incorporating approved Engineering Change Proposals. The decrease in Mean Flight Hours Between Failures SH-60B SEAHAWK is the result of a broader statistical base. The changes in Direct Maintenance Man-Hours/Flight Hour SH-60B SEAHAWK and Mean Time to Repair Air Vehicle are derived from maintenance statistics and indicate performance less than prior estimates.

d. (U) Current Change Explanations --

(Ch-1) (U) Mean Flight Hours Between Failures SH-60B SEAHAWK (Air Vehilce Avionics) changed from 13.2 to 10.1 based upon current 3M data.

(Ch-2) (U) Direct Maintenance Man-Hours/Flight Hour SH-60B SEAHAWK (O-Level Repair)

(b)(1)

Development Estimate: DCP No. 85 dated March 5, 1979.
Approved Program: USD(A) Memo of 17 Feb 88 Approval of Major Program Baselines. DAE Baseline signed 17 February 1988.

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

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E,N)	$579.7	$615.7	$615.7
Procurement (Aircraft)	1482.8	1999.6	1999.6
Airframe & Changes	(342.1)	(557.2)	(557.2)
Engine	(67.9)	(99.2)	(99.2)
Electronics & Comm.	(399.6)	(137.7)	(137.7)
Armament & Other GFE	(18.1)	(13.1)	(13.1)
Weapons System Integration	(62.2)	(498.3)	(498.3)
Total Flyaway	(889.9)	(1305.5)	(1305.5)
Peculiar Support Eq.	(169.9)	(154.3)	(154.3)
Other Support	(269.6)	(363.8)	(363.8)
Total Support	(439.5)	(518.1)	(518.1)
Initial Spares	(153.4)	(176.0)	(176.0)
Procurement (Ship Systems)	325.2	156.8	156.8
Equipment (OPN)			
Sailaway *	(124.4)	(0.0)	(0.0)
Support **	(40.3)	(68.4)	(68.4)
Spares	(36.0)	(2.7)	(2.7)
Total (OPN)	(200.7)	(71.1)	(71.1)
Installation (O&MN)(FMP)***	(124.5)	(85.7)	(85.7)
Construction (MILCON)	9.0	12.3	12.3
Total FY 76 Base-Year	2396.7	2784.4	2784.4
Escalation	1510.9	3160.4	3160.4
Development (RDT&E)	(142.1)	(242.1)	(242.1)
Procurement	(1362.4)	(2909.1)	(2909.1)
Construction (MILCON)	(6.4)	(9.2)	(9.2)
Total Then-Year $ ****	$3907.6	$5944.8	$5944.8
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. (U) Program Acquisition Cost: (Continued)

e. References --

Development Estimate: DCP No. 85 dated March 5, 1979.
Approved Program: FY 90/91 President's Budget.

* 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 HLS 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, W1902) for the Penguin Missile are also excluded.

12. (U) 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 88	UCR Baseline Estimate Dec 87	UCR Baseline Estimate Dec 88
a. Program Acquisition --			
(1) Cost	5944.8	5840.6	5944.8
(2) Quantity	209	209	209
(3) Unit Cost	28.4	27.9	28.4
b. Current Procurement --	(FY 1989) APPN ACT	(FY 1989) APPN ACT	(FY 1990)
(1) Cost	115.8	115.8	198.5
Less CY Adv Proc	(-7.8)	(-7.8)	(-15.2)
Plus PY Adv Proc	(+9.4)	(+9.4)	(+7.8)
Net Total	117.4	117.4	191.1
(2) Quantity	6	6	6
(3) Unit Cost	19.6	19.6	31.8

13. (U) 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	-279.8	+1.1	-255.6
Quantity	-	-228.9	-	-228.9
Schedule	-	+1566.4	-	+1566.4
Engineering	+92.3	+256.5	-	+348.8
Estimating	-117.4	+430.4	+5.0	+318.0
Other	-	-	-	-
Support	+1.6	+182.7	-	+184.3
Subtotal	-0.4	+1927.3	+6.1	+1933.0
Current Changes:				
Economic	-	-24.3	-	-24.3
Quantity	-	-	-	-
Schedule	-	+37.3	-	+37.3
Engineering	-	-	-	-
Estimating	+136.4	-119.9	-	+16.5
Other	-	-	-	-
Support	-	+74.7	-	+74.7
Subtotal	+136.4	-32.2	-	+104.2
Total Changes	+136.0	+1895.1	+6.1	+2037.2
Current Estimate	857.8	5065.5	21.5	5944.8

(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	-	+199.3	-	+199.3
Engineering	+44.0	+82.6	-	+126.6
Estimating	-68.0	+251.8	+3.3	+187.1
Other	-	-	-	-
Support	+1.2	-56.3	-	-55.1
Subtotal	-22.8	+357.6	+3.3	+338.1
Current Changes:				
Quantity	-	-	-	-
Schedule	-	+9.4	-	+9.4
Engineering	-	-	-	-
Estimating	+58.8	-42.2	-	+16.6
Other	-	-	-	-
Support	-	+23.6	-	+23.6
Subtotal	+58.8	-9.2	-	+49.6
Total Changes	+36.0	348.4	+3.3	+387.7
Current Estimate	615.7	2156.4	12.3	2784.4

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 (P³I) Program and transfer of SQQ-28 and SRQ-4 to PMS-411 for SAR reporting responsibilities
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/OM&N(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/OM&N(FMP))
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; impact of six Spanish FMS aircraft (APN); refinement of ship electronics and HLS procurement; and installation cost estimates (OPN/OM&N(FMP))
Support: refinement of support requirements, equipment and spares to support revised aircraft procurement schedules and based on more accurate cost history; refinement of estimates for pubs/technical data (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		
Revised cost estimates and Block II upgrade funding. (Estimating)	+58.8	+136.4
(2) Procurement		
Revised escalation indices. (Economic)	N/A	-24.3
Refinement of prior estimates based on additional procurement history and multi-year procurement; realigned ship installation. (Estimating)	-42.2	-119.9
Revised procurement schedule to outyears. (Schedule)	+9.4	+37.3
Reprogramming of support equipment and spares; refinement of cost estimates based on additional procurement data. (Support)	+23.6	+74.7

(3) MILCON - None

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

a. Initial SAR Estimate to Current Baseline Estimate --

Aircraft

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
15.5	--	--	--	--	--	--	--	--	15.5

b. Current Baseline Estimate to Current Estimate --

Aircraft

PAUC (Dev Est)	Changes								PAUC (Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
15.5	-1.0	--	+7.8	+1.7	+0.3	--	+2.5	+11.3	26.8

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.

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

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: 70.0% (21 yrs/30 yrs)
(2) Percent Program Cost Appropriated: 69.3% ($4118.1/$5944.8)

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	715.6	1.1	21.4	119.7	857.8
PROCUREMENT	3381.0	245.1	178.0	1261.4	5065.5
MILCON	21.5	--	--	--	21.5
Total	4118.1	246.2	199.4	1381.1	5944.8

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	1.3	2.8
1987				1.0	1.9	1.9	1.9	2.7
1988				1.8	3.5	3.4	2.0	3.1
1989				0.9	1.9	1.8	0.0	4.0
1990				0.5	1.1	-	-	3.6
1991				9.6	21.4	-	-	3.3
1992				13.1	30.0	-	-	2.8
1993				19.3	45.0	-	-	2.3
1994				18.8	44.7	-	-	1.8
Subtotal				615.7	857.8	715.3	711.7	

16. (U) 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	107.8	11.6
1982	18	40.7	205.9	350.3	703.8	703.8	662.6	14.3
1983	27	8.6	181.4	344.9	731.3	685.6	658.0	9.0
1984	21		102.0	219.2	484.0	472.6	443.5	8.0
1985	24	8.0	121.0	178.1	405.8	404.2	365.4	3.4
1986	18	2.1	88.1	112.1	262.9	262.5	223.9	2.8
1987	17	0.9	85.8	94.9	229.5	225.8	127.1	2.7
1988	6	2.7	32.3	54.4	136.7	127.2	17.7	3.1
1989	6	0.7	31.8	44.6	115.8	33.5	0.0	4.0
1990	6	6.3	34.0	74.1	198.5	-	-	3.6
1991	6	1.1	32.1	57.9	158.8	-	-	3.3
1992	12		60.5	78.3	218.8	-	-	2.8
1993	12		60.1	75.0	213.6	-	-	2.3
1994	12		60.5	76.7	222.2	-	-	1.8
1995	12	9.6	80.8	112.4	331.1	-	-	1.8
1996	7		47.3	58.2	174.2	-	-	1.8
1997				8.0	24.3	-	-	1.8
1998				8.0	24.9	-	-	1.8
Subtotal	204	80.7	1223.6	1999.6	4740.6	3019.6	2606.0	
Appropriation: OPN 2/								
1982				10.2	18.0	18.0	16.7	7.6
1983				13.9	25.4	25.4	23.2	4.9
1984				9.3	17.6	17.6	17.5	3.8
1985				9.4	18.2	18.2	15.6	3.4
1986				10.0	20.1	20.1	12.6	2.8
1987				4.3	8.9	8.8	4.0	2.7
1988				3.9	8.3	7.6	2.0	3.1
1989				2.5	5.6	1.2	0.0	4.0
1990				3.9	8.9	-	-	3.6
1991				0.2	0.4	-	-	3.3
1992				1.6	3.7	-	-	2.8
1993				1.6	4.0	-	-	2.3
1994				0.3	0.8	-	-	1.8
Subtotal				71.1	139.9	116.9	91.6	

16. (U) 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				0.7	1.2			3.8
1985				8.1	15.4			3.4
1986				8.4	16.5			2.8
1987				16.4	33.0			2.7
1988				5.8	12.2			3.1
1989				3.0	6.4			4.0
1990				16.8	37.7			3.6
1991				8.2	18.8			3.3
1992				6.5	15.3			2.8
1993				11.6	27.9			2.3
1994				0.2	0.6			1.8
Subtotal				85.7	185.0			
Appropriation: MILCON								
1982				7.3	12.5	12.5	12.5	7.6
1983				5.0	9.0	9.0	9.0	4.9
Subtotal				12.3	21.5	21.5	21.5	
TOTAL				2784.4	5944.8			

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.

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	+387.7	2784.4	394.3	2391.0
(TY $)	3907.6	+2037.2	5944.8	1265.3	4679.5
PAUC (BY $)	9.7	+3.6	13.3	1.9	11.4
(TY $)	15.5	+12.9	28.4	6.0	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
[illegible] Date (mo/yr)	8/88	N/A	9/98	N/A	2/87

* Development Estimate used.

17. (U) Production Rate Data: (Continued)

d. Deliveries (Plan/Actual) --

Aircraft:	To Date
RDT&E,N	5/5
Procurement	112/112

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. (U) Operating and Support Costs:

a. N/A

b. N/A.

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	6.5	2.5	2.0	Not Avail	Not Avail
Industrial Fund	0.0	0.0	0.0	Not Avail	Not Avail
Total	6.5	2.5	2.0	Not Avail	Not Avail

* Includes FY 1988 and FY 1989 only. FY 1987 and prior years not available.

SAR-88-053

~~CONFIDENTIAL~~

OF 15 IR MAVERICK

89-0036-T #24

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: AGM-65D & AGM-65G

AS OF DATE: DECEMBER 31, 1988

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1. (U) Designation/Nomenclature (Popular Name): AGM-65D & G/IR Maverick

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

3. (U) Responsible Office and Telephone Number:

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

Mr T. McMillian
Assigned: July
AV 785-4523; COMM (513) 255-4523

4. (U) Program Elements:

RDT&E: PE0604608F
PROCUREMENT: PE0207313F APPN 3020 ICN M65DAG

5. (U) Related Programs: IR GBU-15 (V)/B Cruciform Wing Weapon
F-4D/E, A-7D, A-10A, F-16, F-15E, F-4G
NAVY IR Maverick (AGM-65F), USMC Laser Maverick (AGM-65E)

6. (U) 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

Classified by AGM-65 Security Guide 9th Jul 84
Declassify on OADR

OASD(PA) DFOISR 89-T-0097

Mission and Description (Cont'd):

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, contains the same guidance and control hardware and is designed to destroy specific hardened targets.

7. (U) Program Highlights :

a. (U) 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 set in motion the final efforts to award the production option to Raytheon for 800 missiles scheduled for delivery from May 1987 through Nov 1988.

Following a March 86 DSARC(Joint Review Management Board--JRMB) review, the Maverick program was given a full production decision. IOC was attained in Feb 86.

Program Highlights (Cont'd):

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.

The Raytheon QT&E efforts have produced 10 AGM-65D launches with 8 hits. The last of these shots was conducted on 17 Mar 86.

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 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 was a direct hit on an aircraft shelter.

(b) (U) Significant Developments Since Last Report

Production Reliability Acceptance Tests are conducted on at least three guidance sections per contractor per month. The current cumulative Mean Time Between Failures (MTBF) remains 137 hours after 60 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 31 Dec 88, the Air Force IR Maverick has been fired 433 times scoring 359 hits. Hit rate is now 82.9%

The five-shot AGM-65G flight test program was completed in 1988. Third launch conducted 9 Feb in forced correlate mode against a shelter resulted in a hit. Launch four, in shiptrack mode against a 65ft tugboat, on 4 May 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 July resulted in a hit.

Hughes Aircraft Company delivered 6387 D tactical missiles, 10 G tactical missiles, 834 D training guided missiles, 51 G training guided missiles, and 355 spare guidance sections through 31 Dec 88. One Quality Assurance Disassembly Inspection (QADI) was held in August with no significant faults discovered.

Raytheon Company delivered 904 missiles through 31 Dec 88. Raytheon completed delivery of the original 800 lot production in November. One QADI was performed at Raytheon in April, with no significant findings.

Multiyear assumptions are included in the FY90/91 Amended President's Budget. Program Termination in FY 92 (vice FY 97) reduced missile procurement quantities. IR Maverick continues to meet mission requirements.

Program Developments (Cont'd):

(c) (U) Change since "As Of" date - None

8. (U) Threshold Breaches: DCP #154, 20 Sep 1976.
IOC Threshold of Dec 81 was breached due to Congressional action on FY 1978 budget. There are currently no DAE baseline breaches.

9. (U) Schedule:

a. (U) Milestones	Dev 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. (U) Previous Change Explanations:
The Engineering Contract Development Award date was changed to May 77 because of a Dec 76 PBD cut of $16.2M in FY78 RDT&E funds. Again changed to Aug 77 because of OSD deferral of FY77 IR Maverick funds pending congressional action on the FY78 program. Further changed to Oct 78 because all FY78 funds were deleted and also because additional advance development and testing was required for the IR Centroid Tracker.

The DT&E/IOT&E Flight Tests Start Date was first changed to Apr 79 because of a Dec 76 PBD cut of $16.2M in FY78 RDT&E funds. Further changed to Jul 80 because all FY78 funds were deleted and because additional advanced development and testing was required for the IR Centroid Tracker. Completed June 80.

Demonstration Milestones was first changed to Sep 79 because of a Dec 76 PBD cut of $16.2M in FY78 RDT&E funds. Further changed to Dec 80 because all FY78 funds were deleted and because additional advanced development and testing was required for the IR Centroid Tracker. The need for Demonstration Milestones was deleted when DSARC III (JRMB) milestone was created.

DSARC III A (JRMB) was first changed to Apr 80 because of a Dec 76 PBD cut of $16.2M in FY78 RDT&E funds. Changed to Jan 81 because all FY78 funds were deleted and because additional advanced development and testing was required for the IR Centroid Tracker. Late missile deliveries delayed DT&E completion and the need to reaccomplish winter site testing due to abnormally warm weather during Feb and Mar 81 tests precluded AFOTEC from completing IOT&E until Mar 82. Production decision milestones have been restructured to allow interim decision in Jan 82 to support FY82/490 missile pilot production

start with a follow-on full scale production decision in May 82 after

Schedule Developments (Cont'd):

completion of DT&E/IOT&E testing. Combined into one DSARC III(JRMB) (Milestone 8) and deleted the need for Demonstration Milestones (Milestone 4). OSD Program Review on 2 Mar 82 changed AFSARC/DSARC (JRMB) decision points. The date of completion for DT&E/IOT&E was first changed to Jul 80 because of a Dec 76 PBD cut of $16.2M in FY78 RDT&E funds. Changed to Jul 81 because all FY78 funds were deleted and because additional advanced development and testing was required for the IR Centroid Tracker. Delayed release of FY79 development funds and increased emphasis on operational testing precluded AFOTEC from completing IOT&E until Sep 81. Changed because DOD guidance and Program Management Directive, dated 21 Feb 80, recognized a delay in completion of IOT&E which will impact DSARC III(JRMB) IOC (Milestone 8 and 9 respectively). Late missile deliveries delayed DT&E completion and the need to reaccomplish winter site testing due to abnormally warm weather during Feb and Mar 81 tests precluded AFOTEC from completing IOT&E until Mar 82. Production decision milestones were restructured to allow interim decision in Jan 82 to support FY82/490 missile pilot production start with a follow-on full scale production decision in May 82 after completion of DT&E/IOT&E testing. Changed to accommodate delays encountered in completing DT&E/IOT&E due to limited test support resources. This milestone was accomplished in Aug 82.

DSARC III B (JRMB) was first changed to Dec 81 because of a Dec 76 PBD cut of $16.2M in FY78 RDT&E funds. Late missile deliveries delayed DT&E completion and the need to reaccomplish winter site testing due to abnormally warm weather during Feb 80 and Mar 81 tests precluded AFOTEC from completing IOT&E until Mar 82. Changed to accommodate delays encountered in completing DT&E/IOT&E due to limited test support resources. OSD Program Review on 2 Mar 82 changed AFSARC/DSARC(JRMB) decision points. OSD Review occurred 21 Sep 82 and approved Pilot Production.

Late missile deliveries delayed DT&E completion and the need to reaccomplish winter site testing due to abnormally warm weather during Feb and Mar 1981 tests precluded AFOTEC from completing IOT&E until Mar 82. DSARC III (JRMB) was changed to accommodate delays encountered in completing DT&E/IOT&E due to limited test support resources. Revised by 29 Mar 82 OSD memorandum restructuring the program and establishing new program milestones. DSARC III was replaced by two-phased DSARC III A (JRMB)(Pilot Production) and DSARC III B (JRMB)(Pilot Production, Full Go-ahead).

The IOC was changed to Mar 83 because all FY78 funds were deleted and because additional advanced development and testing was required for the IR Centroid Tracker. Changed to accommodate temporary suspension of DT&E/IOT&E testing needed to correct missile problem identified at Ft. Drum winter testing. Due to production line shutdown and the resultant delay in shipment of hardware, the IOC was slipped from Apr 85 to Sep 85 and then again to Feb 86.

The Reliability/Maintainability Review was accomplished on Apr 83.

The decision of the Apr 83 OSD Review was that the next review should not occur until completion of FOT&E, approximately Aug 85. The Full Production go-ahead

Schedule Developments (Cont'd)

slipped from Aug 85 to Mar 86 due to the impact of the production delays previously mentioned, the resulting slip in FOT&E, and a slower build-up of the production rate.

c. (U) Current Change Explanations -- N/A

d. (U) References --

Development Estimate: DCP 154, dated September 20, 1976, subject "Imaging Infrared Maverick Missile System.

Approved Program: DAE baseline dated February 1988.

10. (U) Technical/Operational Characteristics:

a. (U) Technical

Dev Est	Approved Program Goal/Threshold	Demon. Perf*	Current Estimate
(b)(1)			

b. (U) Operational

	Dev Est	Approved Program Goal/Threshold	Demon. Perf*	Current Estimate
(U) 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
(U) Maximum Launch Range (ft) (1.2 Mach, 0 degree offset)	85,000	65,000/65,000	73,000 at .9	85,000
(U) Lookdown Offset (Degrees below LOS)	15	15/15	15	15
(U) 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
(U) Probability of Hit	.87	.75/.75	.85	.87
(U) Mission Success Probability	.80	.80/.80	.83	.80

* Mean Values

c. (U) Previous Change Explanations --
Change in Probability of Hit from .81 to .85 reflect cumulative results through completion of FOT&E.

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. (U) Current Change Explanations -- None

e. (U) References --

Development Estimate: DCP 154, dated September 20, 1976, subject "Imaging Infrared Maverick Missile System."

Approved Program: DAE baseline dated February 1988.

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

	Development Estimate	Approved Program	Current Estimate
a. (U) Cost --			
Development (RDT&E)	$ 100.0	$ 106.7	$ 106.7
Procurement	895.1	1204.6	1204.6
Total Flyaway	(792.1)	(1066.0)	(1066.0)
Peculiar Support	(99.1)	(116.9) 1/	(116.9) 1/
Other Weapon System Cost	---		---
Initial Spares	(3.9)	(21.7)	(21.7)
Construction(MILCON)	---		---
Total Constant FY75 $	995.1	1311.3	1311.3
Escalation	597.8	1888.8	1888.8
Development (RDT&E)	(34.4)	(61.3)	(61.3)
Procurement	(563.4)	(1827.5)	(1827.5)
Total Program Cost (TY$)	1592.9	3200.1	3200.1

1/ Includes $57.8 in recurring flyaway costs for 891 training missiles.

b. (U) Quantities --

Development (RDT&E)	35	33	33
Procurement	31078	23496	23496
Total	31113	23529	23529

c. (U) 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.

d. (U) Nuclear Costs -- None

e. (U) References --

Development Estimate: DCP 154, dated September 20, 1976, subject "Imaging Infrared Maverick Missile System.

Approved Program: FY90/91 President's Budget

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 88 SAR	Dec 87 SAR	Dec 88 SAR
	(1) Cost	3200.1	7620.8	3200.1
	(2) Quantity	23529	60697	23529
	(3) Unit Cost	.136	.126	.136
b.	Current Procurement--	(FY 1989)	(FY 1989)*APPN	(FY 1990)
	(1) Cost	268.1	268.1	193.1
	Less CY Adv Proc	-	-	10.8
	Plus PY Adv Proc	-	-	-
	Net Total	268.1	268.1	182.3
	(2) Quantity	2540	2540	2270
	(3) Unit Cost	.106	.106	.080

*FY89 quantities and unit price assume concurrent production of 731 Navy missiles and 1000 FMS missiles.

13. (U) 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	-145.5	-135.1
Quantity	-1.1	+1564.4	+1563.3
Schedule	+18.6	+2257.3	+2275.9
Engineering	0.0	+30.0	+30.0
Estimating	-0.2	+2067.0	+2066.8
Other	0.0	0.0	0.0
Support	+5.9	+221.1	+227.0
Subtotal	+33.6	+5994.3	+6027.9
Current Changes			
Economic	0.0	-56.9	-56.9
Quantity	0.0	-2319.4	-2319.4
Schedule	0.0	-410.2	-410.2
Engineering	0.0	-5.8	-5.8
Estimating	0.0	-1538.4	-1538.4
Other	0.0	0.0	0.0
Support	0.0	-90.0	-90.0
Subtotal	0.0	-4420.7	-4420.7
Total Changes	+33.6	+1573.6	+1607.2
Current Estimate	168.0	3032.1	3200.1

13. (U) 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	+512.7	+512.0
Schedule	+6.4	+410.2	+416.6
Engineering	0.0	+10.6	+10.6
Estimating	-2.5	+719.5	+717.0
Other	0.0	0.0	0.0
Support	+3.5	+64.2	+67.7
Subtotal	+6.7	+1717.2	+1723.9
Current Changes			
Quantity	0.0	-742.2	-742.2
Schedule	0.0	-136.1	-136.1
Engineering	0.0	-1.9	-1.9
Estimating	0.0	-498.9	-498.9
Other	0.0	0.0	0.0
Support	0.0	-28.6	-28.6
Subtotal	0.0	-1407.7	-1407.7
Total Changes	+6.7	309.5	316.2
Current Estimate	106.7	1204.6	1311.3

b. (U) Previous Change Explanations --

RDT&E

Economic: Revised Economic Escalation indices.

Quantity: RDT&E change from 35 missiles to 33.

Schedule: PBD changes, Congressional cancellation of FY78 funds.

Estimating: Definitization of FSD Contract, restoration of IR test and second source, estimating offset for economic change due to change in prior year escalation, program amounts aligned to actual obligations in prior years, and completion of Rapid Fire II effort, and adjustment for impact of prior year inflation adjustments, and completion of Rapid Fire II effort, and adjustment for impact of prior years inflation.

Support: Addition of initial support items.

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

b. (U) Previous Change Explanations (Cont'd):

PROCUREMENT

Economic: Revised Economic Escalation Indices.

Quantity: Procurement change from 31078 to 60664.

Schedule: PBD changes, Congressional Cancellation of FY78 funds, realignment of buy quantities, slippage of production start from FY81 to FY82 and program restructure, net change(loss) in production efficiency due to rescheduling units to 1990 time frame due to funding cuts, program schedule extended one year due to amendment to FY85 PB, delay in missile procurement due to out-year budget cuts, budget cuts in FY87 and the FYDP caused a four year extension to the program. Incorporation of split competitive prices.

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, revised estimate from DSARC III ICA, recategorization of containers from Support to Flyaway, re-estimate of containers using contract settlement, re-estimate of Value Engineering Royalties using contract settlement, 300 unit increase in Raytheon pilot production for FY86 and change in FY87 Competition assumptions estimate updated using contract proposal and Hughes productivity plan, adjustment for prior year escalation, one-time change resulting from correction to methodology for computing inflation on programs with advance procurement funding, cost impact to unit prices (production rate inefficiencies) and fixed costs (additional fiscal year buys) caused by schedule delays, budgeting reductions absorbed by ECO line, change in estimate for multiyear assumptions, re-estimation based on updated information, and impact of prior year inflation adjustments. Deletion of single source multiyear assumption. Re-estimate based on split annual buy with down select to a single source in FY90. Adjustment for FY90-92 escalation.

Support: Deletion of FDT, addition of initial spares and support items, re-estimate of training equipment, support equipment and data using Hughes Production Contract, recategorization of containers from Support to Flyaway, Plant 44 environmental clean-up, reduction of initial spares due to funding cuts contained in the amended FY85 PB. and the FY86 PB., re-estimate of Support using contract settlements, re-estimate of initial spares requirements, amount to be added to support to balance to proper mix, additional peculiar support equipment (depot work stations) 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

Cost Variance Analysis (Cont'd)

prior year inflation adjustment. Spares schedule change due to procurring different quantities per FY as a result of missile buy schedule changes. Change in data estimate due to incorporation of competitive prices.

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

c. (U) Current Change Explanations: (Dollars in Millions)

	Base Year $	Then Year $
(1) RDT&E NONE		
(2) PROCUREMENT		
Revised Economic Escalation Indices. (Economic)	---	-56.9
Change due to an AF reduction in authorized quantity from 60,664 missiles to 23,496 missiles. Program terminates in FY92 versus FY97.	-927.7	-2891.2
-Reduction of 37168 missiles. (Quantity)	(-742.2)	(-2319.4)
-Schedule changes applicable since baseline. (Schedule)	(-66.8)	(-205.8)
-Engineering changes applicable since baseline. (Engineering)	(-1.9)	(-5.8)
-Estimating changes applicable since baseline. (Estimating)	(-116.8)	(-360.2)
Schedule changes due to re-programming in FY86 and to reduced quantities in FY90-92. (Schedule)	- 69.3	-204.4
Adjustment for current and prior year escalation. (Estimating)	+ 3.1	+ 8.1
Incorporation of Competitive Price Data (Estimating)	-347.4	-1074.4
Change in estimate due to deletion of single source annual buy. Multiyear FY90-92. (Estimating)	- 37.8	-111.9
Reduced spares buy as a result of total program reduction from 60664 to 23496. (Support)	-28.6	-90.0

14. (U) 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	-.015	.079	.001	.022	.006	.000	.085	.136

15. (U) Contract Information: (Dollars in Millions)

a. RDT&E - N/A

b. Procurement

NOTE: The Qualification portion of Raytheon contract F33657-83-C-2113 has been deleted per the 31 Dec 85 SAR.

Missile:

Second Source Production:

Initial Contract Price		
Target	Ceiling	Qty
$150.1	$166.6	800

Raytheon Co, Missile Systems Division, Bristol, TN
F33657-83-C-2113, FPIF(1st Production Option Only)
Award: January 1, 1986
Definitized: January 1, 1986

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$153.7	$170.5	800	$156.7	$156.9

	Cost Variance	Schedule Variance
Previous Cumulative Variance	$-5.4	$+0.9
Cumulative Variance to Date(27 Nov 88)	$-4.3	$-1.9
Net Change(After Correction)	$+1.1	$-2.8

Explanation of change: The negative cost variance is attributable to problems with the rocket motor and increased engineering activity, associated with the cryoengine cooldown problem. The negative schedule variance continues to reflect problems with the cryoengine redesign effort. The target price increased for redesign of Aerojet Rocket Motors.

Note: All 800 missiles associated with the Second Source Production portion of Raytheon contract F33657-83-C-2113 have been delivered. Therefore this contract will not appear in future reports.

15. (U) Contract Information (Cont'd):

Missile:
Hughes Aircraft Company, Tuscon, AZ*
#F33657-85-C-0086,FFP
Award: 21 May 85
Definitized: 21 May 85

Initial Contract Price		
Target	Ceiling	Qty
$324.0	N/A	2600

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$234.0	N/A	2600	$234.0	$234.0

Note: All 2600 missiles associated with Contract #F33657-85-C-0086 have been delivered, therefore this contract will not appear in future reports.

Missile:
Hughes Aircraft Company, Tuscon, AZ*
#F33657-86-C-2138, FFP
Award: 30 Apr 87
Definitized: 30 Apr 87

Initial Contract Price		
Target	Ceiling	Qty
$236.0	N/A	1436

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$236.0	N/A	1436	$236.0	$236.0

Note: Contract price includes 120 Navy AGM-65Fs and 225 GBU-15s.

Missile:
Hughes Aircraft Company, Tuscon, AZ*
#F33657-87-C-0130, FFP
Award: 20 Apr 87
Definitized: 20 Apr 87

Initial Contract Price		
Target	Ceiling	Qty
$230.6	N/A	2156

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$230.6	N/A	2156	$230.6	$230.6

Note: Contract price includes 248 Navy AGM-65Fs and 16 TGM-65Fs.

Missile:
Hughes Aircraft Company, Tuscon, AZ*
#F33657-88-C-0032, FFP
Award: 4 May 88
Definitized: 4 May 88

Initial Contract Price		
Target	Ceiling	Qty
$132.2	N/A	1069

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$165.1	N/A	1281	$165.1	$165.1

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. (Option includes 155 Navy and 128 Air Force missiles.)

Missile:

Raytheon Co. Missile Systems Div., Bristol, TN* Initial Contract Price
#F33657-88-C-0033, FFP
Award: 4 May 88
Definitized: 4 May 88

Target	Ceiling	Qty
$150.2	N/A	1871

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$193.5	N/A	2137	$193.5	$193.5

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. (Option includes 283 Navy and 194 Air Force missiles.)

*CPR data is not required on FFP contracts.

c. MILCON - N/A

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

a. (U) Program Status--

(1) Percent Program Completed: 83.3% (15/18)

(2) Percent Program Cost Appropriated: 82.8% (2651.0/3200.1)

b. (U) Appropriation Summary --

(Then Year Dollars in Millions)

Appropriation	Current & 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	$ 2483.0	$ 193.1	$ 179.2	$ 176.8	$ 3032.1
MILCON	$ ---	$ ---	$ ---	$ ---	$ ---
	$ 2651.0	$ 193.1	$ 179.2	$ 176.8	$ 3200.1

Program Funding Summary (Cont'd):

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

c. (U) 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	9.2
1983	--	--	--	2.0	4.1	4.1	4.0	4.9
1984	--	--	--	0.8	1.7	1.7	1.7	3.8
SUBTTL	33			106.7	168.0	168.0	167.9	---
			APPROPRIATION: PROCUREMENT					
1982	200	14.3	62.4	104.9	221.5	221.5	214.0	9.6
1983	900	30.3	59.9	111.5	248.7	248.7	245.9	9.0
1984	1980	6.5	100.2	129.7	302.0	302.0	295.7	8.0
1985	2600	0.4	117.7	151.3	361.8	361.8	341.3	3.4
1986	2837	8.0	145.2	168.2	418.9	417.1	288.7	2.8
1987	3224	0.0	137.2	140.7	363.7	356.2	124.6	2.7
1988	2952	0.6	107.4	111.5	298.3	267.4	9.0	3.1
1989	2540***	0.0	91.7	97.1	268.1	—	—	4.0
1990	2270	0.0	62.2	68.1	193.1	—	—	3.6
1991	2020	0.0	61.0	61.7	179.2	—	—	3.3
1992	1973	0.0	60.6	59.9	176.8	—	—	2.8
SUBTTL	23496	60.1	1005.5	1204.6	3032.1	2174.7	1519.2	—
TOTAL	23529			1311.3	3200.1	2342.7	1687.1	—

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 88.

***FY89 quantities and unit prices assume concurrent production of 731 Navy and 1000 FMS missiles.

17. (U) Production Rate Data:

a. (U) 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 Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	*Maximum Economic
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	3096
1988		7000	2952	0
1989		7000	2540**	0
1990		7000	2270	0
1991		7000	2020	0
1992		10000	1973	0

*Based on available tooling.
**FY89 quantities and unit price assume concurrent production of 731 Navy missiles and 1000 FMS missiles

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

Item	Development Estimate	Variance (CE less DE)	Current Estimate	Variance (CE less Max)	*Maximum Economic
Prog Acq Cost (BY$)	995.1	+ 316.2	1311.3	+ 398.3	913.0
Prog Acq Cost (TY$)	1592.9	+1607.2	3200.1	+1115.5	2084.6
PAUC (BY$)	.032	+.024	.056	+.017	.039
PAUC (TY$)	.051	+.085	.136	+.048	.088

*FY88 and prior years based on actuals, outyears based on maximum production rates.

17. (U) Production Rate Data:

c. (U) 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	+70	143	+60	83
End Date (Mo/Yr)	12/87	N/A	11/94	N/A	11/89

d. (U) Deliveries including spares (Plan/Actual)* —

	To Date
RDT&E	33/33
Procurement	8266/8541

*Reflects Program Office records as of 31 December 1988.

e. (U) Approved Design to Cost Goal —

(Average Unit Flyaway Cost)

	Dev Estimate/ Appr Program	Current Estimate	Latest Approved Threshold
Qty: 14740			
Peak rate: 500			
Constant FY 1975 $	0.032/0.032	0.062	0.032
Current (TY $)	0.050/0.072	0.151	0.050

18. Operations and Support Costs

a. N/A

b. N/A

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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)	1.2	2.9	1.9	TBD	6.0
Industrial Fund	.2	.1	.1	TBD	.4
Total	1.4	3.0	2.0	TBD	6.4

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SAR-88-033

N-29 MK-48 ADCAP

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

PROGRAM: Torpedo MK 48 ADCAP

AS OF DATE: December 31, 1988

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89 C0504



1. Designation and Nomenclature (Popular Name): Torpedo MK 48 ADCAP Program

2. DoD Component: Department of the Navy

3. Responsible Office and Telephone Number:

Torpedo MK 48 Weapon Systems Program
Naval Sea Systems Command (PMS402)
Washington, D.C. 20362

CAPT George R. Sterner
Assigned: April 2, 1987
AV 222-0610; COMM (202) 692-0610

4. Program Elements/Procurement Line Items:

RDT&E: PE 0603691N Project S0366

PROCUREMENT: PE 24284N 3111 MK 48 ADCAP APPN 1507
PE 24284N 5120 Spares

MILCON: PE 24896N

5. Related Programs: Submarine Fire Control and Launch Systems, Mobile ASW Target

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~~MAR 02 1989~~

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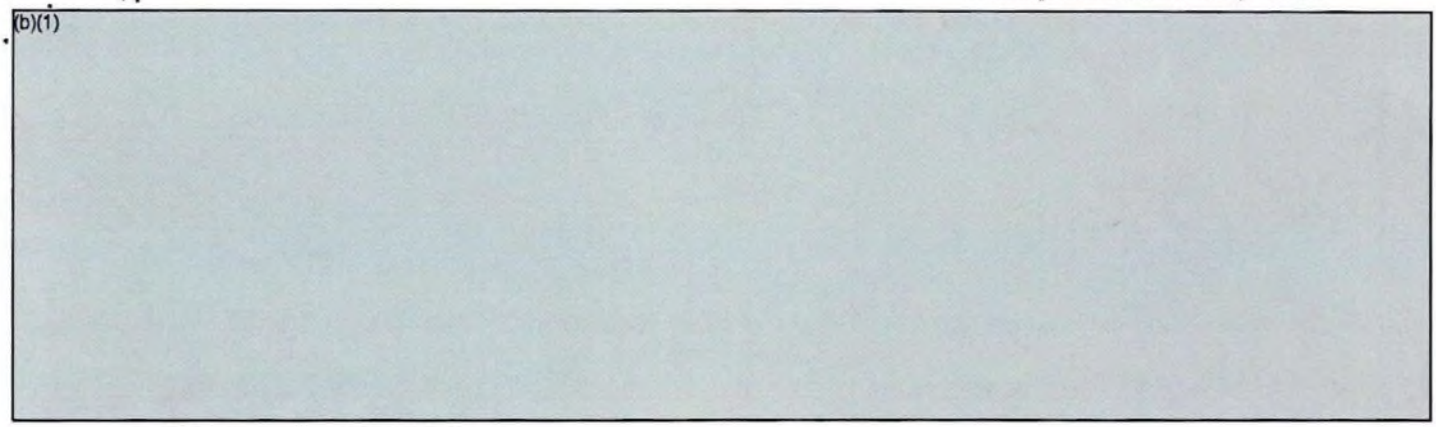

7. (U) Program Highlights:

a. (U) 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 by formal DNSARC I action. The Demonstration and Validation (D&V) contract was awarded in October 1979. Cost and schedule difficulties identified in July 1981 resulted in CNM review of the program. The program was restructured in January 1982 in accordance with recommendations from the NAVMAT review team. In November 1981, the program was designated by the Secretary of Defense as a program of the highest national priority and assigned a BRICKBAT, DX priority rating. A formal production readiness review conducted in March 1984 certified the program ready to enter initial production. The D&V phase was completed in April 1984. A CEB review in October 1984 approved initial WPN funding for long lead material, tooling and test equipment. An Approval for Limited Production (ALP) review in September 1985 authorized FY85 WPN funding for fabrication of 28 limited production torpedoes. An independent operational assessment by COMOPTEVFOR, 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), respectively. OPEVAL was successfully completed in May 1988. In September 1988, the NPDM authorized FY88 WPN funding for 102 torpedoes.

b. (U) Significant Development Since Last Report -- ADCAP NPDM authorized release of FY88 WPN funds in September 1988.

(U) Mission Requirements -- ADCAP is expected to satisfy all current mission requirements.

c. (U) Change Since "As of" Date -- On 23 Jan 1989, the Navy granted approval for ADCAP full production after DEPSECDEF complied with the statutory requirements by submitting the Live Fire Test

Report and the Director, Operational Test and Evaluation (D,OT&E) report to Congress.

8. (U) Threshold Breaches: There are currently no DAE Threshold Breaches.

9. (U) Schedule

a. (U) Milestones --

	Development Estimate	Approved Program	Current Estimate	
(U) DNSARC I	Sep 79	Sep 79	Sep 79	
(U) FSED Contract Award	Aug 82	Aug 82	Aug 82	
(U) DNSARC II	Sep 82	Sep 82	Sep 82	
(U) Critical Design Review	Aug 84	Aug 84	Aug 84	
(U) LRIP Contract Award	Mar 85	Mar 85	Mar 85	
(U) OPEVAL Completion	Oct 86	Apr 88	May 88	
(U) DNSARC III	Jan 87	N/A	Aug 88	
(U) IOC 1/	Feb 87	Aug 88	Aug 88	
(U) Milestone IIIA	N/A	Sep 85	Sep 85	
(U) Milestone IIIB	N/A	Sep 87	Sep 87	(CH-1)
(U) Milestone IIIC	N/A	N/A	Jan 89	(CH-2)

b. (U) Previous Change Explanations -- DNSARC III and IOC dates have been updated from January 1987 to July 1988 and February 1987 to August 1988, respectively to reflect the revised ADCAP program structure and production strategy resulting from technical corrective actions and additional testing to verify fixes. Addition of new milestones. DNSARC III and IOC dates have been updated from July 1988 to August 1988 and August 1988 to September 1988, respectively to reflect approved program changes determined during Approval for Limited Production Review in September 1987.

c. (U) Current Change Explanations -- (CH-1):Milestone IIIA, dated SEP 87 changed to Milestone IIIB. (CH-2): Milestone IIIC (AFP) was delayed until the DEPSECDEF submitted notice to Congress that the ADCAP program had complied with the statutory requirements by submitting the Live Fire Test Report and the Director, Operational Test and Evaluation Report to Congress. Approval for full production was granted 23 January 89. Milestone IIIC approved program was changed from Jul 88 to Aug 88 during ALP Review in September 1987.

d. (U) References --

Development Estimate: NDCP Rev. 1, (Draft), subject "Navy Decision Coordinating Paper (NDCP) for Torpedo MK 48 ADCAP Program".

Approved Program: DAE Program Baseline, 17 February 1988.

1/ (U) IOC is defined as the initial delivery of L1 production MK 48 ADCAP Warshot Torpedoes for loadout under TYCOM control.

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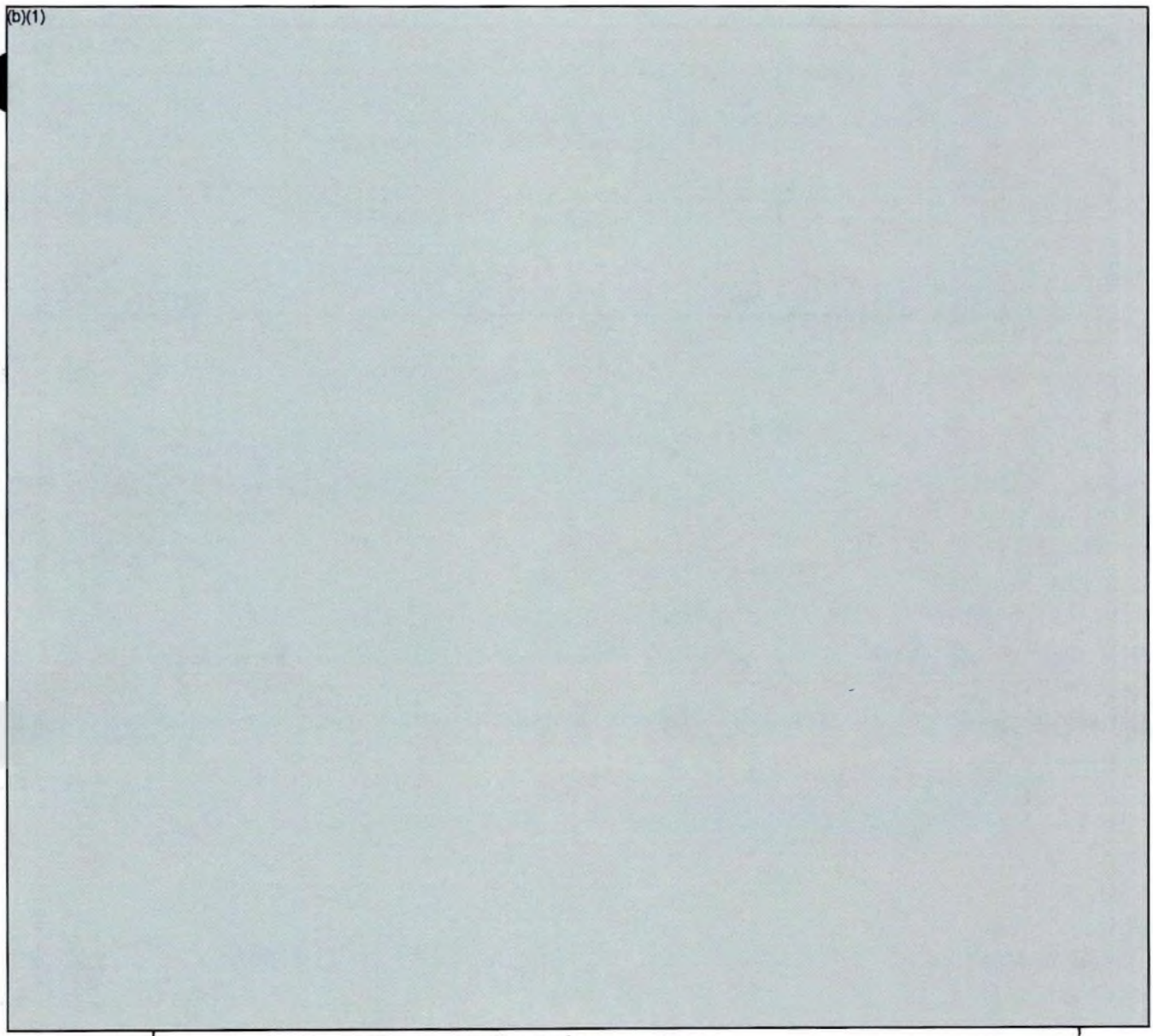

c. (U) Previous Change Explanations - None

d. (U) Current Change Explanations -- None

e. (U) References --

Development Estimate:

(1) NDCP Rev. 1, dated (DRAFT), subject "Navy Decision Coordinating Paper (NDCP) for Torpedo MK 48 ADCAP Program."

(2) OPNAV TEMP 371 Rev. 2, dated 3 Nov 87, subject "Test and Evaluation Master Plan No. 371 for Torpedo MK 48 ADCAP."

Approved Program: DAE Program Baseline, dated 17 February 1988.

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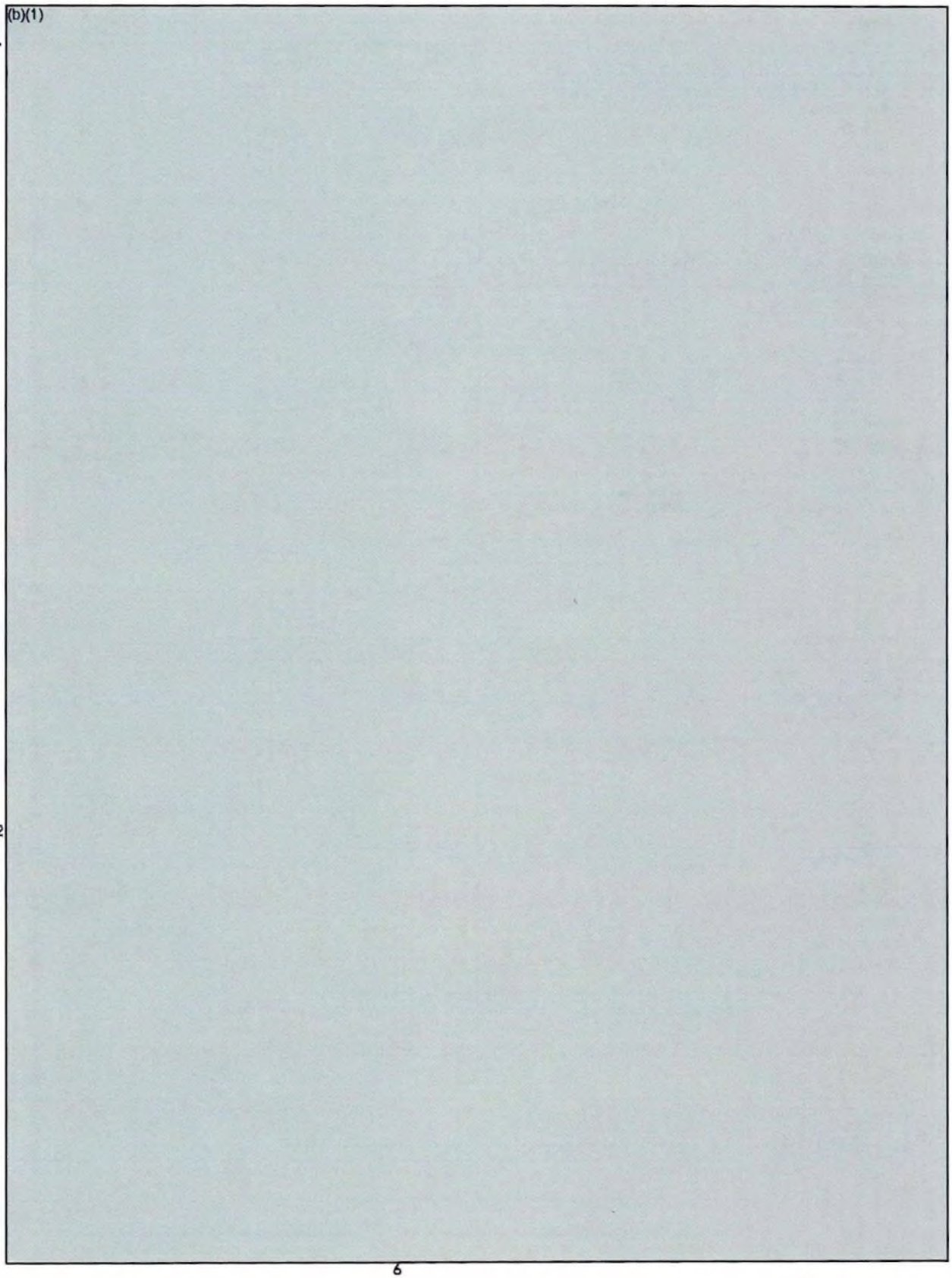

(U) Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1,023.3	5,289.5	0.7	6,314.0
Previous Changes:				
Economic	+0.9	+9.4	-	+10.3
Quantity	-	-	-	-
Schedule	+40.0	+364.3	-	+404.3
Engineering	-	-	-	-
Estimating	-24.3	-690.5	+12.0	-702.8
Other	-	-	-	-
Support	-	-44.4	-	-44.4
Subtotal	+16.6	-361.2	+12.0	-332.6
Current Changes:				
Economic	-0.2	-24.2	-	-24.4
Quantity	-	-	-	-
Schedule	+35.5	+723.5	-	+759.0
Engineering	-	-	-	-
Estimating	+72.5	-10.9	+3.9	+65.5
Other	-	-	-	-
Support	-	+18.8	-	+18.8
Subtotal	+107.8	+707.2	+3.9	+818.9
Total Changes	+124.4	+346.0	+12.0	+486.3
Current Estimate	1,148.2	5,635.5	16.6	6,800.3

(FY 1986 Constant Dollars (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1,092.1	4,471.7	0.7	5,564.5
Previous Changes:				
Quantity	-	-	-	-
Schedule	+33.3	+267.4	-	+300.7
Engineering	-	-	-	-
Estimating	-23.1	-624.1	+10.7	-636.5
Other	-	-	-	-
Support	-	-36.0	-	-36.0
Subtotal	+10.2	-392.7	+10.7	-371.8
Current Changes:				
Quantity	-	-	-	-
Schedule	+27.8	+480.0	-	+507.8
Engineering	-	-	-	-
Estimating	+61.6	-9.7	+3.2	+55.1
Other	-	-	-	-
Support	-	+13.1	-	+13.1
Subtotal	+89.4	+483.4	+3.2	+576.0
Total Changes	+99.6	+90.7	+13.9	+204.2
Current Estimate	1,191.7	4,562.4	14.6	5,768.7

B. Previous Change Explanations --

RDT&E

ECONOMIC: Revised escalation indices

SCHEDULE: Department program/budget adjustment ADCAP baseline DNSARC III estimated to complete Jul 88 vs Jan 87 and product improvement completion in FY94 vs FY92

ESTIMATING: NIF activity rate adjustment, Congressional adjustments, OSD program restructuring, and other budget adjustments

Procurement

ECONOMIC: Revised escalation indices

SCHEDULE: Department actions to adjust FY87 and outyear procurement caused by testing delays

ESTIMATING: Department, OSD, and Congressional budget adjustments, and updated cost projections based on competition

SUPPORT: Transition of support to all DOD/SPCC support activities, and Department revised spares requirements

MILCON

ESTIMATING: Addition of ADCAP unique costs

C. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Jan 89 economic escalation rates. (Economic)	N/A	-0.2
Department decision to defer CCAPS funding to match scheduled requirements. (Schedule)	-0.4	-
Extension of product improvement through FY94 vs FY92 (Schedule)	+28.2	+35.5
Department restoral and other programmatic adjustments (Estimating)	+61.5	+72.3
Adjustment for current and prior escalation (Estimating)	+0.1	+0.2
(2) Procurement		
Revised Jan 89 economic escalation rates. (Economic)	N/A	-24.2
Program rephased to manufacture/procure torpedoes at the minimum economic production rate to sustain competition (320 torpedoes per year), which resulted in a four year extension of the program. (Schedule)	+480.0	+723.5
Programmatic adjustments including revised NIF rates, IR&D, Hawk reduction, and war reserve munitions (Estimating)	-29.3	-35.1
Adjustment for current and prior escalation (Estimating)	+19.6	+24.2
Department decision to procure 1550 CCAPS units (Estimating)	+485.2	+649.4
Reduced hardware costs associated with replacement of propulsion system with CCAPS. (Estimating)	-485.2	-649.4
Department increased spares requirements. (Support)	+13.1	+18.8

(3) MILCON

Revised Jan 89 economic escalation rates. (Economic)	N/A	0.0*
Addition of ADCAP associated costs for magazine at NWS Yorktown and New London weapons facility IMA. (Estimating)	+3.2	+3.9

* less than .1

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

A. RDT&E -- None

B. Procurement --

Prime Contractor (Torpedo):
Hughes Aircraft Company, Fullerton, CA.
00024-85-C-6098, CPIF/AF
ward: March 6, 1985
efinitized: April 14, 1986

Initial Contract Price

Target	Ceiling	Qty
$159.3	N/A	28

Current Contract Price

Target	Ceiling	Qty
$213.9	N/A	28

Estimated Price at Completion

Contractor	Program Manager
$216.3	$216.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-17.4	-23.1
Cumulative Variances to Date (12/31/88)	NOT REQUIRED BY THE CONTRACT	
Net Change		

Explanation of Change: This contract was capped in April 1988 with A00203. The reporting approach was changed with the mod eliminating the requirement for the cost performance report because Hughes no longer provides earned value, which is required to determine variances. The increase in target price over initial target is attributed to added scope including WES ($34M), propulsion changes, systems support, ECPs, RDWs and training courses ($9M), and cost overruns of $14M.

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. (U) Contract Information (Cont.)

Prime Contractor (Torpedo):
Hughes Aircraft Company, Fullerton, CA.
N00024-88-C-6148, FFP
Award: December 24, 1987
Definitized: December 24, 1987

Initial Contract Price		
Target	Ceiling	Qty
$188.1	N/A	123

Current Contract Price		
Target	Ceiling	Qty
$256.3	N/A	123

Estimated Price at Completion	
Contractor	Program Manager
$256.7	$256.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	0.0	0.0
Cumulative Variances to Date (12/31/88)	NOT REQUIRED BY THE CONTRACT	

Explanation of Change: The increase in target price over initial target was caused by addition of scope including spares transferred when L1 contract was capped ($46M), afterbody/ tailcone spares ($7M), and ECPs ($15M).

Prime Contractor (Torpedo):
Hughes Aircraft Company, Fullerton, CA.
N00024-87-C-6056, FPI
Award: September 21, 1987
Definitized: September 21, 1987

Target	Ceiling	Qty
$98.1	$108.8	VARIOUS

Current Contract Price		
Target	Ceiling	Qty
$117.9	$130.5	VARIOUS

Estimated Price at Completion	
Contractor	Program Manager
$117.8	$117.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	0.0	0.0
Cumulative Variances to Date (10/21/88)	-0.3	-2.5
Net Change	-0.3	-2.5

Explanation of Change: The cost variance was created by the early start of work which was not yet baselined. The schedule variance is driven by the late start in the Array Test Set Design/Support area, delayed mechanical design and buyer support tasks caused by late receipt of items, and late material deliveries. The 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 ($4M), ATE microvax upgrade ($1M), and depot spares ($15M).

Prime Contractor (Torpedo):
Westinghouse Electric Company, Cleveland, OH.
N00024-86-C-6162(CLIN 0017 - 0021), FPI
Award: April 15, 1986
Definitized: October 7, 1987*

Target	Ceiling	Qty
$51.0	$58.1	50

Current Contract Price		
Target	Ceiling	Qty
$52.4	$59.5	50

Estimated Price at Completion	
Contractor	Program Manager
$53.4	$53.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	0.0	0.0
Cumulative Variances to Date (10/21/88)	-0.8	+0.3
Net Change	-0.8	+0.3

* Indicates date option (P0003) was exercised.

5. Contract Information (Cont)

Explanation of Change: Cost variance is driven by Afterbody/tailcone section hardware procurement over budget, and G&C section which has been impacted by initial start up and solderability problems. Schedule variance is caused by early material receipt in the torpedo section. The variances will have no impact on contract price at completion.

Prime Contractor (Torpedo):
Hughes Aircraft Company, Fullerton, CA.
N00024-88-C-6215, FFP
Award: September 30, 1988
Definitized: September 30, 1988

Initial Contract Price		
Target	Ceiling	Qty
$229.4	N/A	255

Current Contract Price		
Target	Ceiling	Qty
$229.4	N/A	255

Estimated Price at Completion	
Contractor	Program Manager
$229.4	$229.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	0.0	0.0
Cumulative Variances to Date (12/31/88)	NOT REQUIRED BY THE CONTRACT	

Prime Contractor (Torpedo):
Westinghouse Electric Company, Cleveland, OH.
N00024-88-C-6325, FFP
Award: September 30, 1988
Definitized: September 30, 1988

Initial Contract Price		
Target	Ceiling	Qty
$166.1	N/A	167

Current Contract Price		
Target	Ceiling	Qty
$166.1	N/A	167

Estimated Price at Completion	
Contractor	Program Manager
$166.1	$166.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	0.0	0.0
Cumulative Variances to Date (12/31/88)	NOT REQUIRED BY THE CONTRACT	

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

A. Program Status --

(1) Percent Program Completed: 55.0% (11 yrs/20 yrs)

(2) Percent Program Cost Appropriated: 36.9% ($2511.5/$6800.3)

B. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY79-FY89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-FY98)	Total
RDT&E	959.6	44.9	59.2	84.5	1148.2
Procurement	1544.1	498.3	414.2	3178.9	5635.5
MILCON	12.7	1.4	-	2.5	16.6
Total	2516.4	544.6	473.4	3263.9	6800.3

C. Annual Summary --

Fiscal Year	Qty	Swimaway FY86 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1979				25.7	17.9	17.9	17.9	8.4%
1980				68.2	52.6	52.6	52.6	10.6%
1981				107.7	90.6	90.6	90.6	10.6%
1982				174.4	154.4	154.4	154.4	7.6%
1983				195.0	180.4	180.4	180.4	4.9%
1984				180.6	173.1	173.1	172.7	3.8%
1985				127.4	125.9	125.9	125.5	3.4%
1986				59.5	60.5	60.5	60.3	2.8%
1987				54.0	56.5	56.5	55.5	2.7%
1988				18.6	20.2	20.2	20.9	3.1%
1989				24.5	27.5	13.6	0.2	4.0%
1990				38.6	44.9	-	-	3.6%
1991				49.4	59.2	-	-	3.3%
1992				40.0	49.1	-	-	2.8%
1993				20.1	25.2	-	-	2.3%
1994				8.0	10.2	-	-	1.8%
Sub-total	48			1191.7	1148.2	945.7	931.0	

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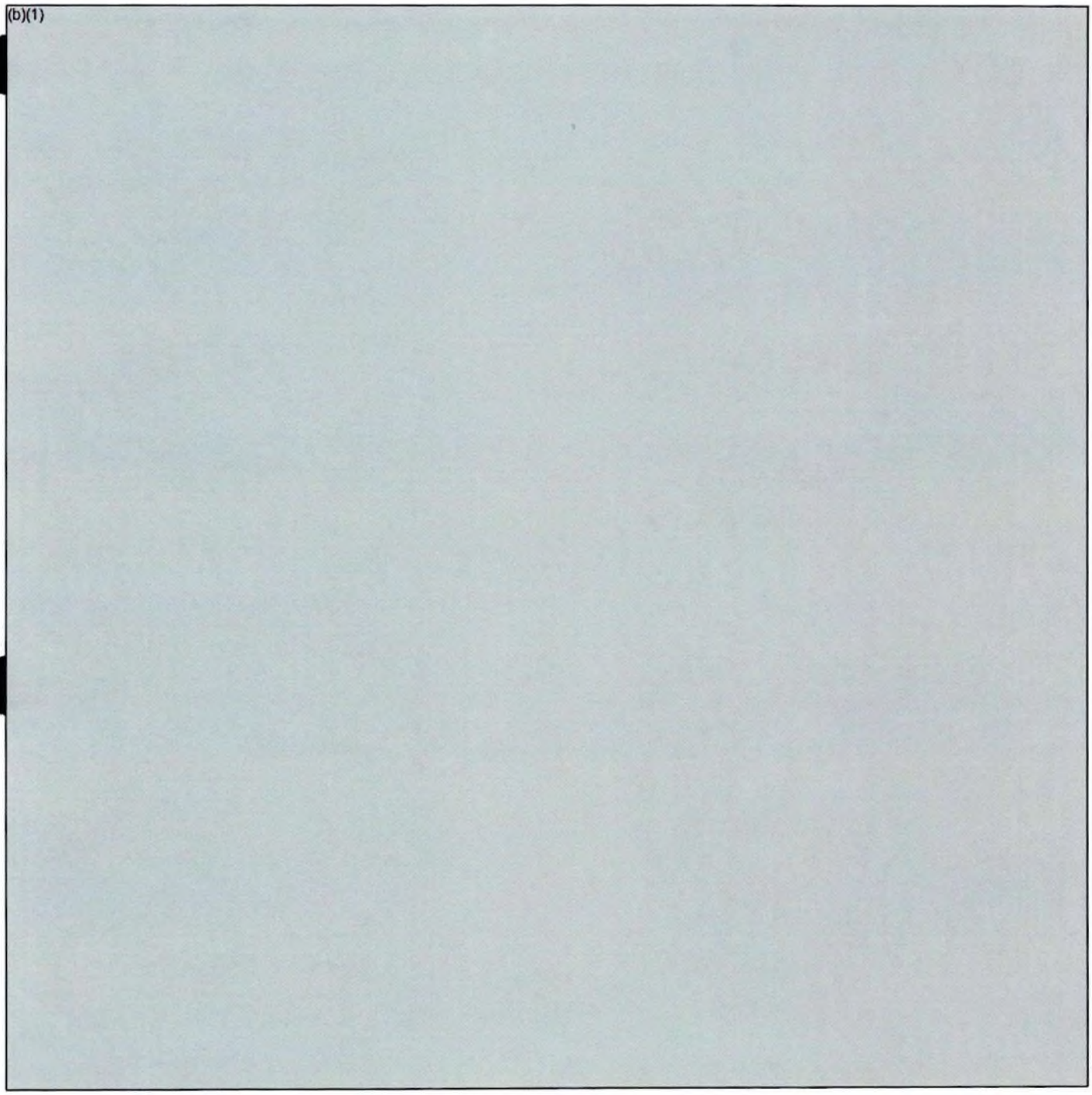

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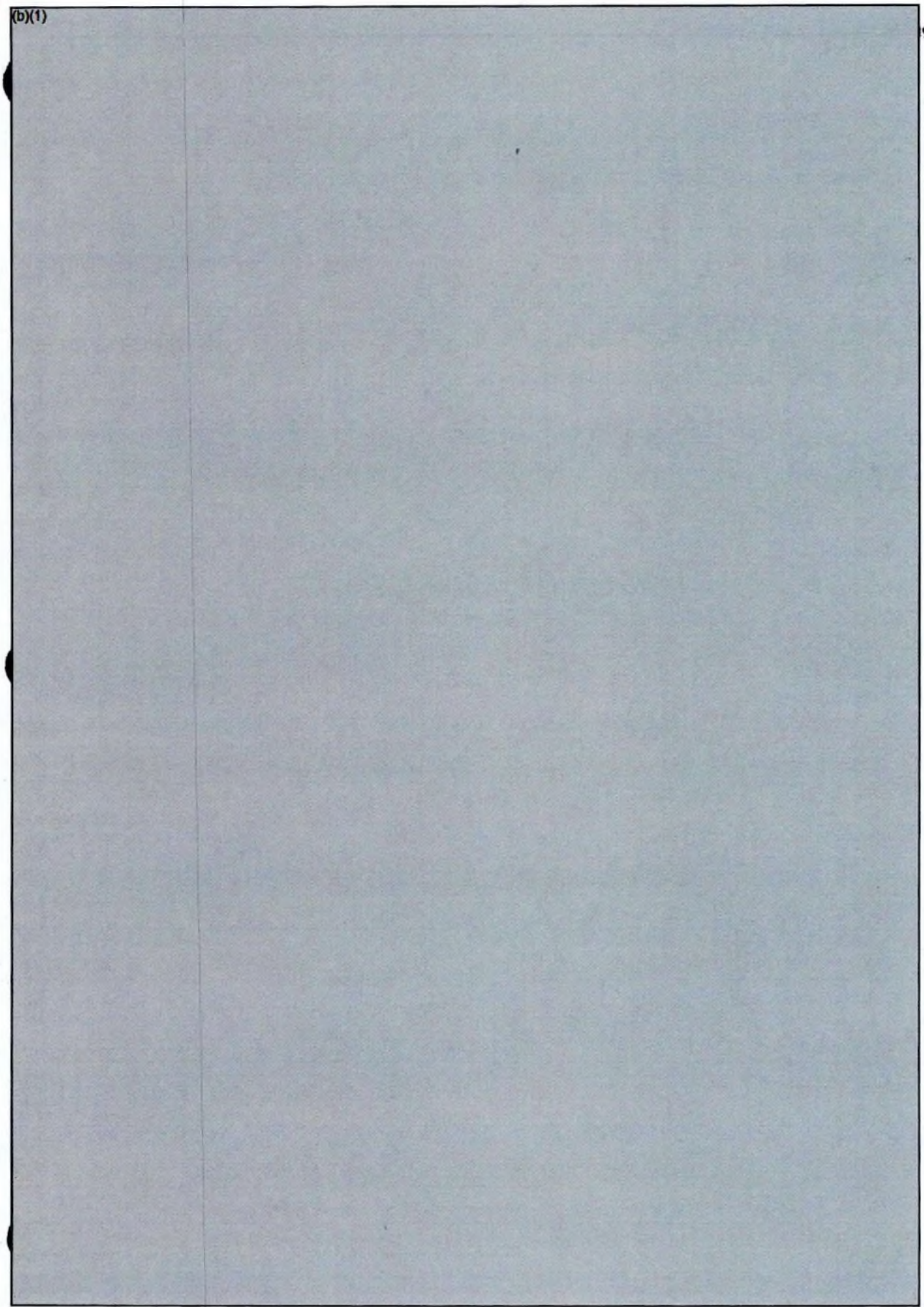

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SAR-88-043

N-37 SPARROW

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

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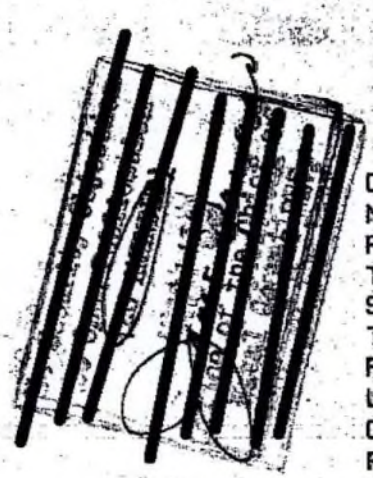
PROGRAM: SPARROW (AIM/RIM-7M) (USN/USAF)

AS OF DATE: December 31, 1988

INDEX



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Technical/Operaional Characteristics	3
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89 C0503

1. (U) Destination and Nomenclature: AIM/RIM-7M Air-to-Air Guided Missile (Sparrow)

2. (U) DOD Component: Departments of the Navy and Air Force

3. (U) Responsible Office and Telephone Numbers:

Air-to-Air Missile Systems Program Office (PMA-259) Washington, DC 20381	PM: CAPT J. J. Stewart, USN Assigned: Feb 14, 1986 AV 222-8222; COMM (202) 692-8226
PMA-259B	PM: LTC Jerry R. McMahan, USAF Assigned: July 1, 1987 AV 222-8222; COMM (202) 692-8224

4. (U) 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. (U) Related Programs: Low altitude fuze improvement (NAVSEA); AMRAAM (USAF)

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~~RECLASSIFY ON: OADR~~

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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 systens and provides all-aspect attack capability in 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.

7. (U) Program Highlights:

A. 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 AMI/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. Funding for the development of a modified AIM-7 SPARROW missile with Electronic Counter-Countermeasures (ECCM) was also deleted after FY1986. 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 -- Even though the Navy did not submit a quantity in the FY89 budget cycle Congress appropriated funds for 450 USN missiles in FY 1989. The USAF quantity has been reduced from 354 to 174 due to reprogramming to higher priority programs.

The AIM/RIM-7M Sparrow Missile system satisfies the mission requirement.

8. (U) Threshold Breaches:
Beginning of IOT&E slipped beyond threashold date of October 1980. Early IOT&E events ocurred in December 1980. Delays in the test program and rescheduling of IOT&E to 1982 caused approval for service use threshold to be breached. DSARC III (DNSARC III) and IOC thresholds were breached.

9. (U) 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-starting of IOT&E, delay in receipt of first production units from the contractor, and the change of program status from a major program to 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 17 Feb 1988.

10. (U) Technical/Operational Characteristics:

	Development Estimate	Approved Prgm Goal/Threshold	Dem Perf	Current Estimate
A. (U) Technical --				
(U) Weight/Launch,lbs	510/510	- /510	510	510
Warhead, lbs	90/90	- / 90	90	90
(U) Guidance	Semi-Active Continuous Wave or Pulse Doppler Radar			
(U) Prop Impulse, lb/sec	31,000	- /31,000	31,000	31,000
(U) Size	Length 144", Diameter 8", Wing Span 40"			

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

b. (U) Operational--	Dev Est	Approved Program Goals/Thres.	Dem Perf	Current Estimate
(b)(1)				

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 17 Feb 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 (FY75-94)
Development (RDT&E)	54.5	53.3	53.3
Procurement	859.2	1,434.5	1,434.5
G,C&A	(681.7)	(1,166.3)	(1,166.3)
Propulsion	(46.7)	(61.5)	(61.5)
Other Hardware	(35.8)	(22.8)	(22.8)
Procurement Sup	(66.4)	(86.9)	(86.9)
Total Flyaway	(830.6)	(1,337.5)	(1,337.5)
Fleet Support	(19.9)	(68.0)	(68.0)
Initial Spares	(8.7)	(29.0)	(29.0)
Construction	0.0	0.0	0.0
Total FY78 Base Year $	913.7	1,487.8	1,487.8
Escalation	344.4	1,264.0	1,264.0
Development	(2.8)	(7.9)	(7.9)
Procurement	(341.6)	(1,256.1)	(1,256.1)
Construction	(0.0)	(0.0)	(0.0)
Total Then-Year $	1258.1	2,751.8	2,751.8
B. Quantities --			
Development(RDT&E)	44	44	44
Procurement	11095	15544	15544
Total	11139	15588	15588

11. (U) Program Acquisition Cost (USN/USAF) (Cont'd):

C. Foreign Military Sales (Includes RIK) -- Signed letters of offer to date total up to 4883 for $956.8 including support to the following: Greece, 270/$67.9; Taiwan, 100/$27.9; Australia, 223/$52.3; Israel, 150/$32.7; Canada, 1031/$201.0; Egypt, 684/$135.6; Turkey, 165/$34.3; NATO 1126/$246.5; SDAF 1100/$145.7; Bahrain, 10/$5.4; Portugal 24/$7.5.

D. Nuclear Costs -- None.

E. References --

Development Estimate: DCP#89, Rev B. dated 19 April 1979 and full approval for service use dated 8 November 1982.

Approved Program: FY1990/91 President's Biemmial Budget.

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

	Current Est Dec 88 SAR	Current Year UCR Baseline Dec 87 SAR	Budget Year UCR Baseline Dec 88 SAR
A. Program Acquisition --			
(1) Cost	2751.8	2758.6	2751.8
(2) Quantity	15588	15318	15588
(3) Unit Cost	0.177	0.180	0.177
B. Current Procurement --			
	(FY1989)	(FY1989) APPN	(FY1990)
(1) Cost	77.3	77.3	0.0
Less CY AP	0.0	0.0	0.0
Plus PY AP	0.0	0.0	0.0
Net Total	77.3	77.3	0.0
(2) Quantity	624	624	0
(3) Unit Cost	0.124	0.124	0.000

13. (U) Cost Variance Analysis: (Total USN/USAF)

A. Summary -- [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	124.9	0.0	128.3
Quantity	0.0	549.9	0.0	549.9
Schedule	5.7	222.4	0.0	228.1
Engineering	0.0	0.0	0.0	0.0
Estimating	-5.2	435.9	0.0	430.7
Other	0.0	0.0	0.0	0.0
Support	0.0	163.5	0.0	163.5
Subtotal	3.9	1496.6	0.0	1500.5
Current Changes:				
Economic	0.0	-2.8	0.0	-2.8
Quantity	0.0	3.5	0.0	3.5
Schedule	0.0	-16.9	0.0	-16.9
Engineering	0.0	0.0	0.0	0.0
Estimating	0.0	4.2	0.0	4.2
Other	0.0	0.0	0.0	0.0
Support	0.0	5.2	0.0	5.2
Subtotal	0.0	-6.8	0.0	-6.8
Total Changes	3.9	1489.8	0.0	1493.7
Current Estimate	61.2	2690.6	0.0	2751.8

[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	211.5	0.0	211.5
Schedule	3.0	76.1	0.0	79.1
Engineering	0.0	0.0	0.0	0.0
Estimating	-4.2	214.6	0.0	210.4
Other	0.0	0.0	0.0	0.0
Support	0.0	75.2	0.0	75.2
Subtotal	-1.2	577.4	0.0	576.2
Current Changes:				
Quantity	0.0	1.5	0.0	1.5
Schedule	0.0	-7.7	0.0	-7.7
Engineering	0.0	0.0	0.0	0.0
Estimating	0.0	1.9	0.0	1.9
Other	0.0	0.0	0.0	0.0
Support	0.0	2.2	0.0	2.2
Subtotal	0.0	-2.1	0.0	-2.1
Total Changes	-1.2	575.3	0.0	574.1
Current Estimate	53.3	1434.5	0.0	1487.8

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-7M

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 revised 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	-2.8
	Quantity: Increase of 450 missiles in FY89 for USN, offset by 180 reduction in USAF resulting in a net increase of 270.	18.9	44.1
	Schedule: Associated schedule changes applicable to 270 missiles since baseline.	-3.3	-6.8
	Estimating: Associated estimating changes applicable to 270 missiles since baseline.	-19.9	-46.1
	Support: Associated support changes applicable to 270 missiles since baseline.	2.2	4.8
(3)	MILCON	0.0	0.0
TOTAL CURRENT CHANGES		-2.1	-6.8

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	+003	+.014	.000	+.028	+.011	.000	+.064	0.177

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

A. 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	Estimated Price at Completion Contractor	Program Manager
$	280.1	N/A	2527	$ 280.1	280.1
(USN)	131.6	N/A	1200	131.6	131.6
(USAF)	47.5	N/A	430	47.5	47.5
(FMS/Other)	101.0	N/A	897	101.0	101.0

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

GC&A		Initial Contract Price Target	Ceiling	Qty
General Dynamics, Camden, AR	$	182.5	N/A	1391
N00019-87-C-0139, FFP	(USN)	97.1	N/A	753
Award: 3/87(FY87) 3/88(FY88)	(USAF)	26.4	N/A	189
Definitized: March 1987	(FMS/Other)	59.0	N/A	449

	Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$	315.6	N/A	2835	$ 315.6	315.6
(USN)	131.9	N/A	1192	131.9	131.9
(AF)	67.6	N/A	616	67.6	67.6
(FMS/Other)	116.1	N/A	1027	116.1	116.1

Explanation of Changes: Cost and Schedule variances not applicable to FFP contracts.

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% ($2751.8/$2751.8)

B. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY75-89)	Budget Year (FY90)	Balance FYDP (FY91)	To complete (1992 - Completion)	Total
RDT&E	61.2	0.0	0.0	0.0	61.2
Procurement	2690.6	0.0	0.0	0.0	2690.6
Total	2751.8	0.0	0.0	0.0	2751.8

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/MPF								
1980	390	7.8	72.4	82.0	118.0	118.1	118.1	11.8
1981	1490	10.2	177.4	201.3	323.2	323.2	323.2	11.6
1982	1516	12.8	171.7	200.3	349.0	349.0	349.0	14.3
1983	1970	0.0	170.7	185.3	341.6	341.5	341.5	9.0
1984	1700	0.0	145.9	163.1	312.9	312.9	300.9	8.0
1985	2131	0.0	163.7	171.6	339.6	339.6	321.0	3.4
1986	2445	0.0	177.1	195.4	399.1	399.1	370.2	2.8
1987	2120	0.0	132.6	137.9	291.4	287.4	201.8	2.7
1988	1158	0.0	73.1	63.3	138.5	133.5	24.9	3.1
1989	624	0.0	24.2	34.2	77.3	0.0	0.0	4.0
SUB TOT	15544	30.8	1308.8	1,434.5	2,690.6	2604.3	2350.6	
TOTAL	15588	30.8	1308.8	1,487.8	2,751.8	2665.5	2411.8	

Escal rates are FY1990/1991 President's Biennial Budget rates.

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
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	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	75.1	144.0	144.0	132.0	8.0
1985	1671	0.0	131.4	139.3	275.7	275.7	258.5	3.4
1986	1948	0.0	141.8	159.8	326.4	326.4	303.6	2.8
1987	1716	0.0	106.9	111.5	235.5	231.8	174.0	2.7
1988	600	0.0	36.0	32.2	72.5	68.0	16.3	3.1
1989	450	0.0	0.0	23.1	52.3	0.0	0.0	4.0
SUB TOT	8994	11.7	701.6	794.7	1,536.2	1475.7	1314.2	
TOTAL	9038	11.7	701.6	844.7	1,592.9	1532.4	1370.9	

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								
1984								
1985								
1986								
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	113.5	182.2	182.2	182.2	11.6
1982	957	5.1	109.5	127.1	221.5	221.5	221.5	14.3
1983	1300	0.0	109.2	116.4	214.5	214.5	214.5	9.0
1984	1005	0.0	85.1	88.1	168.9	168.9	168.9	8.0
1985	460	0.0	32.3	32.3	63.9	63.9	62.5	3.4
1986	497	0.0	35.3	35.6	72.7	72.7	66.6	2.8
1987	404	0.0	25.7	26.5	55.9	55.6	27.8	2.7
1988	558	0.0	37.1	30.2	66.0	65.5	8.6	3.1
1989	174	0.0	24.2	11.1	25.0	0.0	0.0	4.0
SUB TOT	6550	19.1	607.2	638.8	1,154.4	1128.6	1036.4	
TOTAL	6550	19.1	607.2	642.1	1,158.9	1133.1	1040.9	

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		N/A	624	
1990		N/A		
1991		N/A		

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

Item	Production Estimate	Variance (CE Less DE)	Current Estimate	Variance (CE Less MAX)	Maximum Economic
Prog Acq Cost					
(BY $)	1389	+ 98.5	1487.8	+ 786.3	701.5
(TY $)	2511	+ 240.4	2751.8	+ 1302.3	1449.5
PAUC					
(BY $)	0.071	+ 0.025	0.096	+ 0.050	0.046
(TY $)	0.128	+ 0.049	0.177	+ 0.082	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	N/A	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	15544	13841

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	1.3	1.7	0.0	4.3
Industrial Fund	0.2	0.1	0.1	0.0	0.4
Total	1.5	1.4	1.8	0.0	4.7

SAR-88-045

N-39 SSN-688

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

PROGRAM: SSN 688 NUCLEAR ATTACK SUBMARINE

AS OF DATE: December 31,1988

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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 222-3407; COMM (202) 693-3405

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

CLASSIFIED BY: ERDA DOD CLASSIFICATION GUIDE FOR THE NAVAL NUCLEAR PROPULSION PROGRAM, CG-N-1 AND ITS ENTERPRETIVE GUIDANCE BULLETINS

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(U)7. Program Highlights:

a. Significant Historical Developments--The SSN 688 Class submarine construction program consists of 61 awarded ships from FY 70 to present: 33 awarded to General Dynamics Corporation, Electric Boat Division, and 28 to Newport News Shipbuilding. Prior to the period covered by this SAR, 37 ships had been delivered to the Navy--22 by Electric Boat and 15 by Newport News.

b. Significant Developments Since Last Report--General Dynamics Corporation, Electric Boat Division, delivered one SSN 688 Class submarine to the Navy in 1988: the USS SAN JUAN (SSN 751) on 30 June 1988; and Newport News Shipbuilding delivered one SSN 688 Class submarine to the Navy in 1988: the USS OKLAHOMA (SSN 753) on 28 June 1988. The total number of ships delivered since program inception is 39. In addition, two SSN 688's were launched in 1988: USS TOPEKA (SSN 754) on 23 January 1988 and USS MIAMI (SSN 755) on 12 November 1988, both at Electric Boat. The three FY 1988 ships were awarded on 10 Jun 1988. The SSN 768 was awarded to Electric Boat and the SSN 769 and SSN 770 went to Newport News Shipbuilding. Two more ships were authorized for new construction for fiscal year 1989; these ships were awarded on 14 December 1988, one to each shipbuilder.

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

(U)8. Threshold Breaches: DCP #27 was approved 19 March 1970. Notification of the schedule breach was forwarded via memo for DEPSECDEF on 13 August 1976. The DCP was revised 19 August 1986 to incorporate all program developments through 1986, including the Improved Propulsion Machinery Program for one FY 1987 submarine. There are several DAE baseline breaches (17 February 1988) of ship deliveries.

9. Schedule:

a. Milestones--	Dev Estimate	Approved Program	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 94

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 a strike at Electric Boat during Jun-Nov 1975.

c. Current Change Explanations: Ship procurements were reduced from 66 hulls to 63 hulls with the deletion of 3 ships in FY 91 and FY 92 this results in earlier delivery of last follow ship.

d. References--

Development Estimate: Ship Construction Awards dated 8 January 1971. Approved Program: DAE Baseline approved Feb 9, 1988.

10. Technical/Operational Characteristics:

A. Technical-	Dev Est	Approved Program Goal/Threshold	Demonstrated 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

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(b)(1)

(U) 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.

(U) D. Current Change Explanations: None

(U) E. References: -- Development Estimate Ship Construction Awards dated 8 January 1971. Approved Program: DAE Baseline approved Feb 9, 1988.

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

	Development Estimate (FY70-76)	Approved Program	Current Estimate (FY70-96)
a. Cost			
Development (RDT&E)	0.0	24.5	24.5
Procurement (SCN)	5,126.8	11,960.2	11,960.2
Basic Ship Cost	2,484.6	(7,268.7)	(7,268.7)
GFE	2,248.0	(4,303.1)	(4,303.1)
Other	234.2	(58.2)	(58.2)
OF/PD	160.0	(330.2)	(330.2)
Construction (MILCON)	0.0	20.4	20.4
Total: FY71 Base Year	$5,126.8	12,005.1	12,005.1

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1 Program Acqusition Cost (Current Estimate in Millions of Dollars)

	Development Estimate	Approved program	Current Estimate
Escalation	620.7	16,074.5	16,074.5
Development (RDT&E)	0	(23.3)	(23.3)
Procurement(SCN)	620.7	(16,033.3)	(16,033.3)
Construction (MILCON)	0	(17.9)	(17.9)
Total Then-Year $	$5,747.5	$28,079.6	$28,079.6
b. Quantities			
Development (RDT&E)	-	-	-
Procurement (SCN)	32	+31	63
Total	32	+31	63

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 1070.
Approved Program: FY 1990-91 President's Budget.

12. Program Acquisition/Current Procurement Unit Cost Summary:

(Current (Then-Year) Dollars in Millions)

		Current Year		Budget Year
	SAR Current FY 1989 (DEC 88 SAR)	UCR Baseline Estimate (DEC 87 SAR)	UCR Baseline Estimate (DEC 88 SAR)
a. Program Acquisition -			
(1) Cost	30,095.6	30,095.6	28,079.6
(2) Quantity	66	66	63
(3) Unit Cost	456.0	456.0	445.7
b. Current Procurement --	(FY 1989)	(FY 1989)	(FY 1990)
(1) Cost	1,410.2	1,410.2	1,636.0
Less CY Adv Proc	(175.8)	(175.8)	0.0
Plus PY Adv Proc	310.6	310.6	287.5
Less OF/PD	(45.6)	(45.6)	(115.7)
Net Total	1,499.4	1,499.4	1,807.8
(2) Quantity	2	2	2
(3) Unit Cost	749.700	749.700	903.900

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	-4395.6	-5.0	-4394.4
Quantity		25089.5		25089.5
Schedule		87.3		87.3
Engineering	40.0	2005.3		2045.3
Estimating	1.6	-119.1	0.1	-117.4
Other		412.8		412.8
Support		1181.8	43.2	1225.0
Subtotal	47.8	24262.0	38.3	24348.1
Current Changes				
Economic		-157.3		-157.3
Quantity		-2038.0		-2038.0
Engineering		-94.2		-94.2
Estimating		403.0		403.0
Support		-129.5		-129.5
Subtotal	0.0	-2016.0	0.0	-2016.0
Total Changes	47.8	22246.0	38.3	22332.1
Current Estimate	47.8	27993.5	38.3	28079.6

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		6412.0		6412
Schedule		14.6		14.6
Engineering	23.2	536.4		559.6
Estimating	1.3	-125.4		-124.1
Other		298.5		298.5
Support		210.0	20.4	230.4
Subtotal	24.5	7346.1	20.4	7391.0

13. Cost Variance Analysis (Cont'd):

(FY 71 Constant (base-Year) Dollars in Millions

	RDT&E	PROC	MILCON	TOTAL
Current Changes				
Quantity		-588.0		-588.0
Engineering		-27.0		-27.0
Estimating		139.1		139.1
Support		-36.8		-36.8
Subtotal	0.0	-512.7	0.0	-512.7
Total Changes	24.5	6833.4	20.4	6878.3
Current Estimate	24.5	11960.2	20.4	12005.1

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 6 SSNs since the authorization of the DE and 28 SSNs at the established baseline value
Schedule:	postponing the construction of 3 SSNs
Engineering:	changes to the propulsion plant associated with the Long life core, cost reduction improvements and the addition of VLS
Estimating:	refinement of estimate, changes in procurement plan, increased estimates for deferred work, and the Government's liability under P.L. 85-804
Other:	fund REA settlements under P.L. 85-804
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.

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 88 economic escalation (Economic)		-157.3
Deletion of 3 submarines (Quantity)	-588.0	-2038.0
Deletion of Outfitting and Post Delivery associated with the quantity change (Support)	-27.2	-95.0
Reduction associated with the installation of VLS for the quantity change (Engineering)	-27.0	-94.2
Funds identified for shipbuilder contract over-target increases (Estimating)	92.0	269.9
Refinement of estimates to reflect later contract/pricing data (Estimating)	47.1	133.1
Refinement of Outfitting/Post Delivery estimates (Support)	-9.6	-34.5
(3) MILCON N/A		

14. Program Acquisition Unit Cost (PAUC History: (Million 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	
6	-72.2	+277.5	+1.4	+31.0	+4.5	+6.5	+17.4	266.1	445.7

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
1084.6	1219.6	4	1219.6	1219.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-106.2	-68.7
Cumulative Variance to Date (8/21/88)	-170.7	-56.6
Net Change	-64.5	+12.0

Explanation of Change: The cost variance is indicative of an ongoing decline in shipbuilder productivity, this is a result of workforce size in relation to work, increased submarine construction complexity and learning associated with the new modular construction facility. This, coupled with an overly-optimistic budget due to the effects of aggressive competition in submarine new construction, will further impact cost variances. The schedule variance improved as a result of more recent delivery projections. The Program Manager's assessment of total program cost is currently under review.

	Initial Contract Price		
	Target	Ceiling	Qty
Construction of SSN 721-723, 750	675.0	746.6	3

Newport News Shipbuilding and
Drydock Company
Newport News, VA 23607
N00024-81-C-2075, FPIF
Award: 31 Aug 1981
Definitized: 31 Aug 1981

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
[illegible].2	1086.6	4	1052.2	1056.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variance to Date (10/23/88)		
Net Change	(CS/CSC not invoked on this contract)	

Explanation of Change: N/A

Construction of SSN 764-767

Initial Contract Price		
Target	Ceiling	Qty
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
1023.5	1214.5	4	1166.5	1214.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-9.5	-42.0
Cumulative Variance to Date (9/25/88)	-31.4	-99.0
Net Change	-21.9	-57.0

Explanation of Change: The schedule variance is a product of continued worsening productivity on all contracts at Newport News, this is a result of workforce size in relation to work, increased submarine construction complexity and learning associated with the new modular construction facility. This coupled with an optimistic baseline due to aggressive competition will further impact cost and schedule variances. This contract has been budgeted to ceiling.

Construction of SSN 769-770,772

Initial Contract Price		
Target	Ceiling	Qty
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
942.6	1084.7	3	957.2	1054.0
			Cost Variance	Schedule Variance
Previous Cumulative Variances			N/A	N/A
Cumulative Variance to Date (9/25/88)			-0.4	-5.3
Net Change			-0.4	-5.3

Explanation of Change: The cost and schedule variances are reported for the first time and represent reporting on only the first two ships of the contract. An option for the third ship was recently exercised.

The contractor is projecting an over-target increase on the first two ships. The Program Manager's assessment of total program costs is currently under review.

	Initial Contract Price		
	Target	Ceiling	Qty
Construction of SSN 754-755, 757	520.0	589.4	2

tric Boat Division
on, CT 06340
24-84-C-2063, FPIF
Award: 28 November 1983
Definitized: 28 November 1983

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
851.0	962.7	3	908.8	907.1
			Cost Variance	Schedule Variance
Previous Cumulative Variances			-50.8	-19.9
Cumulative Variance to Date (10/1/88)			-60.0	-75.7
Net Change			-9.2	-55.8

Explanation of Change: The continued decline in the schedule variance is due to a recent strike of the Metal Trades Council at E. B. The total impact of the strike, on both cost and schedule, are still under review. The cost variance is largely due to an optimistic budget baseline as a result of aggressive competition in submarine new construction. The Program Manager's assessment of total program cost is currently under review.

	Initial Contract Price		
	Target	Ceiling	Qty
truction of SSN 760-763	1032.6	1171.0	4

[redacted]tric Boat Division
Groton, CT 06340
N00024-86-C-2076, FPIF
Award: 21 March 1986
Definitized: 21 March 1986

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
1046.9	1187.1	4	1187.1	1187.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-27.1	-29.9
Cumulative Variance to Date (10/1/88)	-72.9	-46.5
Net Change	-45.8	-16.6

Explanation of Change: The continued decline in the schedule variance is due to a recent strike of the Metal Trades Council at EBDiv. The total impact of the strike, on both cost and schedule, are still under review. The cost variance is largely due to an optimistic budget baseline as a result of agrressive competition in submarine new construction. The Program Manager's assessment of total program cost is currently under review.

[redacted]. MILCON -- N/A

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

a. Program Status --

(1) Percent Program Completed: 75.0% (21 yrs/28 yrs)

(2) Percent Program Cost Appropriated: 93.0% (26,213.4/28,079.6)

b. Appropriation Summary --

Appropriation	Current & Prior Yrs	Budget Year	Budget Year	Balance to Complete	Total
	(FY69-89)	(FY90)	(FY91)	(FY92-96)	
RDT&E	47.8	-	-	-	47.8
Procurement (SCN)	26,037.3	1636.0	83.2	237.0	27,993.5
AN/BSY-1	(2,306.7)	(241.7)	0	0	(2,548.4)
AN/BQG-5	(84.8)	(80.5)	0	0	(165.3)
MILCON	38.3	-	-	-	38.3
TOTAL	26123.4	1636.0	83.2	237.0	28079.6

6. Program Funding Summary (Cont'd): (Current Estimate in Millions of $)

c. Annual Summary --

Fiscal Year	Qty	FY 71 Base-Year Dollars			Then-Year Dollars			Escal Rate %
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1970	0			0.5	0	0	0.5	5.51
1971	0			1.8	0	0	1.8	5.14
1972	0			1.1	0	0	1.2	4.61
1973	0			1.1	0	0	1.2	4.35
1974	0			0.4	0	0	0.5	7.97
1977	0			1.2	0	0	1.8	2.58
1978	0			1.1	0	0	1.7	6.8
1979	0			3.6	0	0	6.6	8.4
1980	0			1.3	0	0	2.7	10.59
1981	0			2.2	0	0	4.7	10.61
1982	0			2.2	0	0	5.0	7.6
1983	0			3.1	0	0	7.5	4.9
1984	0			1.7	0	0	4.3	3.8
1985	0			1.2	0	0	3.0	3.4
1986	0			2.0	0	0	5.3	2.8
1987	0			0	0	0	0.0	2.7
Subtotal	0	0		24.5	0	0	47.8	
Appropriation: SCN								
1969	0		0.0	24.0		26.5	26.5	
1970	3		526.9	534.6	-26.5	111.3	601.1	5.6
1971	4		600.3	499.5	-69.6	67.5	617.0	5.1
1972	5		739.2	665.6	-109.3	135.9	909.1	4.4
1973	6		838.9	617.7	-135.9	125.4	1042.8	5.3
1974	5		643.8	455.8	-125.4	130.0	932.2	9.0
1975	3		347.5	245.9	-78.0	0.0	532.4	14.1
1976	2		251.9	299.7	-52.0	102.0	579.9	11.5
197T	0		0.0	88.6	0.0	188.9	189.0	2.0

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			Escal Rate %
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: SCN (Cont'd)								
1977	3		582.6	832.5	-179.9	212.8	1413.6	6.2
1978	1		182.6	218.7	-91.6	0.0	452.5	8.2
1979	1		290.9	532.2	-85.7	27.1	757.3	9.6
1980	2		435.1	410.5	-138.6	76.2	1008.2	9.9
1981	2		392.0	444.7	-111.2	188.8	1154.5	9.6
1982	2		534.4	696.9	-150.4	397.9	1536.3	7.5
1983	2		544.6	689.4	-169.4	406.0	1703.7	3.8
1984	3		657.4	708.9	-278.6	389.8	2025.1	3.6
1985	4		844.8	905.2	-408.7	547.2	2649.6	2.1
1986	4		799.9	792.4	-496.5	462.6	2391.5	1.0
1987	4		812.1	766.7	-490.4	284.8	2390.1	1.5
1988	3		592.0	532.9	-428.4	227.5	1714.7	2.6
1989	2		476.0	425.8	-310.6	116.1	1410.2	4.0
1990	2		537.1	482.0	-287.6	0.0	1636.0	3.6
1991	0		0.0	24.0	0.0	0.0	83.2	3.3
1992	0		0.0	26.5	0.0	0.0	93.6	2.8
1993	0		0.0	24.2	0.0	0.0	87.2	2.3
1994	0		0.0	11.1	0.0	0.0	40.8	1.8
1995	0		0.0	4.1	0.0	0.0	15.2	1.8
1996	0		0.0	0.1	0.0	0.0	0.2	1.8
1997	0		0.0	0	0.0	0.0	0.0	1.8
Subtotal	63	0	11630.0	11960.2	-4224.3	4224.3	27993.5	
Appropriation: MILCON								
1973	0			2.9	0.0	0.0	3.9	5.55
1974	0			1.6	0.0	0.0	2.3	11.76
1975	0			2.7	0.0	0.0	4.3	16.12

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			Escal Rate %
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: MILCON								
1976	0			4.2	0.0	0.0	7.0	3.02
1978	0			2.5	0.0	0.0	4.8	7.68
1979	0			3.8	0.0	0.0	7.6	9.31
1982	0			0.2	0.0	0.0	0.6	7.6
1987	0			2.0	0.0	0.0	6.1	2.7
1988	0			0.0	0.0	0.0	0.0	3.1
1989	0			0.5	0.0	0.0	1.7	4.0
Subtotal	0	0.0	0.0	20.4	0.0	0.0	38.3	
Total	63	0.0	11630.0	12005.1	-4224.3	4224.3	28079.6	

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1970	0.5	0.5	0.5
1971	1.8	1.8	1.8
1972	1.2	1.2	1.2
1973	1.2	1.2	1.2
1974	0.5	0.5	0.5
1977	1.8	1.8	1.8
1978	1.7	1.7	1.7
1979	6.6	6.6	6.6
1980	2.7	2.7	2.7
1981	4.7	4.7	4.7
1982	5.0	5.0	4.9
1983	7.5	7.5	7.4
1984	4.3	4.3	4.2

16. Program Funding Summary (Cont'd):

d. Obligations and Expenditures -- (Cont'd)

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
	Appropriation: RDT&E (Cont'd)		
1985	3.0	3.0	2.9
1986	5.3	5.3	5.2
To Complete	0.0	0.0	0.0
Total	47.8	47.8	47.3
	Appropriation: SCN		
1969	26.5	26.5	26.5
1970	601.1	601.1	601.0
1971	617.0	617.0	616.0
1972	909.1	909.2	905.8
1973	1042.8	1042.8	1022.5
1974	932.2	932.0	920.0
1975	532.4	532.1	527.4
1976	579.9	577.8	567.6
197T	189.0	188.9	188.6
1977	1413.6	1411.2	1381.2
1978	452.5	450.3	445.8
1979	757.3	753.1	742.7
1980	1008.2	967.0	918.0
1981	1154.5	1132.1	1098.0
1982	1536.3	1461.6	1429.2
1983	1703.7	1561.7	1527.1
1984	2025.1	1873.8	1514.8
1985	2649.6	2540.0	1751.7
1986	2391.5	2197.0	1016.7
1987	2390.1	2046.7	605.9
1988	1714.7	1514.6	77.2
1989	1410.2	781.0	0.0
To Complete	1956.2	0.0	0.0
Total	27993.5	24117.5	17935.5

16. Program Funding Summary (Cont'd):

d. Obligations and Expenditures -- (Cont'd)

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: MILCON			
1973	3.9	3.9	3.9
1974	2.3	2.3	2.3
1975	4.3	4.3	4.3
1976	7.0	7.0	7.0
1978	4.8	4.8	4.8
1979	7.6	7.6	7.6
1982	0.6	0.6	0.6
1987	6.1	1/	1/
1989	1.7	1/	1/
Total	38.3	30.5	30.5

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	41/39

18. Operating and Support Costs:

a. N/A

b. N/A

c. Contractor Support Costs - N/A

A-26 STINGER

SAR-88-110

~~CONFIDENTIAL~~

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

PROGRAM: STINGER Weapon System FIM 92A/92B/92C

As of Date: December 31, 1988

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CLEARED
MAR 1 1989

1. (U) Designation and Nomenclature (popular name): FIM 92A/92B/92C Man-Portable Air Defense Guided Missile System (STINGER/STINGER POST/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

George B. Reed, Jr.
COL, AD
Project Manager
Assigned: November 15, 1988
AUTOVON: 746-6191
Commercial: 202-876-6191

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

RDT&E: PE 64306 Project D646 (Shared Funding) and Project D524 .
Procurement: APPN 2032 SSN C18500 (Shared Funding).

5. (U) Related Programs: Line-of-Sight Rear (LOS-R) Pedestal Mounted Stinger (PMS).

6. (U) Mission and Description: The STINGER 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. STINGER-RMP utilizes a passive infrared and ultraviolet homing guidance system which

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

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 STINGER-RMP replaces the Basic STINGER and STINGER-POST Weapon System in order to counter the threat of the 1980s and 1990s. It provides the active army and reserve components with a light air defense missile for defense of priority assets within the division.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- The Basic-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 delivery in September 1987. 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. R&D was initially completed in December 1987 with first fielding of production units scheduled in third quarter, Fiscal Year 1988. The first 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. The second year of the second source contract will be effected during the third year of the multiyear contract. Full competition will begin upon completion of the multiyear contract. STINGER safeguard design was completed and a report was provided to Congress on an approach to STINGER-RMP in July 1988. STINGER-RMP safeguard demonstration report is scheduled for Congressional delivery in January 1989. The Fiscal Year 1988 authorized quantity could not be procured within the Fiscal Year 1988 appropriated amount. The actual Fiscal Year 1988 negotiated quantity procured was 3942 missiles.

b. (U) Significant Developments Since Last Report --

STINGER-RMP is expected to meet system requirements.

c. (U) Changes since as of date -- None

8. (U) Threshold Breaches: There are currently no breaches to the DCP or the DAE STINGER-RMP Baseline, March 1989.

9. (U) Schedule:

a. (U) Milestones --

			Development Estimate	Approved Program	Current Estimate
(1)	(U)	BASIC STINGER			
	(U)	Milestone (DSARC II	May 72	N/A	May 72
	(U)	Dev Contract Award	Jun 72	N/A	Jun 72
	(U)	Milestone III (ASARC/DSARC)	Aug 75	N/A	Oct/Nov 77
	(U)	Initial Operational-Capability (IOC)	Sep 77	N/A	Feb 81
(2)	(U)	STINGER-POST			
	(U)	Special ASARC (Dev)	Apr 77	N/A	Apr 77
	(U)	Dev Contract Award	Jun 77	N/A	Jun 77
	(U)	Completion of Design Evaluation Testing	Apr 79	N/A	Jun 81
	(U)	Completion of Guided Test Vehicles	Apr 80	N/A	May 82
	(U)	Completion of PQT/OT	Jan 81	N/A	Oct 82
	(U)	Completion of R&D Program	Feb 81	N/A	Nov 82
	(U)	Special ASARC (Post Production)	Mar 81	N/A	Jan 83
	(U)	First Unit Equipped	Sep 82	N/A	Sep 87
(3)	(U)	STINGER-RMP*			
	(U)	ASARC III 1/	Jun 83	Jun 83	Jun 83
	(U)	R&D Contract Award 2/	Sep 84	Sep 84	Sep 84
	(U)	Initial Production Contract Award	NA	Aug 85	Aug 85
	(U)	Development Test/Operational Test (DT/OT) Started	NA	May 86	May 86
	(U)	Completion of Design Evaluation Testing	Jul 86	N/A	N/A
	(U)	FY86 Production Contract Award 3/	Nov 86	Sep 86	Sep 86
	(U)	Completion of Guided Test Vehicles/Testing	Jul 87	N/A	N/A
	(U)	2nd Source Selection Award	NA	Sep 87	Sep 87
	(U)	Initial Production Contract Deliveries Started	NA	Oct 87	Oct 87
	(U)	Production Verification Test (PVT) I/Pilot Lot Test Started	NA	Nov 87	Nov 87
	(U)	DT/OT Completed	NA	Dec 87	Dec 87
	(U)	FY 87-89 Multiyear Contract Award (36 mos.)	NA	Mar 88	Mar 88

9. (U) Schedule: (Continued)

		Development Estimate	Approved Program	Current Estimate	
(U)	PVT I Completed	NA	Apr 88	Apr 88	
(U)	Special Test (SANDIA)	NA	May 88	May 88	
(U)	Engineering Development Test Extension Start	NA	Jun 88	Jun 88	
(U)	FY86 Production Deliveries Start	NA	Sep 88	Sep 88	
(U)	PVT II Start	NA	Feb 89	Feb 89	
(U)	Performance Assessment	NA	Mar 89	Mar 89	
(U)	Test and Evaluation Master Plan (TEMP) Approval (Army)	NA	Mar 89	Mar 89	
(U)	Follow-On Test & Eval Start	NA	Apr 89	Apr 89	
(U)	PVT II Complete	NA	May 89	May 89	
(U)	Eng Development Test (Extension) Complete	NA	May 89	May 89	
(U)	Follow-On Test & Evaluation Complete	NA	May 89	May 89	
(U)	FY89 2d Source Contract Award	NA	Jun 89	Jun 89	
(U)	R & D Program Complete 4/	Dec 87	Jul 89	Jul 89	(Ch-1)
(U)	FY87-89 Multiyear Deliveries Start	NA	Jun 89	Jun 89	
(U)	First Unit Equipped (FUE) USAREUR 5/	Nov 87	Jul 89	Jul 89	(Ch-2)
(U)	FY89 Competitive Contract Award	NA	Jul 89	Jul 89	
(U)	2d Source Pilot Lot Flight Test Start	NA	Jan 90	Jan 90	
(U)	FY87 2d Source Deliveries Start	NA	Mar 90	Mar 90	
(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	
(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	

9. (U) Schedule: (Continued)

		Development Estimate	Approved Program	Current Estimate
(U)	FY90 Deliveries Start	NA	May 92	May 92
(U)	FUE WESTCOM	NA	Jan 93	Jan 93
(U)	FUE ARNG	NA	Jun 93	Jun 93

1/ Previous SAR (September 30, 1988) titled "Special ASARC (Development)"
2/ Previous SAR (September 30, 1988) titled "Development Contract Award"
3/ Previous SAR (September 30, 1988) titled "Production Baseline Established"
4/ Previous SAR (September 30, 1988) titled "Completion of R&D Program"
5/ Previous SAR (September 30, 1988) titled "First Unit Equipped (FUE)"

b. (U) Previous Change Explanation --

Completion of R&D program was delayed from December 1987 to January 1989. Changes in Basic STINGER result from separating Developmental and Operational tests, flight test technical problems, and reduction in missile procurement funding. Schedule changes in STINGER-POST due to hardware problems, test schedule delay due to flight test failures, electronic design, and packaging difficulties. STINGER-RMP FUE changed from June 1988 to April 1989 due to a delay in production acceptance pending validation of software correction (March 1989). Delay will cause no change in target price of the contract.

c. (U) Current Change Explanation --

(Ch-1) R&D Program Complete changed from Jan 89 to Jul 89 correct software related problems.

(Ch-2) First Unit Equipped (FUE) USAREUR changed from Apr 89 to Jul 89 due to delay in production acceptance pending validaton of software correction.

*STINGER-RMP schedule has been revised to incorporate milestones from the DAE approved STINGER-RMP Baseline.

d. (U) References --

Development Estimate: DCP 114, dated Jul 72, for Basic/Revised DCP 114 dated Jun 5, 73 for STINGER-POST/RMP. ASARC III, Jun 83, for STINGER-RMP.

Approved Program: FY 1990-1991 President's Budget; Secretary of the Army Memo, Jul 83, Subj: System Acquisition Decision Memo - STINGER-POST/RMP ASARC III Executive Council Session, Jun 6, 83; DAE STINGER-RMP Baseline, dated March 1989.

10. (U) Technical/Operational Characteristics:

			Dev Est	Approved Program Goal/Thres	Demon strated Perf	Current Estimate
a.	(U)	Technical --				
(1)	(U)	BASIC STINGER				
		Ready-to Fire Weapon Weight Including Onboard IFF Antenna (lbs)	32	N/A	35	35
(2)	(U)	STINGER-POST				
		Ready-to Fire Weapon Weight Including Onboard IFF Antenna (lbs)	35	N/A	35	35.5
(3)	(U)	STINGER-RMP				
		Ready-to Fire Weapon Weight Including Onboard IFF Antenna (lbs)	35.5	N/A	35	36
b.	(U)	Operational --				
(1)	(U)	BASIC STINGER				

(b)(1)

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

(b)(1)

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

	Dev	Approved Program	Demon-strated	Current
(b)(1)				

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

(b)(1)

	Approved	Demon-

1/ (U) STINGER-RMP is a one shot device. No MTBF or MTTR requirement.
NOTE: ESo=Preuse reliability x prefire reliability x firing reliability x missile lethality for K kills x Pdet (values for current RMP software). Wpn Rel=Prefire reliability x fire reliability x warhead detonation reliability.

c. (U) Previous Change Explanations --

System effectiveness adjusted based on reliability changes and current performance. Weight change based on improved gripstock. Basic STINGER intercept range based on DCP revision which reflects current test data.

(b)(1)

e. (U) References --

Development Estimate: DCP 114, dated Jul 72, for Basic/Revised DCP 114 dated Jun 5,73 for STINGER-RMP. ASARC III, Jun 83, for STINGER-RMP.

Approved Program: FY 1990-1991 President's Budget; Secretary of the Army Memo, Jul 83, Subj: System Acquisition Decision Memo - STINGER-POST/RMP ASARC III Executive Council Session, June 6, 1983; DAE baseline approved March 1989.

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

	Development Estimate	1 Approved Program	Current Estimate
a. (U) Cost --			
Development (RDT&E)	76.6	45.4	174.3
Procurement	334.3	1940.2	926.9
Weapon (FLYAWAY)	(321.9)	(1793.6)	(834.8)
Other	(11.1)	(146.6)	(91.8)
Initial Spares	(1.3)	(0.0)	(0.3)
Construction (MILCON)	0.0	0.0	0.0
Total Constant FY72$	410.9	1985.6	1101.2
Escalation	62.9	763.4	2275.7
Development (RDT&E)	(4.2)	(3.9)	(92.5)
Procurement	(58.7)	(759.5)	(2183.2)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Total Then-Year $	473.8	2749.0	3376.9
b. (U) Quantities* --			
Development (RDT&E)	222	9	214
Procurement	22,980	59,059	63,064
Total Weapons	23,202	59,068	63,278

(b)(1)

(U)	Pakistan	9.4
(U)	Bahrain	4.9
(U)	France	6.1
(U)	Germany	62.7
(U)	Italy	48.9
(U)	Japan	71.8
(U)	Netherlands	34.8
(U)	Norway	.3
(U)	Saudi Arabia	39.2
(U)	Switzerland	1.3
(U)	Turkey	19.0
(U)	United Kingdom	6.3

(b)(1)

1 The approved Program displays the cost of STINGER RMP only (FY 83 Base Year dollars). The costs for STINGER Basic and POST are not included.

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

d. (U) Nuclear Costs -- None

e. (U) References --

Development Estimate: DCP 114, dated Jul 72, for Basic/Revised DCP 114 dated Jun 5,73 for STINGER-RMP. ASARC III, Jun 83, for STINGER-RMP.

Approved Program: FY 1990-1991 President's Budget; Secretary of the Army Memo, Jul 83, Subj: System Acquisition Decision Memo - STINGER-POST/RMP ASARC III Executive Council Session, Jun 6,83; DAE STINGER-RMP Baseline, Mar 1989.

*The Army will procure the maximum number of supportable systems consistent with the dollar 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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1)	(U) Cost	$3,376.9	$3,279.2	$3,376.9
(2)	(U) Quantity	63,278	50,854	63,278
(3)	(U) Unit Cost	$0.053	$0.064	$0.053
b.	(U) Current Procurement --	(FY 89)	(FY 89 APPN)	(FY 90)
(1)	(U) Cost	$241.3	$241.3	$187.5
	Less CY Adv Proc	0.0	0.0	0.0
	Plus PY Adv Proc	38.8	38.8	0.0
	Net Total	280.1	280.1	187.5
(2)	(U) Quantity	6750	6750	4754
(3)	(U) Unit Cost	$0.0415	$0.0415	$0.0394

13. (U) Cost Variance Analysis:

a. Summary --(Current [Then-Year] $ in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	80.8	393.0	0.0	473.8
Previous Changes:				
Economic	+4.8	+432.4		+437.2
Quantity	+11.0	+272.7		+283.7
Schedule	+27.4	+813.6		+841.0
Engineering	+118.1	+87.0		+205.1
Estimating	+14.8	+948.6		+963.4
Other	+7.3			+7.3
Support	+2.7	+65.0		+67.7
Subtotal	+186.1	+2619.3	0.0	+2805.4
Current Changes:				
Economic		-1.2		-1.2
Quantity		+330.8		330.8
Schedule		+176.0		176.0
Engineering				
Estimating	-0.1	-407.8		-407.9
Other				
Support				
Subtotal	-0.1	97.8	0.0	97.7
Total Changes	+186.0	+2717.1	0.0	+2903.1
Current Estimate	266.8	3110.1	0.0	3376.9

(FY 72 Constant Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	76.6	334.3	0.0	410.9
Previous Changes:				
Quantity	+6.6	+78.1		+84.7
Schedule	+13.7	+165.2		+178.9
Engineering	+65.5	+18.8		+84.3
Estimating	+5.1	+293.9		+299.0
Other	+6.0			+6.0
Support	+1.9	+23.6		+25.5
Subtotal	+98.8	+579.6	0.0	+678.4
Current Changes:				
Quantity		+81.7		+81.7
Schedule		+42.5		+42.5
Engineering				
Estimating	-1.1	-111.2		-112.3
Other				
Support				
Subtotal	-1.1	13.0	0.0	11.9
Total Changes	+97.7	+592.6	0.0	+690.3
Current Estimate	174.3	926.9	0.0	1101.2

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

b. (U) Previous change Explanations --

RDT&E

Economic:	Revised escalation indices.
Quantity:	Additional 9 Missiles.
Schedule:	Revision to the POST program resulting in stretchout.
Engineering:	Development of STINGER-RMP to counter future threat; addition and deletion of PMS; Safeguard Interlock System.
Estimating:	Transfer of PEP effort from procurement; increased test costs; revision of PMS estimate; misc. cuts, i.e. Gramm-Rudman, etc.
Other:	Technical problems and 6 week strike.
Support:	Increased flight tests and computer simulation.

Procurement

Economic:	Revised escalation indices.
Quantity:	Additional 8080 missiles for Sgt York and 444 additional peace-time losses due to stretchout of program; reduction of 4505 IFF Interrogators from requirements. Additional Army of Excellence quantities and deletion of Sgt York missiles.
Schedule:	Reduction of missiles in early years and rescheduling procurement in subsequent years as a result of budget cuts. Schedule stretch of 6 months. Shift of 530 missiles to outyear. Moved 270 missiles to FY 91. Moved 1750 missiles from FY93 to FY89. Moved 639 missiles from FY87 to FY93.
Engineering:	Additional manufacturing and assembly cost for producing POST Seekers.
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. Estimating changes due to misc. cuts, i.e. Gramm-Rudman, etc., and MYP/2nd Source Savings.
Support	Increased flight tests and computer simulation.

c. (U) Current change Explanations --

(1) (U) RDT&E

	(Dollars in Millions) Base-Year	Then-Year
Change in base year indices and revision of estimate (estimating)	-1.1	-0.1

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

(2) (U) Procurement

(Dollars in Millions)

	Base-Year	Then-Year
Revised Dec 88 economic escalation rate (Economic)	N/A	-1.2
Increase in Army procurement objective	+124.2	+508.4
• Addition of 12,424 missiles (Quantity)	(+81.7)	(+330.8)
• Program completion stretch from FY93 to FY95 (Schedule)	(+42.5)	(+176.0)
Change in Unit price	-104.2	-379.5
• Multiyear Contract savings (Estimating)	(-46.0)	(-154.4)
• Competition savings (Estimating)	(-40.1)	(-154.4)
• Error in unit price (Estimating)	(-11.2)	(-43.9)
• Change in BCU requirement (Estimating)	(-6.9)	(-26.8)
Reduction in In-House Test requirement (Estimating)	-7.0	-28.3

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

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

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
.020	.007	-.003	.016	.003	.009	.000	.001	.033	.053

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

a. (U) RDT&E -- None

b. (U) Production

RMP

General Dynamics Corp., Pomona, CA
DAAH01-85-C-A073, FFP/FPI
Award: Aug 85
Definitized: Feb 86

Initial Contract Price		
Target	Ceiling	Qty
$231.6	$255.3	3218

Current Contract Price		
Target	Ceiling	Qty
$230.6	$257.7	3218

Estimated Price at Completion	
Contractor	Program Manager
$238.6	$241.3

	Cost Variances	Schedule Variances
Previous Cumulative Variances	$ -24.1	$ -11.7
Cumulative Variances To Date (Oct 88)	$ -17.1	$ -4.7
Net Change:	$ +7.0	$ +7.0

Explanation of Change: This contract is essentially complete as of December 1988, no further CPR data will be submitted.

General Dynamics Corp, Rancho Cucamonga, CA
DAAH01-86-C-0838 FPI
Award: Sep 86
Definitized Sep 86

Initial Contract Price		
Target	Ceiling	Qty
$231.9	$263.1	4643

Current Contract Price		
Target	Ceiling	Qty
$235.9	$267.3	4643

Estimated Price at Completion	
Contractor	Program Manager
$231.2	$227.6

	Cost Variance	Schedule Variance
Previous Cumulative Variance	$ +5.2	$ -31.6
Cum Variances to date (Nov 88)	$ +5.5	$ -33.8
Net Change:	$ + .3	$ - 2.2

Explanation of Change: The contractor's internal schedule has a setback of 12 weeks. Overall, the contract is approximately three weeks behind schedule. No impact to program deliveries is anticipated at this time.

15. (U) Contract Information: (Continued)

RMP	Initial Contract Price Target	Ceiling	Qty
General Dynamics Corp., Pomona, CA			
Fiscal Year 1987 Multiyear Portion	$128.5	$128.5	5258
Fiscal Year 1988 Multiyear Portion	$243.8	$243.8	2750

DAAH01-87-C-0607, FFP/CPAF
Award: Letter 26 Aug 87 (fixed) $120.0M
Award Fee $8.5M
Definitized: 15 Mar 88
FY 88 Portion Awarded: 15 Apr 88

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$226.2	$226.2	5258	$226.2	$226.2
$292.0	$292.0	7013	$292.0	$292.0

Note: Cost Performance Report (CPR) data is not required on Firm Fixed Price (FFP) contracts.

16. (U) Program Funding Summary: (Current estimated $ in Millions)

a. (U) Program Status --

(1) (U) Percent BASIC STINGER/POST program completed: 100% (1971/1984)

(U) Percent STINGER-RMP program completed: 53.8% (7 years/13 years) (1983/1995) (Year Funds Appropriated/Total Program Years)

(2) (U) Percent BASIC STINGER/POST program cost appropriated: 100% ($932.3/$932.3)

(U) Percent STINGER-RMP program cost appropriated: 43.5% ($1065.8/2444.6) (Funds Appropriated to Date in Millions/Total Program Funding in Millions)

b. (U) Appropriation Summary --

Appropriation	Current & Prior Yrs (FY71-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-95)	Total
RDT&E	266.8	0.0	0.0	0.0	266.8
Procurement	1731.3	187.5	280.1	911.2	3110.1
MILCON	0.0	0.0	0.0	0.0	0.0
Total	1998.1	187.5	280.1	911.2	3376.9

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

c. (U) Annual Summary --

FISCAL YEAR	QTY	FY 72 BASE-YEAR DOLLAR			THEN-YEAR DOLLARS			ESCL RATE %
		FLYAWAY		TOTAL	Program	Obli-gated	Ex-pended	
		NONREC	REC					
APPROPRIATION: RDT&E								
1971	0			4.6	4.5	4.5	4.5	4.4
1972	179			7.2	7.5	7.5	7.5	2.6
1973	0			18.0	19.8	19.8	19.8	7.4
1974	0			21.4	25.4	25.4	25.4	9.4
1975	0			24.9	32.1	32.1	32.1	11.2
1976	0			16.5	22.4	22.4	22.4	8.7
197T	0			1.2	1.7	1.7	1.7	1.9
1977	26			18.3	26.7	26.7	25.3	8.0
1978	0			7.6	11.9	11.9	11.7	8.6
1979	0			14.3	24.6	24.6	24.4	8.5
1980	0			9.9	18.7	18.7	18.6	9.4
1981	0			2.7	5.6	5.6	5.6	11.9
1982	0			7.5	16.6	16.6	16.4	7.6
1983	0			8.7	20.0	20.0	17.9	4.9
1984	0			0.0	0.0	0.0	0.0	3.8
1985	0			2.0	5.0	5.0	3.8	3.4
1986	3			6.9	17.5	17.5	15.6	2.8
1987	6			1.5	3.8	2.8	0.0	2.7
1988	0			1.1	3.0	2.4	0.0	3.1
SUBTOT	214			174.3	266.8	265.2	252.7	
APPROPRIATION: PROCUREMENT								
1978	258		18.9	20.5	36.9	36.9	36.2	6.8
1979	1651		33.4	50.0	100.8	100.8	100.5	8.7
1980	1482		27.7	35.7	80.9	80.2	79.2	9.7
1981	1144		20.4	27.6	70.3	66.3	65.3	11.9
1982	2544		42.6	59.5	166.8	163.3	162.6	14.3
1983	1006		34.6	41.4	122.7	122.2	120.4	9.0
1984	1205		42.5	42.7	131.6	120.3	119.4	8.0
1985	2360		59.7	62.4	198.9	195.5	169.0	3.4
1986	2909		53.5	64.4	212.2	207.8	131.2	2.8
1987*	3541		54.2	58.4	199.2	194.2	27.9	2.7
1988	3942		46.9	48.0	169.7	156.5	4.3	3.1
1989	6750		61.5	66.2	241.3	0.0	0.0	4.0
1990	4754		45.8	50.1	187.5	0.0	0.0	3.6
1991	7203		68.9	73.1	280.1	0.0	0.0	3.3
1992	7464		70.2	72.6	283.8	0.0	0.0	2.8
1993	5960		48.9	49.2	196.1	0.0	0.0	2.3
1994	2460		27.3	27.3	110.5	0.0	0.0	1.8
1995	6431		77.7	77.7	320.8	0.0	0.0	1.8
SUBTOT	63064		834.8	926.9	3110.1	1444.0	1016.0	
TOTAL	63278		834.8	1101.2	3376.9	1709.2	1268.7	

*FY87 Procurement does not include 41.2M funding reported in the LOS-R SAR.

17. (U) Production Rate Data:

a. (U) Annualized Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1976/Prior	550			
1977	3050			
1978	3850	258	258	258
1979	4800	2250	1651	1651
1980	4800	2400	1482	1482
1981	4800	2658	1144	1144
1982	1130	4650	2544	2544
1983		4000	1006	1006
1984		4000	1205	1205
1985		5750	2360	2360
1986		4487	2909	2909
1987			3541	3541
1988			3942	4200
1989			6750	6750
1990			4754	9075
1991			7203	9600
1992			7464	9600
1993			5960	5739
1994			2460	
1995			6431	

Estimates display Fiscal Year procurements. The Annual production rates differ from authorized quantities because funded delivery periods overlap in Fiscal Years. Maximum Economic quantities consider all customer 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 $)	N/A	N/A	1,101.2	+71.2	1,030.0
(TY $)	N/A	N/A	3,376.9	+347.1	3,029.8
PAUC (BY $)	N/A	N/A	0.017	0.001	0.016
(TY $)	N/A	N/A	0.053	0.005	0.048

17. (U) Production Rate Data: (Continued)

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	Jun-72	0	Jun-72
Duration (in Months)	N/A	N/A	296	+29	267
End Date (Mo/Yr)	N/A	N/A	Feb-97	+29	Sep-94

*Not applicable due to combination of Basic/POST and RMP Programs.

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

	TO DATE
RDT&E	214/214
Procurement	12017/9290

e (U) Approved Design to Cost Goal -- No DTC goal was established with Secretary of Defense in DCP 114 dated 5 Jan 78.

18. (U) Operating and Support Costs:

a. Assumptions and Ground Rules -- Not required

b. Costs -- Not required

c. Contractor Support Costs --

(Then-Year Dollars in Millions)

	1 FY1989 & Prior	FY1990 Year	FY1991 Year	Balance to Complete	Total
O&M (Army)	6.4	4.4	4.9	0.0	15.7
Industrial Fund	0.0	0.0	0.0	0.0	0.0
Total	6.4	4.4	4.9	0.0	15.7

1. Represents cost for FY88 and FY89.

SAR-88-017

CONFIDENTIAL

CONFIDENTIAL AN/SQQ-89 31 DECEMBER 1988

A AN/SQQ-89

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)
PROGRAM: AN/SQQ-89 Surface Ship ASW Combat System (U)

AS OF DATE: December 31, 1988

INDEX (U)

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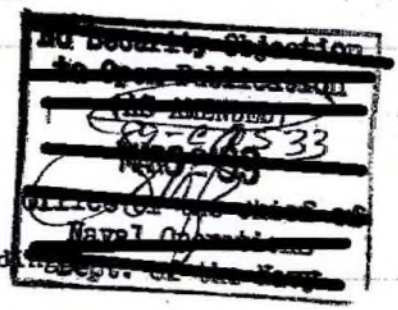
1. (U) Designation and Nomenclature (Popular Name).
AN/SQQ-89(V) Surface Ship ASW Combat System Program

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 88
COMM (202) 692-8018
AUTOVON: 222-8018



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 fund
0604575N/ S1451 (AN/SQS-53C)

PROCUREMENT: SCN 0204292N/ 8219, 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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4. (U) Program Elements/Procurement Line Items (continued)

Basic AN/SQQ-89 (continued)

O&M,N: 78017N/ 21105020, 21104510 P4K3, RU7C: (Shared funding.)
78012N/ 21114034, 21116010 Q7UM, RFXN: (Shared funding.)

Improved AN/SQQ-89

RDT&E,N: 0604713N/ S1916 (AN/SQQ-89I)
0603553N/ S1704 (AN/SQQ-89I): (FY87-89)
(Shared funding.)

PROCUREMENT: SCN 0204292N/ 8219, 8224: (Shared funding.)
OPN 0204225N/ 33213600, 82DB

5. (U) Related Programs. LAMPS MK III

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7. (U) Program Highlights

a. (U) 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 are procured and the AN/SQQ-89 subsystems lose their separate identities. Basic AN/SQQ-89 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

Operational testing of the integrated Basic AN/SQQ-89 was completed in 1983.

The AN/SQS-53C update to the Basic AN/SQQ-89 was installed in DD 978, and technical evaluation was conducted at sea from February 1987 to May 1987 and October 1987. OPEVAL began in January 1988 and is scheduled to be complete in January 1989.

Contracts for the design definition of the 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.

b. (U) Significant Developments Since Last Report. A lower program risk and significant savings will result from immediate modification of the AN/SQQ-89 system to accept the Acoustic Video Processor (AVP), and from procurement of the AVP in fiscal year 1990 according to the Navy's original schedule. To achieve these savings and lowered risk, and to maintain the integrity of the AN/SQQ-89 schedule, the conferees have provided additional funding to permit the Navy to initiate immediately the required modification to the AN/SQQ-89 system.

The AN/SQQ-89 FY 88 production contract N00024-88-C-6219 was awarded to General Electric in July 1988, with an estimated completion date of December 1991.

Four contracts that were reported on the previous December 31, 1987 SAR are not addressed in this SAR because each is over 90% complete and all systems have been delivered.

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7. (U) Program Highlights (continued)

The contracts that are no longer reported are:

N00024-83-C-6292, Production, CPAF, for the AN/SQR-19 Subsystem
N00024-82-C-6208, Development, CPAF, for the AN/SQS-53C Subsystem
N00024-83-C-6316, Production, FFP/FPI, for the AN/SQS-53B Subsystem
N00024-84-C-6232, Production, FFP/FPI, for the AN/SQS-53B Subsystem

The Basic and Improved AN/SQQ-89 are expected to satisfy all mission requirements.

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

(b)(1)

9. (U) Schedule (continued)

a. (U) Milestones (continued)

(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	Mar 89(CH-1)
(U) MK 116 Subsystem		
Approval for Production	Dec 82/Dec 82	Dec 82

(b)(1)

b. (U) Previous Change Explanations

AN/SQS-53C DNSARC ~~(NPDM)~~ IIIC occurred in November 1987, but the official decision memorandum was pending as of the December 1987 SAR submission. The official decision memorandum was issued in March of 1988.

The Improved AN/SQQ-89 program was restructured to 1) address the restrictive language in the Joint Conference Report on the FY87 Appropriations Bill; 2) account for the deferment of all FY87 funds; and 3) conform to the FY88/89 Presidential Budget.

c. (U) Current Change Explanations

(CH-1) AN/SQS-53C OPEVAL will be completed in January 1989 instead of May 1988 due to emergent fleet requirements for the OPEVAL ship and to verify that changes in the production baseline did not affect the system's performance. The AFP decision is currently scheduled for March 1989.

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9. (U) Schedule (continued)

(CH-2) The Improved AN/SQQ-89 program milestones have been restructured to reflect the changes due to the 88/89/90/91 budget reductions (POM 90).

(CH-3) MS III (FFG) Block 2 has been combined with MS III (FFG) Block 1.

(CH-4) The Milestone III (FFG) Decision for either Block 1 or 2 to enter production is scheduled to occur in FY94. The Milestone III (BGE) Decision for Block 3 Approval for Limited Production (ALP) is scheduled to occur in FY95 and Approval for Full Production (AFP) is scheduled to occur in FY96. The Milestone III Decision for Block 1 (BGE) is scheduled for FY96.

(CH-5) The Milestone II Decision for Block 1 or 2 to enter FSED is scheduled to be completed in FY90. The Decision for Block 1 and to begin Block 3 FSED for only Critical Design Review for the Battle Group Escort (BGE) Class ships is also scheduled at this time.

(CH-6) IOC (for BGE), ALP, and AFP have been assigned independent milestone dates for the current estimate.

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-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 February 1988.

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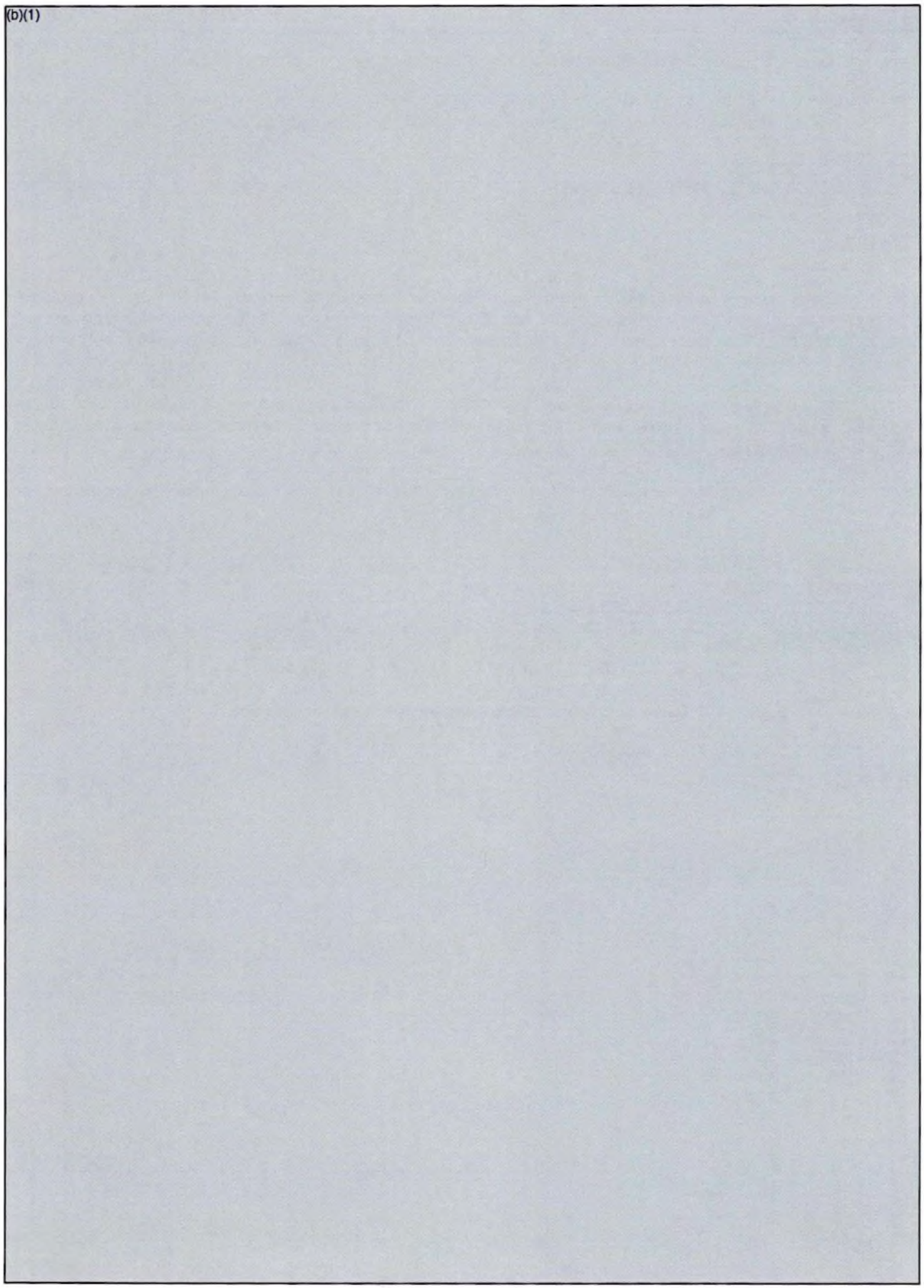

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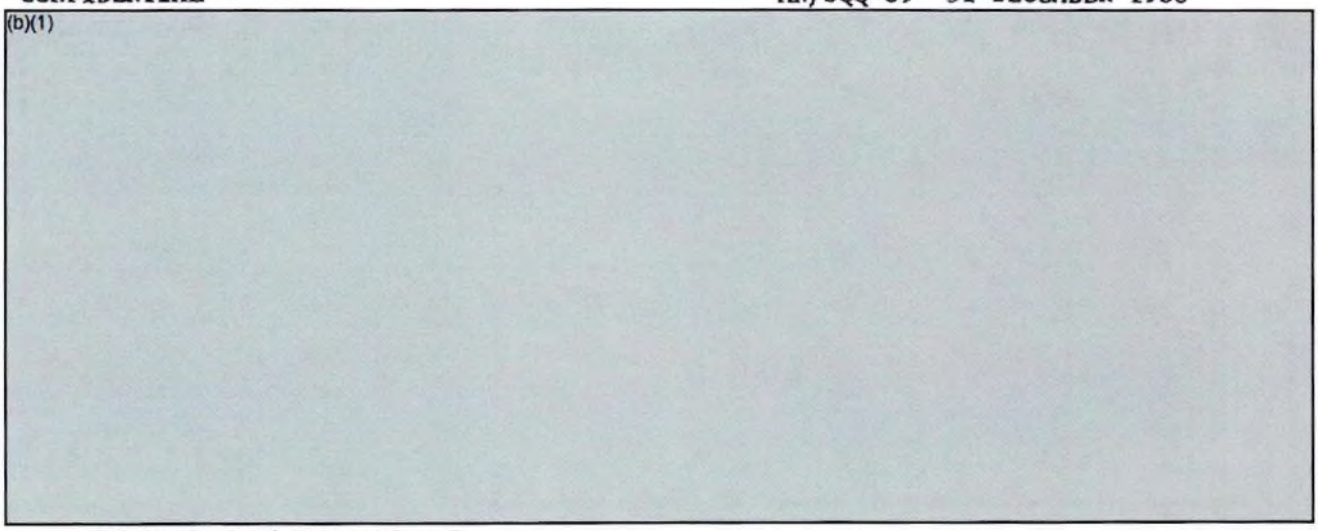

(U) Technical/Operational

Processing Capability/Sonobuoy	
LOFAR (AN/SSQ-41)	The AN/SQQ-28 is required to process the sonobuoys identified, and has demonstrated this capability.
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)	

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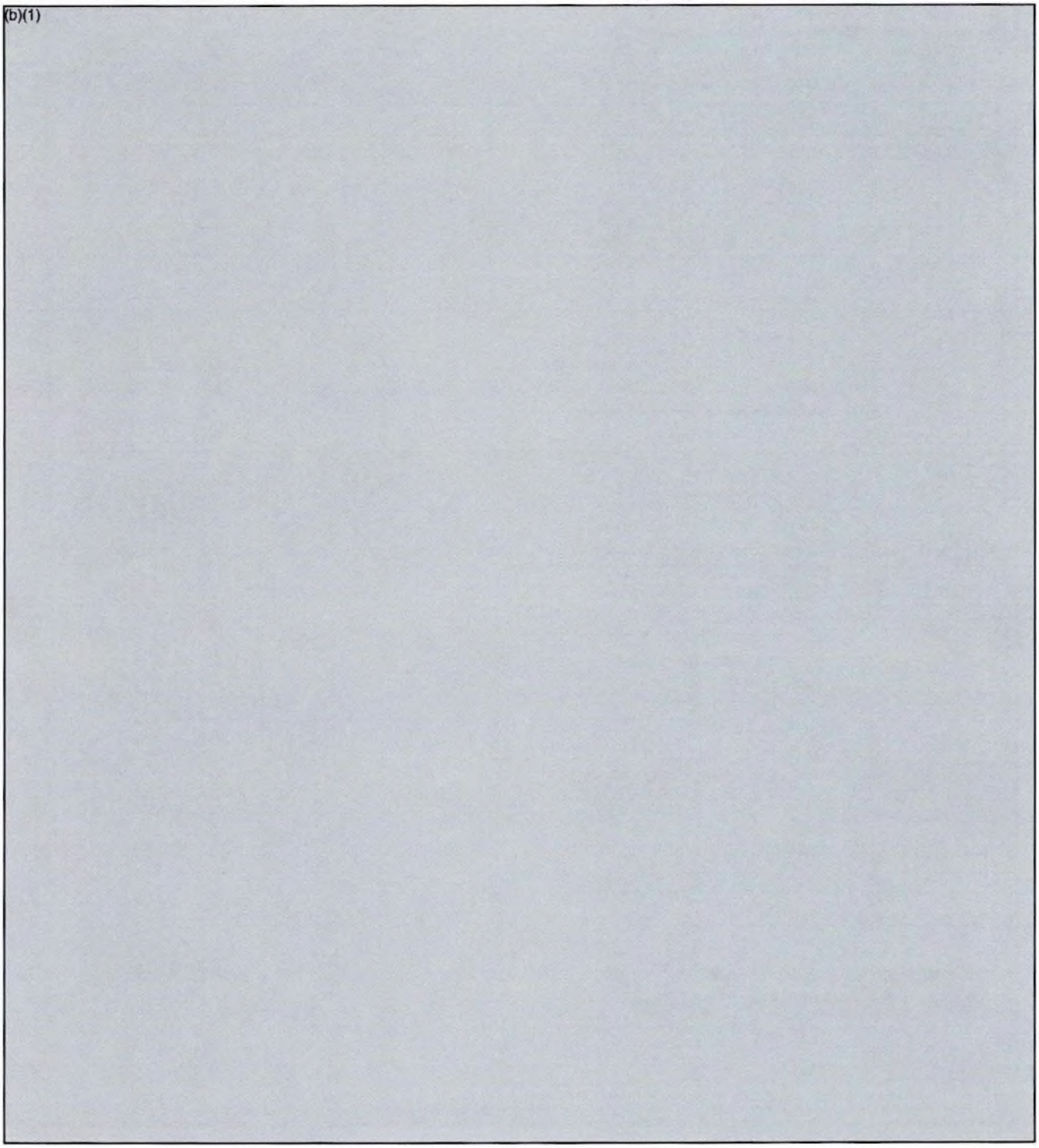

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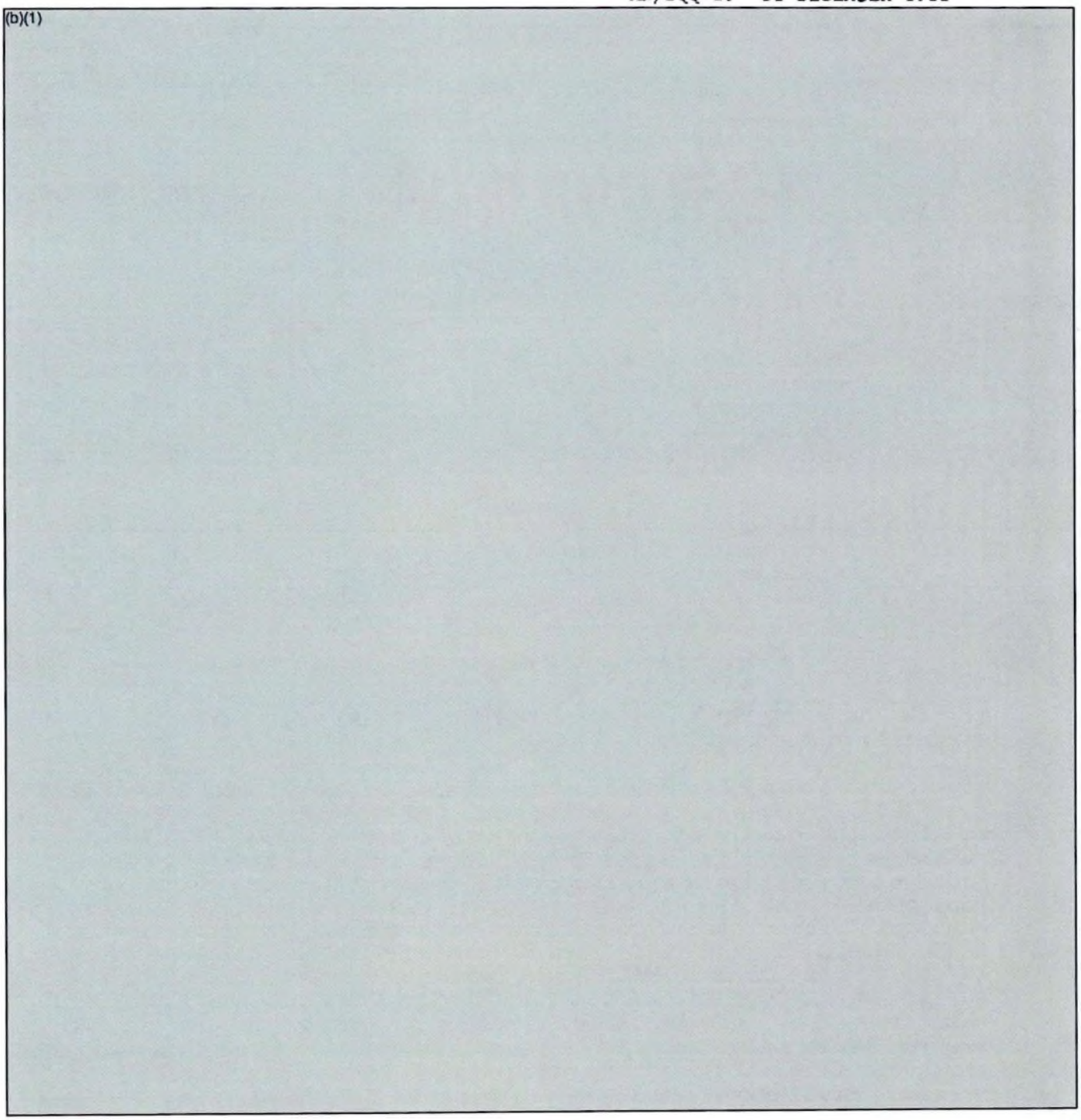

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11. (U) Program Acquisition Cost. (Current Estimate in Millions of Then-Year Dollars)

I. Basic AN/SQQ-89

a. Costs	Production Estimate	Approved Program Estimate	Current Estimate
Development (RDT&E,N)	754.2	901.6	901.6
Procurement	2961.0	2810.1	2810.1
Major System Equipment	(1986.5)	(1664.5)	(1664.5)
System Support	(207.9)	(323.1)	(323.1)
Sailaway Total	2194.4	1987.6	1987.6
Other Wpn Sys Cost	548.3	574.2	574.2
Initial Spares	218.3	248.3	248.3
O&M,N (Fleet Mod. Prog.) (4)	183.8	160.6	160.6
TOTAL FY85 BASE-YEAR $	3899.0	3872.3	3872.3
Escalation			
Total Escalation	248.6	412.0	412.0
Development (RDT&E,N)	(-66.4)	(-99.6)	(-99.6)
Procurement	(291.9)	(487.0)	(487.0)
O&M,N (FMP)	(23.1)	(24.6)	(24.6)
Total Then-Year $	4147.6	4284.3	4284.3
b. Quantities (5)			
Development (RDT&E,N)	0	0	0
Procurement	120	114	114
TOTAL	120	114	114

(4) (U) Only AN/SRQ-4 and AN/SQQ-28 O&MN (FMP) cost estimates are currently addressed.

(5) (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 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)

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: The AN/SQQ-89 Basic program has been reporting a Production Estimate since 31 December 1986.

Approved Program: FY1990/91 President's Budget.

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	766.6
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	766.6
Escalation			
Total Escalation	187.9	210.5	210.5
Development (RDT&E,N)	187.9	210.5	210.5
Procurement	0	0	0
O&M,N (FMP)	0	0	0
Total Then-Year $	952.7	977.1	977.1
(5)			
b. Quantities			
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: The AN/SQQ-89 Improved Program MS II was scheduled for FY89. Currently, MS II is scheduled for January 1990.

Approved Program: FY1990/91 President's Budget.

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

I. Basic AN/SQQ-89

	Current Year(FY88)		Budget Year(FY89)
	Dec 1988 SAR Current Estimate	Dec 1987 SAR UCR Baseline(6) Estimate	Dec 1988 SAR UCR Baseline Estimate
a. Program Acquisition:			
(1) Cost	4284.3	3965.3	4284.3
(2) Quantity	114	120	114 (7)
(3) Unit Cost	37.6	33.0	37.6

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.

(6) (U) Current year UCR Baseline Estimate represents December 1987 SAR.

(7) (U) Change in quantity reflects changes in the number of systems attributed to OPN or SCN appropriation at the time it is finally upgraded to the final Basic AN/SQQ-89 configuration each ship is scheduled to receive.

13. (U) Cost Variance Analysis.

a. Summary. Total AN/SQQ-89 Program (8)

Current (Then-Year) Dollars in Millions

	RDT&E,N	PROCUREMENT	O&MN	TOTAL
Production/Planning Estimate	1640.5	3252.9	206.9	5100.3
Previous Changes:				
Economic	31.3	66.4	3.7	101.4
Quantity	.0	-421.6		-421.6
Schedule	4.5	158.3		162.8
Engineering	6.6	251.0		257.6
Estimating	54.4	-332.2	9.3	-268.5
Other				
Support	.0	-8.6		-8.6
Subtotal	96.8	-286.7	13.0	-176.9
Current Changes:				
Economic	-7.0	-10.7	-.5	-18.2
Quantity		-153.2		-153.2
Schedule		171.6		171.6
Engineering	+.1			+.1
Estimating	48.7	323.2	-34.2	337.7
Other				.0
Support				.0
Subtotal	41.8	330.9	-34.7	338.0
Total Changes	138.6	44.2	-21.7	161.1
Current Estimate	1779.1	3297.1	185.2	5261.4

FY 1985 Constant (Base-Year) Dollars in Millions

	RDT&E,N	PROCUREMENT	O&MN	TOTAL
Production/Planning Estimate	1519.0	2961.0	183.8	4663.8
Previous Changes:				
Quantity	.0	-386.8		-386.8
Schedule	4.7	.9		5.6
Engineering	9.0	211.4		220.4
Estimating	101.0	-208.0	3.6	-103.4
Other				.0
Support	.0	-14.3		-14.3
Subtotal	114.7	-396.8	3.6	-278.5
Current Changes:				
Quantity		-116.7		-116.7
Schedule		121.3		121.3
Engineering				.0
Estimating	34.5	241.3	-26.8	249.0
Other				.0
Support				.0
Subtotal	34.5	245.9	-26.8	253.6
Total Changes	149.2	-150.9	-23.2	-24.9
Current Estimate	1668.2	2810.1	160.6	4638.9

(8)(U) 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. (U) Cost Variance Analysis (continued)

a. Summary. Basic AN/SQQ-89

Current (Then-Year) Dollars in Millions

	RDT&E,N	PROCUREMENT	O&MN	TOTAL
Production Estimate	687.8	3252.9	206.9	4147.6
Previous Changes:				
Economic	8.9	66.4	3.7	79.0
Quantity		-421.6		-421.6
Schedule	4.5	158.3		162.8
Engineering	6.7	251.0		257.7
Estimating	71.4	-332.2	9.3	-251.5
Other				.0
Support		-8.6		-8.6
Subtotal	91.5	-286.7	13.0	-182.2
Current Changes:				
Economic	.1	-10.7	-.5	-11.1
Quantity		-153.2		-153.2
Schedule		171.6		171.6
Engineering				.0
Estimating	22.6	323.2	-34.2	311.6
Other				.0
Support				.0
Subtotal	22.7	330.9	-34.7	318.9
Total Changes	114.2	44.2	-21.7	136.7
Current Estimate	802.0	3297.1	185.2	4284.3

FY 1985 Constant (Base-Year) Dollars in Millions

	RDT&E,N	PROCUREMENT	O&MN	TOTAL
Production Estimate	754.2	2961.0	183.8	3899.0
Previous Changes:				
Quantity		-386.8		-386.8
Schedule	4.7	.9		5.6
Engineering	9.0	211.4		220.4
Estimating	117.0	-208.0	3.6	-87.4
Other				.0
Support		-14.3		-14.3
Subtotal	130.7	-396.8	3.6	-262.5
Current Changes:				
Quantity		-116.7		-116.7
Schedule		121.3		121.3
Engineering				.0
Estimating	16.7	241.3	-26.8	231.2
Other				.0
Support				.0
Subtotal	16.7	245.9	-26.8	235.8
Total Changes	147.4	-150.9	-23.2	-26.7
Current Estimate	901.6	2810.1	160.6	3872.3

13.(U) Cost Variance Analysis (continued)

(9)

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 and hardware development costs.

Procurement

Economic: Revised escalation indices.

Quantity: Decreased ship market.

Schedule: Program restructured due to funding constraints.

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 and hardware development costs.

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.

(8) (U) 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

(9)(U) 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.

3.(U) **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: (1) address the restrictive language in the Joint Conference Report on the FY87 Appropriations Bill; (2) account for the deferment of all FY87 funds; (3) conform to the FY88/89 Presidential Budget.

13.(U) Cost Variance Analysis (continued)

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).		.1
Increased program costs due to changes in ASWCSI external interface requirements (Estimating).	16.7	22.6
PROCUREMENT		
Revised escalation indices for the AN/SQQ-89(V) Basic (Economic).		-10.7
A decrease from 120 to 114 OPN systems being procured (Quantity)	-116.7	-153.2
Change due to revisions in fleet overhaul schedule which resulted in different ships receiving incremental upgrades thus changing specific upgrades to be provided. (Estimating)	241.3	323.2
Change due to revised production schedule (Schedule).		8.3
Refinement of estimate to include one additional year of incremental upgrades for those ships not yet at their final Basic AN/SQQ-89 configuration. This reflects one year of delay in the AN/SQQ-89I introduction caused by deferment of AN/SQQ-89I funds (Schedule).	121.3	163.3
O&MN		
Revised escalation indices for the AN/SQQ-89(V) Basic (Economic).		-.5
Refinement of estimate for shipboard portion of LAMPS MK III (AN/SRQ-4 and AN/SQQ-28) program (Estimating).	-26.8	-34.2

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

AN/SQQ-89 Improved Program

RDT&E

Revised escalation indices for the AN/SQQ-89(V) Basic (Economic).		-7.1
Refinement of estimate to reflect restructured program caused by deferment of funds in FY88 thru FY91 (Estimating).	17.8	26.1

13. (U) Cost Variance Analysis (continued)

d. Summary. Improved AN/SQQ-89

Current (Then-Year) Dollars in Millions

	RDT&E,N	PROCUREMENT	O&M,N	TOTAL
Planning Estimate	952.7	TBD	TBD	952.7
Previous Changes:				
Economic	22.4			22.4
Quantity				0
Schedule				0
Engineering				0
Estimating	-17.0			-17.0
Other				0
Support				0
Subtotal	5.4	0	0	5.4
Current Changes:				
Economic	-7.1			-7.1
Quantity				0
Schedule				0
Engineering				0
Estimating	26.1			26.1
Other				0
Support				0
Subtotal	19.0	0	0	19.0
Total Changes	24.4	0	0	24.4
Current Estimate	977.1	TBD	TBD	977.1

FY 1985 Constant (Base-Year) Dollars in Millions

	RDT&E,N	PROCUREMENT	O&MN	TOTAL
Planning Estimate	764.8	TBD	TBD	764.8
Previous Changes:				
Quantity				.0
Schedule				.0
Engineering				.0
Estimating	-16.0			-16.0
Other				.0
Support				.0
Subtotal	-16.0	0	0	-16.0
Current Changes:				
Quantity				.0
Schedule				.0
Engineering				.0
Estimating	17.8			17.8
Other				.0
Support				.0
Subtotal	17.8	0	0	17.8
Total Changes	1.8	0	0	1.8
Current Estimate	766.6	TBD	TBD	766.6

13.(U) Cost Variance Analysis (continued)

14. (U) 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	
33.0	.596	-1.7	2.933	2.261	.527	.0	-.075	4.5	37.6

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								.0	TBD

15.(U) 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		
Target	Ceiling	Qty
$ 73.8	$ 76.5	2

Estimated Price at Completion	
Contractor	Program Manager
$64.7	$70.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-2.2	$-1.0
Cum Variances To Date (12/88)	$-3.7	$-2.1
Net Change	$-1.5	$-1.1

Explanation of Change: The MK 116 Mod 7 contract was modified in August 1988 to reflect current program status, past government furnished software and equipment deficiencies, new technical requirements, and conversion of the contract type from CPAF to CPIF with a firm ceiling price.

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

b. AN/SQR-19 Subsystem Procurement
Gould Inc., Glen Burnie, MD

N00024-83-C-6294/FPIF
Awarded: June 1983
Definitized: August 1984

Initial Contract Price		
Target	Ceiling	Qty
$102.5	$113.2	26 Arrays

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$180.2	$194.3	67 Arrays 39 H&SGs	$152.0	$157.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+0.8	$-0.3
Cum Variances To Date (12/88)	$+2.9	$ -0.4
Net Change	$+2.1	$-0.1

Explanation of Change: Past program problems have been resolved. The contractor continues to experience positive cost variance due to increased efficiency in the production area. Martin Marietta (formerly Gould) has delivered by the contractual delivery date all thirty-nine (39) OK-410/SQR Handling and Stowage Group subsystems that have been procured. All systems delivered to the Navy have met the contractual requirements set forth in the contract. Also, sixty-seven (67) OA-9056 Towed Array Group subsystems (TAG) have been procured and sixty-five (65) delivered. All TAGs delivered to date have met the contractual requirements set forth. No delays in the delivery of the remaining systems are anticipated.

c. AN/SQS-53C Subsystem Procurement
General Electric Company, Syracuse, NY

N00024-85-C-6116/FPI
Awarded: April 1985
Definitized: June 1986

Initial Contract Price		
Target	Ceiling	Qty
$44.5	$47.4	1

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$127.4	$152.3	6	$143.0	$168.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-5.6	$-3.0
Cum Variances To Date (12/88)	$-16.2	$-6.0
Net Change	$-10.6	$-3.0

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

Explanation of Change: The contractor has experienced manufacturing and delivery problems. The DDG 51 system was delivered four months late with minimal impact to the government. Currently, the contractor's cost is over the Target Price and the Navy believes over the Ceiling Price. The Navy has committed funds to cover the ceiling price.

d. 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
$162.7	$178.9	48	$153.5	$148.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+1.7	$-1.4
Cum Variances To Date (12/88)	$+1.2	$-4.1
Net Change	$-0.5	$-5.5

Explanation of Change: GE is behind schedule for the manufacture of the Signal Data Processor Unit; however, they have presented a Plan of Action and Milestone schedule to meet Navy requirements to deliver the units in time.

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

e. AN/SQQ-89 On-Board Trainer Subsystem Procurement
Raytheon, SSD, RI

N00024-84-C-6132 FPI
Awarded: September 1985
Definitized: September 1985

Initial Contract Price		
Target	Ceiling	Qty
$82.0	$87.6	52

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$64.8	$69.6	52	$61.8	$64.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-2.6	$-1.1
Cum Variances To Date (12/88)	$-4.2	$-4.5
Net Change	$-1.6	$-3.4

Explanation of Change: The On-Board Trainer contract was signed in FY85, with options in FY85, 86, and 87. The cost and schedule variances were caused by computer software deficiencies. The contract is approximately three months behind the initial delivery schedule. At this time, the contractor is experiencing cost growth and is predicting to overrun the Target Price. PMS411 has allocated funds to cover the ceiling price.

f. AN/SQQ-89 Subsystem Procurement
General Electric, Syracuse, NY

N00024-88-C-6219/FFP
Awarded: July 1988
Definitized: July 1988

Initial Contract Price		
Target	Ceiling	Qty
$276.9	$ N/A	12 TAGs 12 OBTs 5 Forward fits 9 Backfits

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$276.9	$N/A	12 TAGs 12 OBTs 5 Forward fits 9 Backfits	$ N/A	$ N/A

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cum Variances To Date (12/88)	$ 0.0	$ 0.0
Net Change	$ 0.0	$ 0.0

Explanation of Change: This contract is Firm Fixed Price; GE is required to submit annual Contractor Cost Data Reports (CCDR). To date, partial reports have been submitted. The total contract price plus option year is estimated to be $603.5 million.

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

a. Basic AN/SQQ-89

1. Program Status

(1) Percent Program Completed: 71.4%
(15 yrs./21 yrs.)

(2) Percent Program Cost Appropriated: 55.0%
($2,356.0 / $4,284.2)

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	705.9	16.2	19.0	60.9	802.0
OPN	1565.3	218.8	278.4	1234.6	3297.1
O&M,N (FMP)	84.8	37.7	18.9	43.8	185.2
TOTAL	2356.0	272.7	316.3	1339.3	4284.3

b. Improved AN/SQQ-89

1. Program Status

(1) Percent Program Completed: N/A
(2 yrs./TBD)

(2) Percent Program Cost Appropriated: N/A
($60.2 / TBD)

2. Appropriation Summary (Then-Year Dollars)

Appropriation	Prior Years (FY87-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-COMPLETE)	Total
RDT&E,N	60.2	84.7	117.9	714.3	977.1
OPN	.0	.0	TBD	TBD	TBD
O&M,N (FMP)	.0	.0	.0	.0	.0
TOTAL	60.2	84.7	117.9	714.3	977.1

16.(U) 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	Obligated	Expended	
		Nonrec	Rec					
Appropriation: RDT&E,N								
1975		16.6		16.6	8.7	8.7	8.7	10.9%
1976		19.1		19.1	10.6	10.6	10.6	6.6%
197T		7.1		7.1	4.1	4.1	4.1	2.9%
1977		42.3		42.3	25.1	25.1	25.1	2.6%
1978		58.9		58.9	37.6	36.8	36.8	6.8%
1979		66.1		66.1	46.6	46.1	46.1	8.4%
1980		95.3		95.3	74.3	74.3	74.3	10.6%
1981		82.5		82.5	70.2	70.2	69.7	10.6%
1982		87.0		87.0	77.8	77.8	77.8	7.6%
1983		96.1		96.1	89.9	89.6	83.8	4.9%
1984		72.4		72.4	70.3	68.8	68.0	3.8%
1985		61.4		61.4	61.4	61.2	59.8	3.4%
1986		50.8		50.8	52.3	52.0	50.9	2.8%
1987		35.8		35.8	38.6	38.1	35.0	2.7%
1988		37.3		37.3	41.6	32.3	20.2	3.1%
1989		49.4		49.4	57.1	4.8	.2	4.0%
1990		84.4		84.4	100.9	.0	.0	3.6%
1991		111.2		111.2	136.9	.0	.0	3.3%
1992		130.8		130.8	165.0	.0	.0	2.8%
1993		137.0		137.0	176.4	.0	.0	2.3%
1994		151.1		151.1	198.1	.0	.0	1.8%
1995		131.6		131.6	175.6	.0	.0	1.8%
1996		36.8		36.8	50.0	.0	.0	1.8%
1997		7.2		7.2	10.0	.0	.0	1.8%
1998		.0		.0	.0	.0	.0	1.8%
1999		.0		.0	.0	.0	.0	1.8%
2000		.0		.0	.0	.0	.0	1.8%
Subtotal		1668.2	.0	1668.2	1779.1	700.5	671.1	

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	263.1	263.6	3.8%
1985		7.3	159.8	245.5	245.5	244.0	211.4	3.4%
1986		4.8	141.3	215.7	234.4	229.1	148.0	2.8%
1987		10.7	137.7	211.5	238.0	224.3	69.9	2.7%
1988		7.8	107.2	149.2	173.4	150.0	29.4	3.1%
1989		14.1	127.3	197.2	236.7	25.6	.0	4.0%
1990		15.5	97.0	177.1	218.8	0	.0	3.6%
1991		46.8	151.4	220.0	278.4	0	.0	3.3%
1992		37.7	126.2	245.3	316.9	0	.0	2.8%
1993		7.3	174.7	251.3	330.7	0	.0	2.3%
1994		5.9	140.5	247.1	331.0	0	.0	1.8%
1995		3.1	152.98	187.7	256.0	0	.0	
To Complete		TBD	TBD	TBD	TBD	TBD	TBD	
Subtotal	TBD	175.6	1812.0	2810.1	3297.1	1303.6	886.1	
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				30.5	33.0	33.0	33.0	2.7%
1988				10.9	12.2	.0	.0	3.1%
1989				5.5	6.4	.0	.0	4.0%
1990				31.4	37.7	.0	.0	3.6%
1991				15.3	18.9	.0	.0	3.3%
1992				12.1	15.3	.0	.0	2.8%
1993				21.6	27.9	.0	.0	2.3%
1994				.5	.6	.0	.0	1.8%
To Complete								
Subtotal		.0	.0	160.6	185.2	66.2	66.2	
Total	TBD	1843.9	1812.0	4638.9	5261.4	4182.8	1623.4	

16.(U) 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		16.6	8.7	8.7	8.7	10.9%
1976		19.1		19.1	10.6	10.6	10.6	6.6%
197T		7.1		7.1	4.1	4.1	4.1	2.9%
1977		42.3		42.3	25.1	25.1	25.1	2.6%
1978		58.9		58.9	37.6	36.8	36.8	6.8%
1979		66.1		66.1	46.6	46.1	46.1	8.4%
1980		95.3		95.3	74.3	74.3	74.3	10.6%
1981		82.5		82.5	70.2	70.2	69.7	10.6%
1982		87.0		87.0	77.8	77.8	77.8	7.6%
1983		96.1		96.1	89.9	89.6	83.8	4.9%
1984		72.4		72.4	70.3	68.8	68.0	3.8%
1985		61.4		61.4	61.4	61.2	59.8	3.4%
1986		50.8		50.8	52.3	52.0	50.9	2.8%
1987		35.8		35.8	38.6	38.1	35.0	2.7%
1988		19.3		19.3	21.5	21.1	12.0	3.1%
1989		14.7		14.7	17.0	3.6	.2	4.0%
1990		13.5		13.5	16.2	.0	.0	3.6%
1991		15.5		15.5	19.0	.0	.0	3.3%
1992		15.4		15.4	19.4	.0	.0	2.8%
1993		16.3		16.3	21.0	.0	.0	2.3%
1994		15.6		15.6	20.4	.0	.0	1.8%
1995		.0		.0	.0	.0	.0	1.8%
1996		.0		.0	.0	.0	.0	1.8%
1997		.0		.0	.0	.0	.0	1.8%
1998		.0		.0	.0	.0	.0	1.8%
Subtotal		901.6	.0	901.6	802.0	688.1	663.0	

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	Obligated	Expended	
		Nonrec	Rec					
Appropriation: OPN (10)								
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	263.1	263.6	3.8%
1985		7.3	159.8	245.5	245.5	244.0	211.4	3.4%
1986		4.8	141.3	215.7	234.4	229.1	148.0	2.8%
1987		10.7	137.7	211.5	238.0	224.3	69.9	2.7%
1988		7.8	107.2	149.2	173.4	150.0	29.4	3.1%
1989		14.1	127.3	197.2	236.7	25.6	0	4.0%
1990		15.5	97.0	177.1	218.8	0	0	3.6%
1991		46.8	151.4	220.0	278.4	0	0	3.3%
1992		37.7	126.2	245.3	316.9	0	0	2.8%
1993		7.3	174.7	251.3	330.7	0	0	2.3%
1994		5.9	140.5	247.1	331.0	0	0	1.8%
1995		3.1	153.0	187.7	256.0	0	0	1.8%
1996		.0	.0	.0	.0	0	0	1.8%
Subtotal	114	175.6	1812.0	2810.1	3297.1	1303.6	886.1	
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	33.1	33.1	2.7%
1988				10.9	12.2	.0	.0	3.1%
1989				5.5	6.4	.0	.0	4.0%
1990				31.4	37.7	.0	.0	3.6%
1991				15.3	18.9	.0	.0	3.3%
1992				12.1	15.3	.0	.0	2.8%
1993				21.6	27.9	.0	.0	2.3%
1994				.5	.6	.0	.0	1.8%
Subtotal		.0	.0	160.6	185.2	66.3	66.3	
Total	114	1077.2	1812.0	3872.3	4284.3	2032.8	952.4	

(10)(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

16.(U) 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	Obligated	Expended	
		Nonrec	Rec					
Appropriation: RDT&E,N								
1987		.0		.0	.0	.0	8.2	2.7%
1988		18.0		18.0	20.1	11.3	8.2	3.1%
1989		34.7		34.7	40.1	1.1	.0	4.0%
1990		70.9		70.9	84.7			3.6%
1991		95.8		95.8	117.9			3.3%
1992		115.4		115.4	145.6			2.8%
1993		120.7		120.7	155.4			2.3%
1994		135.5		135.5	177.7			1.8%
1995		131.6		131.6	175.6			1.8%
1996		36.8		36.8	50.0			1.8%
1997		7.2		7.2	10.0			1.8%
1998		.0		.0	.0			1.8%
1999		.0		.0	.0			1.8%
2000		.0		.0	.0			1.8%
Subtotal	0	766.6	.0	766.6	977.1	12.4	16.3	
Appropriation: OPN								
Subtotal	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Appropriation: O&M,N								
Subtotal		.0	.0	.0	.0	.0	.0	
Total	TBD	766.6	.0	766.6	977.1	977.1	16.3	

(10) (U) (continued)
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(11) and Final Configuration(12))

	PARTIAL PLANNED/DELIVERED	FINAL PLANNED/DELIVERED
RDT&E,N	0/0	0/0
OPN	14/14	3/3

c. Approved Design to Cost

AN/SQQ-89 Basic: Not available.

AN/SQQ-89 Improved: None.

(11) 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.

(12) 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 98 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	1.16	N/A
MPN	.69	N/A
OPN	.26	N/A
Total	2.11	N/A

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

Appropriation	Prior Years	Year (FY90)	Year (FY91)	To Complete (FY92-COMPLETE)	Total
O&M,N (13)	19.1	13.4	14.0	TBD	46.6
NIF	N/A	N/A	N/A	N/A	N/A
					.0
TOTAL	19.1	13.4	14.0	.0	46.6

(13) 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.

~~SECRET RESTRICTED DATA~~

~~SECRET~~

43 TOMAHAWK

SAR-88-048

AS AMENDED

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FOR OPEN PUBLICATION

MAR 02 1989

11

DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: TOMAHAWK SEA LAUNCHED CRUISE MISSILE, R/UGM-109 (U)

AS OF DATE: December 31, 1988

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No Security Objection to Open Publication (AS AMENDED) MAR 02 '89 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 - 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.

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~~SECRET~~

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 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 1,000 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) Following successful completion of TECHEVAL in the Spring of CY 1988, the R/UGM-109D TOMAHAWK successfully completed OPEVAL in the Summer of CY 1988, leading to approval for limited production. The four-flight OPEVAL demonstrated launch from the Iowa class (BB-61) development and TECHEVAL tests had previously launched from Los Angeles class submarines and the Virginia class (CGN-38) and Ticonderoga class (CG-47) cruisers.

(2) (U) The first operational night TOMAHAWK Land Attack Missile/conventional (TLAM/C) was vertically launched from a Ticonderoga class (CG-47) guided missile cruiser off the coast of California. The missile firing was specifically timed to meet the FAA requirement that the missile exit the FAA IR-200 route just before sunset. The missile continued its night flight into the Naval Weapons Center, China Lake, CA range area and successfully completed four night Digital Scene Matching Area Correlator (DSMAC) updates. After the final DSMAC update the missile simulated a programmed Warhead Detonation (PWD) over the target and continued to recovery.

In addition, 21 flight tests were conducted as part of the Operational Test Launch (OTL) Program. The following events occurred in conjunction with the OTL program:

The first open ocean and Mobile Sea Range TASM launches demonstrated a new test capability to further enhance operational realism in the test environment.

FAA approval for the Fallon, NV and Northern Maine test routes were received in April and August 1988, respectively, further expanding the spectrum of environmental test conditions and providing a west coast capability for conducting TACAIR/TOMAHAWK integrated strike training.

The first dual TASM salvo launch was successfully conducted from a CG-47 class guided missile cruiser in April 1988 demonstrating the formidable firepower capability of the Mk 37 TOMAHAWK Weapon System (TWS) and Mk-41 VLS.

Developmental flight testing of the 402 engine upgrade commenced with a successful ground launch demonstrating engine performance and engine/airframe compatibility.

The Mk 37 TWS and TWCS BLK I FOT&E efforts completed allowing fleet introduction of this significant system upgrade.

Two TOMAHAWK OTLs were conducted during CY88 in support of SSN 688 Class VLS TECHEVAL. On 7 July 1988, a vertically launched TASM was successfully fired from the USS Providence (SSN 719), followed by a vertically launched TLAM/C on 6 August 1988.

(3) (U) The Afloat Planning System (APS) completed a Logistics Review Group (LRG) Audit and Acquisition Review Board in June 1988. APS proceeded to a Navy Program Decision Memorandum (NPDM) and received MILESTONE II approval on 26 July 1988. With MS II approval, contract options were exercised to begin the FSED reports for the production APS and of two Engineering Development Models (EDMs). The EDMs will be installed at NSWC/DL and onboard the USS Wisconsin in FY 91.

(4) (U) The TOMAHAWK Land Attack Missile Submunition Dispensing Variant (TLAM/D) completed operational evaluation in July 1988 following three successful flight tests. In August 1988 the first TLAM/D missiles were placed on U.S. combatants achieving Initial Operational Capability (IOC) one month early.

(5) (U) On 1 November 1988, approval was granted for full production of the Surface Ship TOMAHAWK Vertical Launch Weapon Control System (AN/SWG-3), limited production for Capsule Launch System (CLS) and for TOMAHAWK Land Attack Conventional Missile with Submunitions Dispenser (TLAM/D), and full scale engineering development for TOMAHAWK Land Attack Conventional Missile Upgrade (TLAMC/D Block III).

(6) (U) Full scale development contract for the Block III Upgrade program was awarded on 14 December 1988. The Block III program will extend the performance envelope of the conventional TOMAHAWK Cruise Missile (TLAM) by adding a Global Positioning System (GPS) to the guidance control system and a light weight, insensitive warhead which not only satisfies the insensitive munitions requirements but allows additional fuel storage providing additional missile range. Time of arrival control is also provided to allow coordinated strike planning with other Navy assets. Coupled with the development program is a product improvement effort for the Digital Scene Matching Area Correlator (DSMAC). This improvement provides needed reliability and producibility improvements for the DSMAC.

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

8. (U) <u>Threshold Breaches</u>: There are currently no DAE Baseline breaches or NDCP approved 20 October 1986, threshold breaches.

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) [redacted] 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

UNCLASSIFIED [redacted]

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

8. (U) IOC	Dev. Est. Sub/Ship	Approved Program Sub/Ship	Current --Est. Sub/Ship
Land Attack Conventional			
(Block I)	N/A	N/A/Apr83	N/A/Apr83
(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 [redacted] due to ship availability and delay in missile deliveries 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 Feb 17, 1988.

(b)(1) ; (b)(3):42 USC §2168(a) (1)(C)–(FRD)

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

	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
(11) (U) Mission Success				
(1) Sub/Ship (FOC)	.72/.72	.80/.85	.80/.85	.80/85
(2) Sub/Ship (IOC)	.57/.50	.57/.50	.67/.80	.57/50

b. (b)(1)

c.(U) Previous Change Explanations --
10. (U) Approved program based on NDCP W0545 dated 31 Aug 1987.
10.b.4.(U) Probability of Hit - Demonstrated Performance based on flights from 1 Jan 83 to 1 Feb 88.

c.(U) Current Change Explanations --
(CH-1) (U) Approved Program based on NDCP K0545 dated 31 Oct 1988.
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 January 5, 1977; NDCP K0545 dated October 31, 1988 (TOMAHAWK Weapons System) approved by OPNAV.

Approved Program: DAE Baseline approved Feb. 17, 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	1315.7
Procurement	1023.6	3850.8	3850.8
Air Vehicle (Flyaway)	(786.0)	(2974.8)	(2974.8)
Other Launch/Fire Control Costs	(90.2)	(467.8)	(467.8)
Peculiar Support	(81.1)	(268.9)	(268.9)
Initial Spares	(66.3)	(139.3)	(139.3)
Construction (MILCON)	0	23.6	23.6
Total FY 77 Base-Year $	1806.4	5190.6	5190.1
Escalation	616.5	5538.1	5538.1
Development (RDT&E)	(83.3)	(554.5)	(554.5)
Procurement	(533.2)	(4955.2)	(4955.2)
Construction (MILCON)	(0.0)	(28.4)	(28.4)
Total Then-Year Prog Cost	$2422.9	$10728.2	$10728.2
b. (U) Quantities --			
Development (RDT&E)	81	74	74
Procurement	1,082	4,030	4,030
Total	1,163	4,104	4,104

c. (U) Foreign Military Sales -- N/A

(b)(1);(b)(3):42 USC §2162(a)-- (RD)

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 KO545 dated October 31, 1988 (TOMAHAWK Weapons System) approved by OPNAV.

Approved Program: FY 1990-91 President's Budget.

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

	Current Est (Dec 88 SAR)	UCR Baseline (Current Year) (Dec 87 SAR)	UCR Baseline (Budget Year) (Dec 88 SAR)
a. (U) Program Acquisition --			
(1) Cost	10728.2	11300.8	10728.2
(2) Quantity	4104	4068	4104
(3) Unit Cost	2.614	2.778	2.614
b. (U) Current Procurement --	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	702.7	702.7	647.8
Less CY Adv Proc	-71.4	-71.4	-75.6
Plus PY Adv Proc	75.6	75.6	0
Net Total	706.9	706.9	572.2
(2) Quantity	510	510	400
(3) Unit Cost	1.386	1.386	1.430

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	--	2422.9
Previous Changes:				
Economic	-17.1	-1843.0	+0.1	-1860.0
Quantity	-22.6	+7649.2	--	+7626.6
Schedule	+213.4	+132.4	--	+345.8
Engineering	759.7	+999.6	--	+1759.3
Estimating	+6.8	-761.4	-0.1	-754.7
Other	--	--	--	--
Support	+2.9	+1757.5	+0.5	+1760.9
Subtotal	+943.1	+7934.3	+0.5	+8877.9
Current Changes:				
Economic	+0.7	-34.5	--	-33.8
Quantity	--	+52.4	--	+52.4
Schedule	--	+314.4	--	+314.4
Engineering	+60.3	--	--	+60.3
Estimating	--	-1017.4	+51.5	-965.9
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+61.0	-685.1	+51.5	-572.6
Total Changes	+1004.1	+7249.2	+52.0	+8305.3
Current Estimate	+1870.2	+8806.0	+52.0	+10728.2

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	--	1806.4
Previous Changes:				
Quantity	-17.5	+2641.0	--	+2623.5
Schedule	+148.5	-275.7	--	-127.2
Engineering	+395.7	+422.1	--	+817.8
Estimating	-9.3	-388.3	-0.1	-397.7
Other	--	--	--	--
Support	+2.1	+709.0	+0.4	+711.5
Subtotal	+519.5	+3108.1	+0.3	+3627.9
Current Changes:				
Quantity	--	+19.9	--	+19.9
Schedule	--	+110.2	--	+110.2
Engineering	+13.4	--	--	+13.4
Estimating	--	-411.0	+23.3	-387.7
Other	--	--	--	0.0
Support	--	--	--	0.0
Subtotal	+13.4	-280.9	+23.3	-244.2
Total Changes:	+532.9	+2827.2	+23.6	3383.7
Current Estimate	1315.7	3850.8	23.6	5190.1

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, Navy affordability issues and Gramm Rudman Hollings. Block IIB Overrun.

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.
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.
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.
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)

13. (U) **Cost Variance Analysis (cont'd):**
c. (U) Current Change Explanations --

	(DOLLARS IN MILLIONS) Base-Year	Then-Year
(1) RDT&E		
Revised Jan 89 economic escalation rates. (Economic)	N/A	+.7
Program years add-on (Engineering)	+13.4	+60.3
(2) Procurement		
Revised Jan 89 economic escalation rates. (Economic)	N/A	-34.5
Quantity change of 36 missiles. (Quantity)	+19.9	+52.4
Missile procurement schedule slip for affordability issues. (Schedule)	+110.2	+314.4
Estimating reductions related to competitive contract awards and repricing. (Estimating)	-397.1	-944.3
Expected multi-year contract savings. (Estimating)	+51.5	-128.0
Revised estimates of surface and submarine support equipment. (Estimating)	+37.6	+54.9
(3) MILCON		
Revised Jan 89 economic escalation rates (Economic)	N/A	0
New Program Requirements (Estimating)	23.3	+51.5

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	-.461	+.807	+.161	+.443	-.419	.000	.000	+.531	2.614

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

PAUC (Dev Est)	Changes								PAUC (Current EST)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
2.614	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.614

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

a. (U) RDT&E -- Dollar Value of ongoing effort has dropped below reporting threshold.

b. (U) Procurement -- Information includes SLCM and GLCM cost and quantities.

1. AUR Missile:

McDonnell Douglas (FY87-AUR)
St. Louis, MO
N00032-86-C-6124, FFP
Award: November 1986
Definitized: November 1986

Initial Contract Price		
Target	Ceiling	Qty
$187.9M	N/A	240

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$187.9M	N/A	240	$187.9M	$187.9M

	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:

General Dynamics (FY87 AUR)
San Diego, CA
N00032-86-C-6126, FFP
Award: December 1986
Definitized: December 1986

Initial Contract Price		
Target	Ceiling	Qty
$157.8M	N/A	151

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$172.5M	N/A	160	$172.5M	$172.5M

	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

Explanation of Contracted Value: Navy exercised option to procure an additional nine missiles in FY87 to achieve authorized level of 324. Navy realigned other funds within TOMAHAWK to accomplish this procurement.

NOTE: Contracts N00019-85-C-4484 and N00019-84-C-4458 are 90% complete and will no longer be reported.

15. (U) Contract Information (cont'd):

3. **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.

4. **AUR Missile**:

McDonnell Douglas (FY88 AUR)
St. Louis, MO
N00032-87-C-3103, FFP
Award: November 1987
Definitized: November 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.

5. **AUR Missile**:

General Dynamics (FY89 AUR)
San Diego, CA
N00019-88-C-3137, 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

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 (FY89 AUR)
St. Louis, MO
N00019-88-C-3128, 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.

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

(1) Percent Program Completed: 80.0% (15 yrs/20 yrs)

(2) Percent Program Cost Appropriated: 65.0%
($6,934.5/$10,728.2)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY74-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-95)	Total
RDT&E	1653.9	64.3	51.9	100.1	1870.2
Procurement	5276.4	653.1	718.5	2158	8806.0
Weapon	4591.4	604.9	689.9	2004.5	7890.7
Other	685.0	48.2	28.6	153.5	915.3
MILCON	4.2	4.6	10.9	32.3	52.0
Total	6934.5	722.0	781.3	2290.4	10728.2

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

c. (U) 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			6.6	6.6	6.6	6.6	8.0
1975	0			37.3	37.3	37.3	37.3	10.9
1976	0			130.6	130.6	130.6	130.6	6.6
1977	0			119.2	119.2	119.2	119.2	2.6
1978	0			188.0	209.5	209.5	209.5	6.8
1979	74			125.3	154.1	154.1	154.1	8.4
1980	0			77.5	105.5	105.5	105.5	10.6
1981	0			90.3	134.0	134.0	134.1	10.6
1982	0			92.4	144.4	144.4	143.2	7.6
1983	0			72.5	118.2	118.2	116.8	4.9
1984	0			79.9	134.9	134.9	129.8	3.8
1985	0			46.2	80.6	80.6	77.8	3.4
1986	0			41.3	73.8	73.8	73.2	2.8
1987	0			41.7	77.1	76.9	76.7	2.7
1988	0			36.3	69.5	69.5	23.7	3.1
1989	0			29.6	58.7	47.3	1.2	4.0
1990	0			31.3	64.3	NA	NA	3.6
1991	0			24.5	51.9	NA	NA	3.3
1992	0			17.9	38.9	NA	NA	2.8
1993	0			15.7	34.8	NA	NA	2.3
1994	0			11.6	26.4	NA	NA	1.8
1995	0			0.0	0.0	NA	NA	1.8
Sub TTL	74			1,315.7	1,870.1	1642.4	1539.3	

59.90
51.9 983
1.0

16. (U) 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	9.8	19.5	30.0	30.0	30.0	11.8
1981	50	13.8	83.4	114.1	195.8	195.8	195.8	11.6
1982	61	15.5	93.3	124.6	232.0	232.0	232.0	14.3
1983	51	14.2	84.7	111.9	220.2	220.2	220.2	9.0
1984	124	20.2	119.9	167.0	343.3	343.3	343.3	8.0
1985	180	32.2	192.3	265.5	561.8	561.8	561.8	3.4
1986	249	34.0	219.2	316.1	690.6	690.6	690.6	2.8
1987	324	42.1	234.8	322.7	730.9	729.1	608.4	2.7
1988	475	42.8	284.4	367.0	858.1	829.2	228.3	3.1
1989	510	21.1	253.9	301.6	728.7	446.8	365.5	4.0
1990	400	33.9	157.1	243.2	604.9	NA	NA	3.6
1991	400	35.7	196.0	270.8	689.9	NA	NA	3.3
1992	400	32.3	217.7	332.7	865.4	NA	NA	2.8
1993	400	0.0	257.6	222.8	590.2	NA	NA	2.3
1994	400	0.0	231.4	203.5	548.9	NA	NA	1.8
1995	0	0.0	0.0	0.0	0.0	NA	NA	1.8
Sub TTL	4,030	339.4	2,635.5	3,383.0	7,890.7	4,278.8	3475.9	

243.2
23.8
267.0

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

FY	Qty	Flyaway FY77 Dollars		Total Base Year$	Total Then-Year Dollars			ESCL Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: OPN								
1981	0			23.0	36.3	36.3	35.0	10.6
1982	0			43.2	70.9	70.9	60.4	7.6
1983	0			74.6	127.1	127.1	123.2	4.9
1984	0			35.1	61.7	61.7	52.2	3.8
1985	0			44.2	80.1	80.1	74.3	3.4
1986	0			52.2	105.1	105.1	81.9	2.8
1987	0			52.9	109.9	105.9	61.6	2.7
1988	0			27.9	56.2	52.4	17.2	3.1
1989	0			26.9	37.5	13.5	80.2	4.0
1990	0			23.8	48.2	NA	NA	3.6
1991	0			13.3	28.6	NA	NA	3.3
1992	0			33.4	65.0	NA	NA	2.8
1993	0			14.8	46.4	NA	NA	2.3
1994	0			12.5	42.3	NA	NA	1.8
1995	0			0.0	0.0	NA	NA	1.8
Sub TTL	0	0.0	0.0	467.8	915.3	653.0	586.0	
Appropriation: MILCON								
1982	0			0.3	0.5	.5	.5	7.6
1983	0			0.0	0.0	NA	NA	4.9
1984	0			0.0	0.0	NA	NA	3.8
1985	0			0.0	0.0	NA	NA	3.4
1986	0			0.0	0.0	NA	NA	2.8
1987	0			1.9	3.7	NA	NA	2.7
1988	0			0.0	0.0	NA	NA	3.1
1989	0			0.0	0.0	NA	NA	4.0
1990	0			2.1	4.6	NA	NA	3.6
1991	0			5.0	10.9	NA	NA	3.3
1992	0			6.7	15.0	NA	NA	2.8
1993	0			6.5	14.8	NA	NA	2.3
1994	0			1.1	2.5	NA	NA	1.8
1995	0			0.0	0.0	NA	NA	1.8
Sub TTL	0			23.6	52.0	.5	.5	

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

a. (U) 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	400	600
1992	-	631	400	600
1993	-	-	400	600
1994	-	-	400	600
1995	-	-	-	

* March 1994 would be the earliest theoretical date for total program (4030) completion at maximum production rates.

17. (U) Production Rate Data cont'd:

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 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. (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 Rate
Start Date (Mo/Yr)	July 82	N/A	July 82	N/A	July 82
Duration (in Months)	140	12	152	12	140
End Date (Mo/Yr)	March 94	N/A	March 95	N/A	March 94

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

	To Date
RDT&E	
Land Attack	47/37
Anti-Ship	27/37
Total	74/74
PROCUREMENT	
Land Attack	238/189
Anti-Ship	339/340
Land Attack/Nuclear	291/290
Total	868/819

18. (U) Operating and Support Costs: N/A

18. (U) 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	150.4	57.9	77.1	.0	285.4
Industrial Fund	4.1	2.2	2.2	.0	8.5
Total	154.5	61.1	79.3	.0	293.9

A-28 UH-60A

UNCLASSIFIED

SAR-88-108

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

PROGRAM: UH-60A BLACK HAWK

AS OF DATE: December 31, 1988

INDEX

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FOR OPEN PUBLICATION
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1. Designation and Nomenclature (Popular Name): UH-60A 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 and AH-64 APACHE programs; Navy's SH-60B SEAHAWK program; Air Force's MH-60G PAVE HAWK program; Army's UH-60A BLACK HAWK Flight Simulator; and Navy's SH-60F program.

OASD(PA) DFOISR 89-T-0558

UNCLASSIFIED

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 missions. This aircraft is the Army's first true squad assault helicopter. 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-60A BLACK HAWK is replacing the UH-1H Iroquois in air assault, and 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.

7. Program Highlights (Cont'd):

The Multiyear III Airframe contract for FY 88-91 to procure 252 UH-60As, completing the original procurement objective of 1107, was approved by Congress. Congressional authorization increased the planned annual buy in FY 88 by 11 aircraft. Subsequent Congressional appropriation provided funding for those Aircraft in FY 88 with a corresponding reduction in FY 91.

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. The development will conclude in 1992 with the incorporation of those configuration changes in the aircraft production line.

b. Significant Developments Since Last Report -- The FY89 increment for 72 UH-60's was awarded on the MYP III contract in November 1988. The continued procurement of the UH-60 was approved in the Army Aviation Modernization Plan for a total quantity of 2253 aircraft. Pending Department of the Army approval of a new procurement objective (proposed 2253) for the UH-60, the quantity of 1337 is utilized in this SAR to reflect the total quantity of UH-60's as approved within the budget through FY94. The propulsion system for the UH-60A will be changed from the GE T700 engine to the GE T701C engine in October 1989.

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 DAE baseline breaches.

b. The update to UH-60A BLACK HAWK DCP No. 13 was approved November 1, 1977. The total quantity of 1,107 UH-60As cannot be procured within the total cost threshold of $1,447M (FY 71 C $). The current estimate is $2,931.1M (FY 71 C $).

c. The weight growth of the UH-60A due to incorporation of design revisions and added mission capabilities has resulted in a degradation of the vertical climb in feet per minute from 450 to 425 and cruise speed in knots from 145 to 139 in the current production configuration. These performance threshold values will be regained in Oct 89 with the incorporation of the GE T701C uprated engine which has a minimum of 9% additional shaft horsepower.

d. The mission reliability and system meantime between failure in hours meets or exceeds the Materiel Need (MN) requirements. Sample data collection on Lot 9 (FY85) and newer UH-60A aircraft

8. Threshold Breaches (Cont'd):

reflects a estimated 4.7 hours system meantime between failure. This exceeds the development estimate of 4.0 hours. A mission reliability test conducted in FY88 using new production aircraft demonstrated a mission reliability of .991, exceeding the MN minimum requirement of .987. The test confirmed the UH-60A performs with higher mission reliability than previously estimated and reported.

9. Schedule

a. Milestones --

	Development Estimate	Approved Program	Current Estimate
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
1st Production Aircraft Delivery	N/A	Oct 78	Oct 78
FDTE			
Started	Not Shown	Jul 79	Jul 79
Completed	Not Shown	Oct 79	Oct 79
Milestone III A (ASARC)	Not Shown	Oct 79	Oct 79
Initial Oper Capability (IOC) 1/	Jun 79	Nov 79	Nov 79
Initial Proc Obj (1107) Completed	N/A	Jun 91	Jun 91 (CH-1)
MY Airframe Contract Award (FY88-91)	N/A	Jan 88	Jan 88 (CH-1)
Plnd Del-FY88-91 MYC Contract Start	N/A	Jan 88	Jan 88 (CH-1)
H-60 Series Engine Contract Award	N/A	May 88	May 88 (CH-1)
MY Airframe Contract Award (FY89)	N/A	Nov 88	Nov 88 (CH-1)
H-60 Series Eng (GE T701C) Del Start	N/A	Jan 89	Jan 89 (CH-1)
Planned Incorporation of GE T701C	N/A	Oct 89	Oct 89 (CH-1)
MY Airframe Contract Award (FY90)	N/A	Nov 89	Nov 89 (CH-1)
MY Airframe Contract Award (FY91)	N/A	Nov 90	Nov 90 (CH-1)
Appr UH-60 Proc Obj (2253)	N/A	Mar 89	Mar 89 (CH-1)
Appr MSIP IPR by Deparment of Army	N/A	Mar 89	Mar 89 (CH-1)

9. Schedule (Cont'd)

a. Milestones --

	Development Estimate	Approved Program	Current Estimate
Award MSIP Development Contract	N/A	Apr 89	Apr 89 (CH-1)
Award CRS Dev Contract	N/A	Apr 89	Apr 89 (CH-1)
MSIP/CRS Preliminary Design Review	N/A	Oct 89	Oct 89 (CH-1)
MSIP/CRS Critical Design Review	N/A	Oct 90	Oct 90 (CH-1)
Deployment Plan:			
3/227th AHB - Hanau GE	N/A	Feb 89	Feb 89 (CH-1)
E/1st ASLT - Ft. Riley	N/A	Apr 89	Apr 89 (CH-1)
1/245 ASLT - OKNG	N/A	Apr 89	Apr 89 (CH-1)
140th ASLT - CANG	N/A	May 89	May 89 (CH-1)
1/24th AHB - Hunter	N/A	Jul 89	Oct 89 (CH-1)
2/1st AHB - Ansbach GE	N/A	Oct 89	Oct 89 (CH-1)

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 July 11, 1979 official beginning of FDTE at Ft. Campbell, KY; and (h) the October 15, 1979 completion of FDTE at Ft. Campbell, KY.

c. Current Change Explanation -

(CH-1) Baseline additions.

d. References --

Development Estimate: DCP #13, June 13, 1971 and DCP #13 Update, November 1, 1977.

Approved Program: DAE Baseline Mar 1989

Footnote:

1/ IOC of the BLACK HAWK means that during 1st Quarter of FY80, Company "D" Combat Support Aviation Company, 158th Aviation Battalion (Combat), 101st Airborne Division, Ft. Campbell, KY was equipped with BLACK HAWK aircraft and operationally ready.

10. Technical/Operational Characteristics:

a. Technical --

	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	(CH-1) 425 3/
(2) Cruise Speed in Knots 4/	150	145/139	145	(CH-2) 139
(3) Endurance in Hours 5/	2.3	2.3/2.3	2.3	2.3
Sys Meantime Between Failure (MTBF) in Hours	4.0	4.0/4.0	6.6	(CH-3) 4.7
Maintenance Man-hours Per Flight Hour (MMH/FH) 6/	3.8	3.0/3.0	3.0	3.0

b. Operational --

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	(CH-4) .991
(MTBMA in Hours)	70.9	106/75.9	106	(CH-4) 106

c. Previous Change Explanations --

Variances in the demonstrated performance and current estimates of the operational/technical characteristics 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) an analysis of the data which were obtained from the previously conducted RAM/LOG sample data collection on 7 Lot IV (FY 80) production aircraft at Ft. Campbell; KY; (3) an adjustment to vertical climb to reflect the latest findings of the US Army Aviation Engineering Flight Activity (AEFA), the expected results from Lot 9 (FY 85) production aircraft RAM/LOG sample data collection when the ESSS removable provisions kit is fielded, and the actual weight of the 685th production aircraft; and (4) the demonstrated performance

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

of maintenance man-hours per flight hour that reflect the increase due to an update using 1985 fleet wide sample unscheduled maintenance data from January 1, 1985 to April 18, 1985.

d. Current Change Explanations --

(CH-1) 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.

(CH-2) Weight growth due to design revisions and added mission capabilities have reduced the cruise speed from 145 knots to 139 knots.

(CH-3) System meantime between failures has been revised from 4.3 to 4.7 based on sample data collected on Lot 9 (FY 85) and newer UH-60A aircraft.

(CH-4) Mission Reliability has been revised from .980 to .991 with the associated meantime between mission aborts in hours going from the estimated 49.5 to the demonstrated 106 hours. These values are based on a mission reliability evaluation performed on Lot 12 (FY88) aircraft Mar-Aug 1988.

e. References --

Development Estimate: DCP #13, June 13, 1971 an DCP #13 Update, November 1, 1977.

Approved Program: DAE Baseline Mar 1989

Footnotes:

1/ At 4,000 ft, altitude at 95 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 reconfiguration, preparation of aircraft for air transport and refueling 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 meantime between mission aborts 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 1/ Estimate	Approved Program	Current Estimate
Development (RDT&E)	$ 357.6	$ 415.1	$ 415.1
Procurement	1,584.4	2,502.5	2,502.5
Airframe		(1,448.7)	(1,448.7)
Engine		(418.1)	(418.1)
Avionics		(75.8)	(75.8)
Other Flyaway		(264.7)	(264.7)
Total Flyaway		(2,207.3)	(2,207.3)
Other Weapon System Cost		(105.9)	(105.9)
Initial Spares		(189.3)	(189.3)
Construction (MILCON)	Ø	13.5	13.5
Total FY 71 Base-Year	1,942.Ø	2,931.1	2,931.1
Escalation	365.3	5,520.2	5,520.2
Development (RDT&E)	(52.3)	(220.1)	(220.1)
Procurement	(313.Ø)	(5,268.8)	(5,268.8)
Construction (MILCON)	(Ø)	31.3	31.3
Total Then-Year $	2,307.3	8,451.3	8,451.3

1/ Adjusted from the December 31, 1985 SAR to reflect the current then-year dollars the Development Estimate.

2/ The Army will procure the maximum number of supportable systems consistant with the dollars appropriated.

b. Quantities --			
Development (RDT&E)	16	1Ø	1Ø
Procurement	1,1Ø7	1327	1,327
Total	1,123	1337	1,337

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

c. Foreign Military Sales --

SAUDI ARABIA

Case Identifier - SR-B-VJB
LOA Date - 20 Oct 87
Model - UH-60A (DESERT HAWK)
Quantity - 13
Case Total Cost - $152.1M
Delivery Schedule - Nov 89 - (1)
Dec 89 - (1)
Jan 90 - (2)
Feb 90 - (3)
Mar 90 - (3)
Apr 90 - (3)

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)

d. Nuclear Costs -- None

e. References --

Development Estimate: DCP #13, June 13, 1971 and DCP #13 update, November 1, 1977.

Approved Program: FY90-91 President's Budget.

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

		Current Year		Budget Year
a. Program Acquisition --		Current Est (Dec 88 SAR)	UCR Baseline (Dec 87 SAR)	UCR Baseline (Dec 88 SAR)
(1)	Cost	8,451.3	6,547.2	8,451.3
(2)	Quantity	1,337	1,121	1,337
(3)	Unit Cost	6.32	5.84	6.32
b. Current Procurement --		(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1)	Cost	468.5	468.5	412.8
	Less CY Adv Proc	205.6	205.6	180.3
	Plus PY Adv Proc	202.3	202.3	183.3
	Net Total	465.2	465.2	415.8
(2)	Quantity	72	72	72
(3)	Unit Cost	6.46	6.46	5.78

13. Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	409.9	1,897.4	---	2,307.3
Previous Changes:				
Economic	+ 52.3	+ 1,168.6	---	+ 1,220.9
Quantity	- 22.0	+ 10.5	---	- 11.5
Schedule	+ 3.0	- 46.0	---	- 43.0
Engineering	+ 96.2	+ 156.5	---	+ 252.7
Estimating	+ 23.6	+ 2,663.1	---	+ 2,686.7
Other	+ 18.5	+ 1.4	---	+ 19.9
Support	+ 9.3	+ 104.9	---	+ 114.2
Subtotal	+180.9	+ 4,059.0	---	+ 4,239.9
Current Changes:				
Economic	- .3	+ 37.9	---	+ 37.6
Quantity	---	+ 630.9	---	+ 630.9
Schedule	---	---	---	---
Engineering	+ .5	+ 139.5	+ 44.8	+ 184.8
Estimating	+ 41.1	+ 750.0	---	+ 791.1
Other	---	---	---	---
Support	+ 3.1	+ 256.6	---	+ 259.7
Subtotal	+ 44.4	+ 1,814.9	+ 44.8	+ 1,904.1
Total Changes	+225.3	+ 5,873.9	+ 44.8	+ 6,144.0
Current Estimate	635.2	7,771.3	+ 44.8	8,451.3

(FY 1971 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	357.6	1,584.4	---	1,942.0
Previous Changes:				
Quantity	- 20.2	+ 3.2	---	- 17.0
Schedule	+ 1.4	- 100.5	---	- 99.1
Engineering	+ 35.5	+ 25.0	---	+ 60.5
Estimating	+ 7.0	+ 598.9	---	+ 605.9
Other	+ 12.6	+ .8	---	+ 13.4
Support	+ 6.6	+ 65.5	---	- 58.9
Subtotal	+ 42.9	+ 461.9	---	+ 504.8
Current Changes:				
Quantity	---	+ 168.4	---	+ 168.4
Schedule	---	---	---	---
Engineering	+ .2	+ 37.3	+ 13.5	+ 51.0
Estimating	+ 13.3	+ 183.9	---	+ 197.2
Other	---	---	---	---
Support	+ 1.1	+ 66.6	---	+ 67.7
Subtotal	+ 14.6	+ 456.2	---	+ 484.3
Total Changes	+ 57.5	+ 918.1	+ 13.5	+ 989.1
Current Estimate	415.1	2,502.5	+ 13.5	2,931.1

13. Cost Variance Analysis (Cont'd)

b. Previous Change Explanations --

RDT&E

Economic:	Due to the application of January 1988 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.
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 and addition of the ESSS program.
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.
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; and increases for providing engine and avionics representatives for support at the airframe contractor's site.

Procurement

Economic:	Due to application of January 1988 and prior DA/OSD inflation guidance.
Quantity:	Due to procurement of 4 additional aircraft for the U.S. Customs Service in FY 87.

13. Cost Variance Analysis (Cont'd):

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

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.
Engineering:	Due to net deletion of funding for Special Operations Forces aircraft and addition of HELLFIRE production.
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 cost growth on the FY 77 airframe production contract.
Support:	Due to 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 carryover of funding shortfalls from earlier years, resumption of funding liability for peculiar ground support equipment (PGSE) increased technical data requirements.
MILCON:	None.

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Application of 1989 DA/OSD inflation indicies (Economic)		- .3
Addition of requirement to develop Solid State Flight Data Recorder (Engineering)	+ .2	+ .5
Provision of funding to complete the Multistage Improvement Program (MSIP) (Estimating)	+ 13.3	+ 41.1
Addition of the requirement to develop a Command Instrument Systems Trainer (CIST) and cost growth on the Cockpit Emergency Procedures Trainer (CEPT). (Support)	+ 1.1	+ 3.1
(2) Procurement		
Application of 1989 DA/OSD and UH-60A BLACK HAWK System Unique Inflation Indices (Economic)	Ø	+ 37.9
Increase in the procurement quantity from 1111 to 1327 (Quantity)	+168.4	+630.9
Incorporation of the Multistage Improvement Program changes into the aircraft commencing in FY91 (Engineering)	+ 37.3	+139.5
Estimating changes applicable to additional 216 aircraft since cost quantity curve was developed (Estimating)	+183.9	+750.Ø
Cost of Flight Simulators, Initial Spares and other support equipment for the increased procurement of Quantity (Support)	+ 66.6	+256.6
(3) MILCON		
Addition of MILCON costs associated with Flight Simulator buildings, and maintenance hangar, and other BLACK HAWK facilities. (Engineering)	+ 13.5	+ 44.8

14. Program Acquisition Unit Cost (PAUC) History:

Initial SAR (Development) estimate to Current Estimate

PAUC (Dev Estimate	Changes								PAUC (Current Estimate
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
2.055	+.941	+ .134	-.032	+.327	+2.601	+.280	+.015	+4.266	6.321

Footnote: Initial SAR dated December 31, 1971.

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

a. RDT&E: None.

b. Procurement

	Initial Target	Contract Price Ceiling	Qty
General Electric Co., Lynn MA DAAJ09-85-C-A481, FFP Award: February 11, 1986 Definitized: February 11, 1986	716.2	N/A	1,724

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
914.0	N/A	2,095	914.0	914.0

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

	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

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
1,128.5	N/A	288	1,128.5	1,128.5

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

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

	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
564.2	N/A	1,156	564.2	564.2

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: 82.1% (23/28 yrs)

(2) Percent Program Cost Appropriated: 70.9% ($5,991.2/$8,451.3)

b. Appropriation Summary --

Appropriation	Current & Prior Yrs (FY68-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-94)	Total
RDT&E	594.0	26.2	11.8	3.2	635.2
Procurement	5,379.9	412.8	468.9	1,509.7	7,771.3
MILCON	17.3	0.0	0.0	27.5	44.8
TOTAL	5,991.2	439.0	480.7	1,540.4	8,451.3

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

c. Annual Summary --

Fiscal Year	Qty	FY71 Base-Year Dollars			Then-Year Dollars			Escl Rate 1/ (%)
		Flyaway						
		Nonrec	Rec	Total	Program	Obli-gated	Ex-pended	
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				44.1	50.3	50.3	50.3	4.4
1974				83.3	102.6	102.6	102.6	8.0
1975				39.4	52.7	52.7	52.7	10.9
1976				65.8	93.6	93.6	93.6	6.6
1971				12.7	18.6	18.6	18.6	2.9
1977				49.8	76.0	76.0	76.0	2.6
1978				23.9	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	9.2	9.2	9.2	4.9
1984				5.9	14.8	14.8	13.2	3.8
1985				0.0	0.0	0.0	0.0	3.4
1986				6.2	16.4	16.2	13.3	13.3
1987				0.8	2.2	2.2	.6	2.7
1988				5.3	14.9	.6	.3	3.1
1989				13.9	40.7	0.0	0.0	4.0
1990				8.7	26.2	0.0	0.0	3.6
1991				3.8	11.8	0.0	0.0	3.3
1992				1.0	3.2	0.0	0.0	2.8
Subtotal	10			415.1	635.2	538.8	532.4	

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 -- (Cont'd)

Fiscal Year	Qty2/	FY71 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Program	Obligated	Expended	Escl Rate 1/ (%)
Appropriation: Procurement								
1977	15	18.7	39.8	71.9	140.6	139.6	139.5	3.7
1978	56	11.8	82.2	111.5	245.8	245.7	245.7	6.0
1979	92	5.4	131.7	157.8	395.6	392.8	387.8	12.0
1980	94	3.2	124.5	138.0	380.2	378.7	377.2	19.8
1981	80	2.3	123.7	165.5	478.0	473.5	458.6	13.5
1982	96	2.6	180.6	211.8	618.8	613.4	610.9	8.1
1983	96	8.7	165.3	184.3	540.6	539.1	527.7	-0.3
1984	84	1.1	125.5	132.1	389.4	389.4	373.4	1.7
1985	86	0.9	135.5	146.9	436.7	428.5	383.9	-0.3
1986	78	1.3	125.2	134.9	411.5	411.5	401.6	-1.0
1987	82	1.8	99.7	119.2	381.8	373.8	304.8	-0.1
1988	72	6.5	124.3	146.2	492.4	454.8	251.4	7.6
1989	72	8.8	115.6	136.3	468.5	348.1	0.0	4.0
1990	72	7.5	99.1	116.8	412.8	0.0	0.0	3.6
1991	72	6.8	97.3	129.5	468.9	0.0	0.0	3.3
1992	60	3.3	110.0	125.8	465.9	0.0	0.0	2.8
1993	60	2.7	106.4	122.5	462.3	0.0	0.0	2.3
1994	60	0.4	127.1	151.5	581.5	0.0	0.0	1.8
Subtotal	1327	93.8	2113.5	2502.5	7771.3	5188.9	4462.5	

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/ Total procurement quantities will be reflected after final approval of Army procurement objective and Multi Stage Improvement Configuration.

Fiscal Year	Qty	FY71 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Program	Obligated	Expended	Escl Rate 1/ (%)
Appropriation: MILCON								
1987				3.2	9.4	9.4	9.4	2.7
1988				2.5	7.9	7.9	4.0	3.1
1989				0.0	0.0	0.0	0.0	4.0
1990				0.0	0.0	0.0	0.0	3.6
1991				0.0	0.0	0.0	0.0	3.3
1992				0.0	0.0	0.0	0.0	2.8
1993				7.8	27.5	0.0	0.0	2.3
Subtotal				13.5	44.8	17.3	13.4	
Total	1337			2931.1	8451.3	5744.9	5008.2	

17. Production Rate Data:

a. Annual Production Rates --

NOTES: 1. 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

2. The maximum economic Production Rate shown below was not attainable due to the participation of other customers in the production program.

Fiscal Year	Production Rates (Quantity/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	121	144
1982	165	168	121	144
1983	165	168	138	144
1984	165	180	113	144
1985	165	180	109	144
1986			80	144
1987			84	144
1988			72	144
1989			72	144
1990			72	144
1991			72	144
1992			60	144
1993			60	144
1994			60	144

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$)	1755.6	+1206.9	2962.5	+233.0	2729.5
(TY$)	4991.3	+12473.2	8393.7	+986.7	7407.0
PAUC (BY$)	.644	+.513	2.216	+.174	2.042
(TY$)	3.046	+3.232	6.278	+.738	5.540

c. Schedule Variance --

Item	Production Estimate	Variance (CE Less Pde)	Current Estimate	Variance (CE Less Max)	Maximum Economic
Start Date (Mo/Yr)	Oct 78		Oct 78		Oct 78
Duration (in months)	93	+105	198	+58	140
End Date (Mo/Yr)	Jun 86		Dec 94		May 90

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	10/10
Procurement	931/931

e. Approved Design to Cost Goal --

	(Average Unit Flyaway Cost) 1/ Development Estimate	Current Estimate	Latest Approved Threshold
Constant FY 72 $	.951	1.661	---
Then-Year $	1.089	5.027	---

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 - N/A

b. Costs - N/A

c. Contractor Support Costs -

	(Then-Year Dollars in Millions)				
	FY1989 & Prior 1/	FY1990 Year	FY1991 Year	Balance To Complete	Total
O&M	110.5	76.3	76.8	---	263.6

1/ Includes FY 1988 and FY 1989

A-18 M1/M1A1 ~~SECRET~~ SAR-88-105

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

PROGRAM: TANK, COMBAT, FT. M1/M1A1

AS OF DATE: December 31, 1988

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1. (U) Designation and Nomenclature (Popular Name):
M1/M1A1 (Abrams)/Tank, Combat, Full Tracked (General Abrams Tank)

2. (U) DOD COMPONENT: Department of the Army

3. (U) Responsible Office and Telephone Number:

PM, Abrams Tank System
AMCPM-ABMS
US Army Tank-Automotive Command
Warren, MI 48397-5000

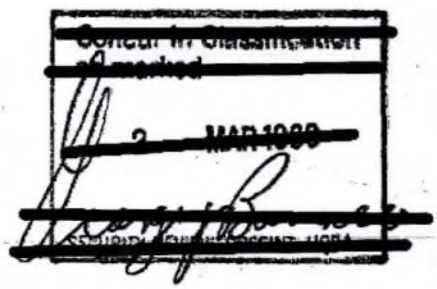
PM: COL John E. Longhouser
ASSIGNED: June 30, 1987
AV: 786-6885
COMM: (313) 574-6885

4. (U) 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 2916
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)



5. (U) Related Programs:
Tank Main Armament Systems (TMAS); Combat Vehicle Improvement Program.

OASD(PA) DFOISR 89-T-0685

~~SECRET~~

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 Block II 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 FY91 vehicle procurement include distributed data and power architecture, the Commander's Independent Thermal Viewer (CITV), Carbon Dioxide Laser Range Finder (CO2LRF), Position Navigation (POS/NAV) system, and appropriate Survivability Enhancements. 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 approved on January 8, 1973 by DCP #117. On November 12, 1976, a Full Scale Engineering Development/Producibility Engineering and Planning (FSED/PEP) contract was awarded for the M1 Tank System. On November 19, 1981, the SECDEF authorized production beyond 30 tanks per month. The M1A1 Tank Army Systems Acquisition Review Council (ASARC) approval was obtained on August 28, 1984 and the Department of Defense Systems Acquisition Review Council (DSARC) was successfully completed 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 1977 and Initial Production Testing of the new tank ended in September 1987. As of December 31, 1987, total production of the 120mm M1A1 Abrams stood at 1,482 units.

b. (U) Significant Developments Since Last Report-- Seven hundred eighty four 120mm M1A1 Abrams Tanks were produced in 1988, bringing total production up to 2,266 units while fieldings continued on schedule. In February, FMC Corporation won a multiyear contract to deliver the new T-158 improved durability track starting in March 1989. M1A1 survivability test was successfully concluded by September 1988, while the Test and Evaluation Master Plan (TEMP) for the proposed Block II improvement program was being established. On November 1st, the Secretary of Defense and the Government of Egypt agreed to a ten year, 555 vehicle M1A1 co-production program valued at some $2.3 billion. On December 2nd, the Defense Acquisition Board (DAB) conditionally accepted the Army's proposal to proceed with development of the Block II improved Abrams and a Full Scale Development (FSD) contract was then awarded to General Dynamics Corporation on December 14, 1988. The FY90/91 President's Budget proposes that the first procurements of the new M1A2 tank start in FY91.

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:

The combat loaded weight of the M1A1 tank exceeds the original DCP threshold due to engineering changes to the basic M1 and M1A1 vehicles and adjustments to the combat load. The system continues to meet or exceed all its operational and transportation requirements. The user has now established that future improvements to the M1 series tanks will not cause the vehicle weight to exceed 70 tons. The program has breached the February 1988 DAE Baseline for the Maximum Net Weight milestone and System Maintainability milestone.

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)

(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
Start Initial Production Test	NA	Jun 86	Jun 86
First Unit Equipped (CONUS)	NA	Dec 86	Dec 86
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
End Follow-on Evaluation	NA	Jul 87	Jul 87
Start Survivability Test	NA	Aug 87	Aug 87
End Initial Production Test	NA	Nov 87	Sep 87 (Ch-1)
End Survivability Test	NA	Jul 88	Aug 88 (Ch-2)
Full Scale Development Award (M1A2)	Dec 88	N/A	Dec 88 (Ch-3)
FY90 Tank Production Contract Award	NA	N/A	Dec 89 (Ch-3)
FY91 Tank Production Contract Award	NA	N/A	Dec 90 (Ch-3)
End User Testing (M1A2)	Apr 91	N/A	Apr 91 (Ch-3)
Milestone III Production Decision (M1A2)	Aug 91	N/A	Aug 91 (Ch-3)
End Technical Testing (M1A2)	Dec 91	N/A	Dec 91 (Ch-3)
First Delivery (M1A2)	Aug 92	N/A	Aug 92 (Ch-3)
First Unit Equipped (Europe) (M1A2)	Mar 93	N/A	Mar 93 (Ch-3)

b. (U) Previous change explanations - - none

c. (U) Current change explanations - - M1A1

(Ch-1) The Initial Production Test was completed in Sep 87 (vs Nov 87).

(Ch-2) The Survivability Test was completed in Aug 88 (vs Jul 88). This delay was due to extra test requirements.

(Ch-3) Milestone added.

d. (U) References - -

Development Estimate: DCP #117A, May 24, 1978.

Approved Program: DAE Abrams Program Baseline, February 1988.

9. (U) Schedule:

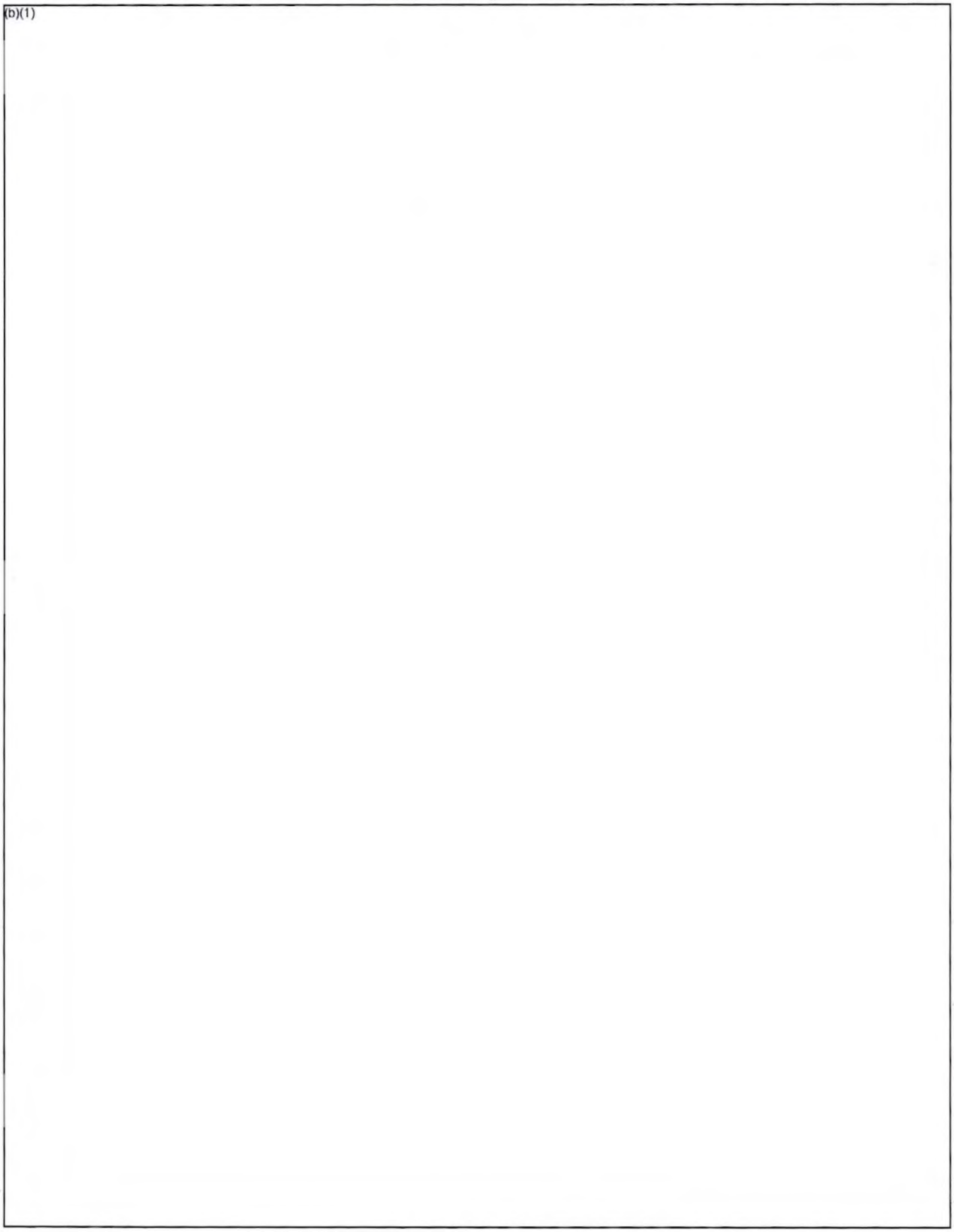
		Development Estimate	Approved Program	Current Estimate
(2) (U)	Milestones -- M1A1			
	Material Release (CONUS-Conditional)	N/A	Jul 86	N/A
	Material Release (Europe-Conditional)	N/A	Jan 87	N/A
	Call-up FY86 + FY87 Tanks	N/A	May 87	N/A
	First MY Production Delivery	N/A	May 87	N/A
	Production IPR (CWS)	N/A	Dec 87	N/A
	Call-up FY88	N/A	Dec 87	N/A
	Material Release (Full)	N/A	Jul 88	N/A
	Call-up FY89	N/A	Dec 88	N/A
	Last MY Production Delivery	N/A	Apr 91	N/A

(b)(1)

c. (U) Previous Change Explanations - -
Engineering changes to the basic M1 increased the weight from 60.28 to 60.8 tons. A later independent study, which considered the weight of each item in the combat load, further increased the weight to 61.5 tons. Increased weight also increased the time of acceleration from 6 to 7 seconds. Height measured during M1 DT/OT increased from 93.125 to 93.5 inches. DT III demonstrated a speed change from 25 to 30 mph and no change in cruising range of 310 miles was obtained from Comparison Production Tests. Improved production experience increased Combat Mission Reliability from 320 to 385 MMBF. Maturation of the tank system improved the maintenance ratio from 1.25 to 1.18. System Availability, which is not a DCP requirement, was deleted. Power Train Durability is now expressed as the probability of achieving 4000 miles without a major incident. Hit probability current estimates were changed to reflect demonstrated performance (DT III).

(b)(1)

(b)(1)



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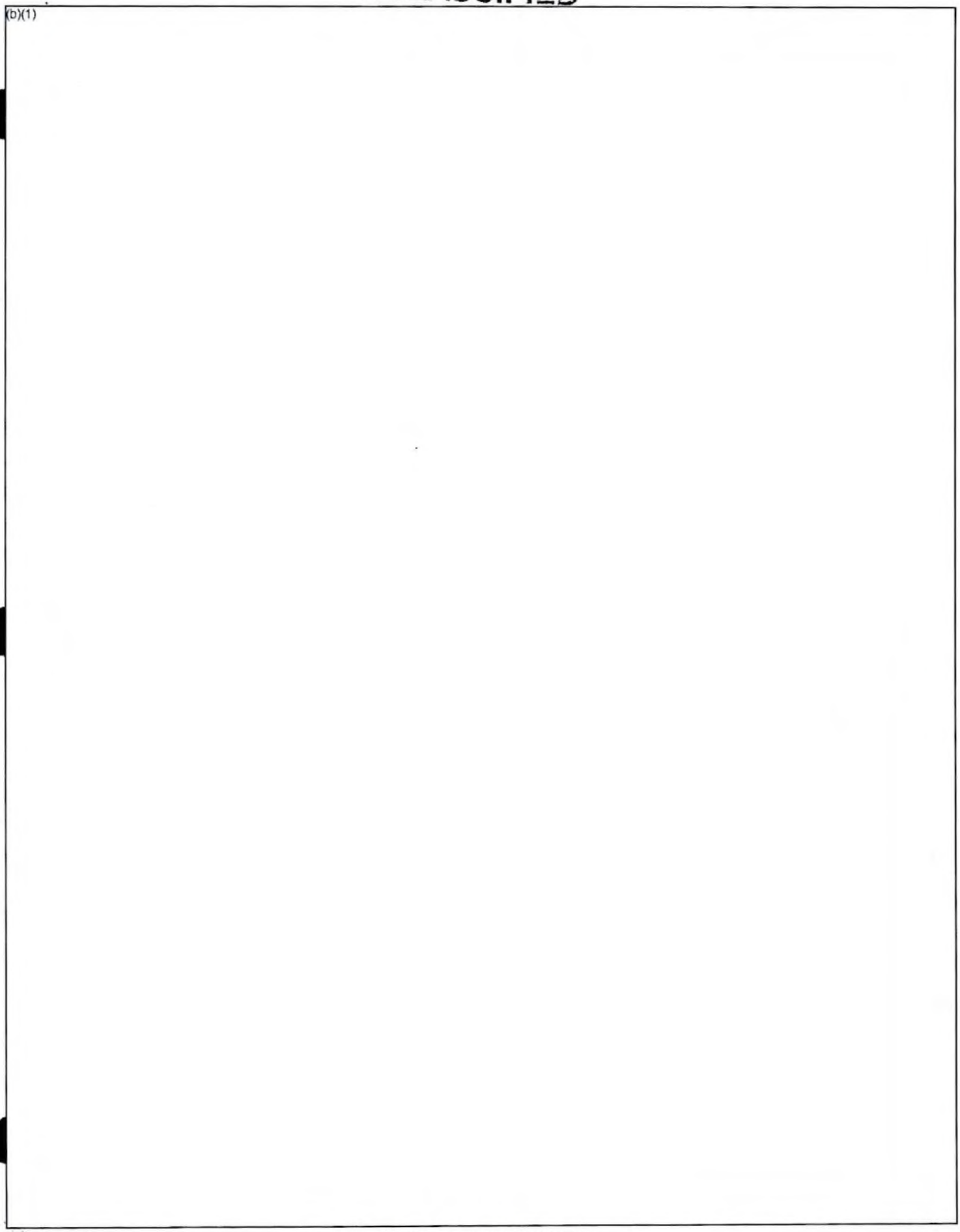

11. (U) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. (U) Cost - -			
Development (RDTE)	422.6	730.7	730.7
Primary Veh/105mm Gun	(422.6)	(455.5)	(455.5)
Primary Veh/120mm Gun	(0.0)	(275.2)	(275.2)
Procurement	1970.2	7202.9	7202.9
Primary Veh/105mm Gun	(1900.4)	(2386.5)	(2386.5)
Primary Veh/120mm Gun	(0.0)	(4297.6)	(4297.6)
Initial Spares	(69.8)	(407.4)	(407.4)
Training Devices	(0.0)	(111.4)	(111.4)
Construction (MILCON)	0.0	9.0	9.0
Total FY72 Base-Year $	2392.8	7942.6	7942.6
Escalation	2386.6	18458.7	18458.7
Development (RDTE)	(162.0)	(619.5)	(619.5)
Procurement	(2224.6)	(17825.8)	(17825.8)
Construction (MILCON)	(0.0)	(13.4)	(13.4)
Total Then-Year $	4779.4	26401.3	26401.3
b. (U) Quantities - -			
Development (RDTE)			
105mm Gun	13	13	13
120mm Gun	0	0	0
Procurement			
105mm Gun	3312	3268	3268
120mm Gun	0	6036	6036
Total	3325	9317	9317

c. (U) Foreign Military Sales - - On November 1, 1988, the Secretary of Defense and the Government of Egypt agreed to a 555 vehicle M1A1 co-production program valued at some $2.3 billion. The Letter of Offer and Acceptance (LOA) providing funds for an Intensive Management Office was then signed and followed by LOA's for Manufacturing Technical Assistance, Facilitization, Field Support, and U.S. Government Furnished Equipment. One more LOA for a complete Technical Data Package is still pending.

d. (U) Nuclear Costs - - None

e. (U) References - -

Development Estimate: DCP #117A, May 24, 1978.

Approved Program:
FY90/91 President's Budget.

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

		Current Year		Budget Year
		Current Est (Dec 88 SAR)	UCR Baseline (Dec 87 SAR)	UCR Baseline (Dec 88 SAR)
a. (U)	Program Acquisition - -			
(1)	Cost	26401.3	21999.5	26401.3
(2)	Quantity	9317	7857	9317
(3)	Unit Cost	2.8	2.8	2.8
b. (U)	Current Procurement - -	(FY 1989)	(FY 1989 Appn) *	(FY 1990)
(1)	Cost	1425.8	1425.8	1371.5
	Less CY Adv Proc	246.9	246.9	245.0
	Plus PY Adv Proc	251.3	251.3	290.9
	Net Total	1430.2	1430.2	1417.4
	* Adjusted to reflect FY 1989 Appropriations.			
(2)	Quantity	555	555	448
(3)	Unit Cost	2.6	2.6	3.2

13. (U) Cost Variance Analysis:

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

	RDTE	PROC	MILCON	TOTAL
Development Estimate	584.6	4194.8		4779.4
Previous Changes:				
Economic	6.4	254.6	-	261.0
Quantity	-	8326.1	-	8326.1
Schedule	-	1070.0	-	1070.0
Engineering	338.0	1320.5	-	1658.5
Estimating	252.6	5125.4	22.4	5400.4
Other	-	-	-	-
Support	98.5	405.6	-	504.1
Subtotal	695.5	16502.2	22.4	17220.1
Current Changes:				
Economic	-53.6	-100.8	-	-154.4
Quantity	-	4000.3	-	4000.3
Schedule	-	-223.4	-	-223.4
Engineering	106.9	358.5	-	465.4
Estimating	16.8	87.6	-	104.4
Other	-	-	-	-
Support	-	209.5	-	209.5
Subtotal	70.1	4331.7	-	4401.8
Total Changes	765.6	20833.9	22.4	21621.9
Current Estimate	1350.2	25028.7	22.4	26401.3

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

(FY72 Constant (Base-Year) Dollars in Millions)

Development Estimate	422.6	1970.2	-	2392.8
Previous Changes:				
Quantity	-	2409.3	-	2409.3
Schedule	-	102.3	-	102.3
Engineering	145.7	314.8	-	460.5
Estimating	65.8	1311.8	9.0	1386.6
Other	-	-	-	-
Support	46.2	48.9	-	95.1
Subtotal	257.7	4187.1	9.0	4453.8
Current Changes:				
Quantity	-	955.0	-	955.0
Schedule	-	-49.6	-	-49.6
Engineering	37.4	83.1	-	120.5
Estimating	13.0	7.3	-	20.3
Other	-	-	-	-
Support	-	49.8	-	49.8
Subtotal	50.4	1045.6	0.0	1096.0
Total Changes	308.1	5232.7	9.0	5549.8
Current Estimate	730.7	7202.9	9.0	7942.6

b. (U) Previous Change Explanations - -

(U) RDTE

Economic: Revised escalation indices.

Engineering: Added 120mm system and Block II improvements.

Estimating: Additional FY77 and FY78 funding for turbine engine improvements. Revised 120mm system integration effort. Increased contractor cost to support DT/OT III and other M1 test support. Extended FSED test support and increased funding for logistics associated with DT/OT III.

(U) Procurement

Economic: Revised escalation indices.

Quantity: Increase from 3312 to 7467 units. Production stretchout of program to FY92 resulting in procurement of 377 additional tanks (total of 7844).

Schedule: Lengthened build-up and procurement schedules.

Engineering: Introduction of 120mm gun, Chemical Agent Resistant Coating (CARC), Reliability, Availability, Maintainability - Durability (RAM-D) investments, optical improvements, and revised estimates for Block II improvements.

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

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

Estimating:	Increased cost for initial production facilities. Transmission and final drive savings. Revised contract prices for basic vehicle, engine, fire control subsystems, and other hardware items. Additional requirements including special projects and test programs. Revised requirements for government engineering and quality assurance.
Support:	Revised estimates for peculiar support equipment (special tools and test sets), initial spares, training devices, and system technical support.

(U) MILCON

Estimating: Revised estimate 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)	---	-53.6
Correction of previous SAR change explanation for increased Block II requirements (+18.8) and additional Block II requirements (+88.1)	(Engineering)	+37.4	+106.9
Historical program adjustment (-18.0), current and prior year inflation offset (+53.6), and correction of previous SAR change explanation (-18.8)	(Estimating)	+13.0	+16.8
(2) (U) Procurement			
Revised escalation indices	(Economic)	---	-100.8
Addition of 1,460 tanks	(Quantity)	+955.0	+4000.3
Two hundred and nine tanks were rescheduled from FY91-92 to the FY86-90 period	(Schedule)	-49.6	-223.4
Block II Design changes	(Engineering)	+83.1	+358.5
Historical program adjustment (-13.2), current and prior year inflation offset (+75.3), and revised hardware price estimates (+25.5)	(Estimating)	+7.3	+87.6
Revised requirements for training devices (-40.0), spares (+407.5), and other weapon system costs (-158.0)	(Support)	+49.8	+209.5

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

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

	(Dollars in Millions) Base-Year	Then-Year
(3) (U) MILCON - NA	0.0	0.0

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 Estimate)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
.90	+.58	-	-.03	-.09	-	+.06	+.02	+.54	1.44

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

PAUC (Dev Estimate)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1.44	+.01	+.40	+.09	+.23	+.58	-	+.08	+1.39	2.83

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 1)
CPIF
Award: December 14, 1988
Definitized: NA

Initial Contract Price		
Target	Ceiling	Quantity
NA	207.0	NA

Current Contract Price		
Target	Ceiling	Quantity
NA	207.0	NA

Estimated Price at Completion	
Contractor	Program Manager
NA	NA

The letter contract for the Abrams Block II FSD was awarded on 14 December 1988. This contract is not expected to be definitized before June 1989. The Initial CSCS/C report, for the period ending 31 January 1989, is expected to arrive February 1989. $134.1 million was budgeted by PM Abrams and $72.9 million was budgeted by TMAS.

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
400.0	NA	3299

Estimated Price at Completion	
Contractor	Program Manager
400.0	400.0

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

Track, T-158, 10th-14th Yr 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.

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

Transmission 10th Year Production
Allison Transmission Div, Gen Mtrs
Indianapolis, IN
DAAE07-88-C-A002
FFP

Initial Contract Price		
Target	Ceiling	Quantity
89.3	NA	669

Award: November 12, 1987
Definitized: November 12, 1987

Current Contract Price		
Target	Ceiling	Quantity
89.3	NA	669

Estimated Price at Completion	
Contractor	Program Manager
89.3	89.3

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

Engine, 8th-12th Year Production
TEXTRON, Lycoming Division
Stratford, CT
DAAE07-86-C-A050
FFP

Initial Contract Price		
Target	Ceiling	Quantity
301.6	NA	840

Award: June 13, 1986
Definitized: March 31, 1987

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 Land Systems Div
Warren, MI
DAAE07-85-C-A043
FFP

Initial Contract Price		
Target	Ceiling	Quantity
3569.8	NA	3000

Award: April 1, 1985
Definitized: May 29, 1987

Current Contract Price		
Target	Ceiling	Quantity
3593.0	NA	3000

Estimated Price at Completion	
Contractor	Program Manager
3593.0	3593.0

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

c. (U) MILCON - - NA

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

a. (U) Program Status - -

(1) Percent Program Completed: 78.3% (18 yrs/23 yrs)

(2) Percent Program Cost Appropriated: 68.2% ($17999.4/$26401.3).

b. (U) Appropriation Summary - -

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY72-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-94)	Total
RDT&E	1231.2	57.5	44.5	17.0	1350.2
Procurement	16745.8	1371.5	1288.3	5623.1	25028.7
MILCON	22.4	0.0	0.0	0.0	22.4
Total	17999.4	1429.0	1332.8	5640.1	26401.3

c. (U) Annual Summary - -

Fiscal Year	QTY	Rollaway FY87 Dollars		Total Base Year $	Total Then-Year Dollars			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1972				19.3	20.0	20.0	20.0	
1973				19.5	21.5	21.5	21.5	4.4
1974				45.3	53.8	53.8	53.8	8.0
1975				50.5	65.0	65.0	65.0	10.9
1976				38.9	52.8	52.8	52.8	6.6
197T				28.0	39.3	39.3	39.3	2.9
1977				67.7	98.6	98.6	98.6	2.6
1978				80.2	125.8	125.8	125.8	6.8
1979				53.6	92.3	92.3	92.3	8.4
1980				36.2	68.7	68.7	68.7	10.6
1981				46.6	96.4	96.4	96.4	10.6
1982				51.7	113.7	113.7	113.7	7.6
1983				30.0	69.0	69.0	69.0	4.9
1984				36.7	87.6	87.6	87.6	3.8
1985				19.9	49.0	49.0	49.0	3.4
1986				9.0	22.7	22.7	22.7	2.8
1987				9.4	24.5	24.5	13.5	2.7
1988				26.3	70.9	69.3	15.9	3.1
1989				21.4	59.6	0.1	0.0	4.0
1990				19.9	57.5			3.6

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

Fiscal Year	QTY	Rollaway FY87 Dollars		Total Base Year $	Total Then-Year Dollars			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E (Cont'd)								
1991				15.0	44.5			3.3
1992				5.6	17.0			2.8
1993				0.0	0.0			2.3
1994				0.0	0.0			1.8
Subtotal	13			730.7	1350.2	1170.1	1105.6	
Appropriation: Procurement								
1977	0	12.9	0.0	12.9	21.2	21.2	21.2	
1978	0	57.9	0.0	87.4	164.8	155.7	155.7	3.6
1979	90	69.2	81.6	190.7	402.6	380.9	375.7	10.7
1980	309	53.9	194.0	300.1	726.8	661.0	645.4	11.4
1981	569	62.5	351.3	507.9	1407.0	1345.9	1326.7	18.3
1982	665	17.3	374.7	521.0	1553.1	1470.6	1439.6	20.2
1983	855	33.0	430.1	619.3	1961.2	1863.7	1845.8	9.0
1984	840	17.1	422.0	521.4	1719.0	1559.9	1544.6	8.0
1985	854	13.5	472.2	565.7	1909.1	1899.1	1755.8	3.4
1986	811	1.5	442.5	542.7	1892.1	1766.4	1550.5	2.8
1987	810	0.7	451.1	514.5	1852.7	1701.6	1412.3	2.7
1988	689	0.6	391.6	457.5	1710.4	1305.1	119.1	3.1
1989	555	0.6	321.2	369.3	1425.8	695.8	0.0	4.0
1990	448	32.6	270.4	345.3	1371.5			3.6
1991	261	18.3	197.2	316.6	1288.3			3.3
1992	516	0.6	373.0	464.4	1928.2			2.8
1993	516	0.6	371.7	443.1	1873.6			2.3
1994	516	0.6	372.6	423.1	1821.3			1.8
Subtotal	9304	393.4	5517.2	7202.9	25028.7	14826.9	12192.4	
Appropriation: MILCON								
1980				2.6	5.8	5.8	5.8	
1981				0.0	0.0	0.0	0.0	10.6
1982				0.0	0.0	0.0	0.0	7.6
1983				3.7	9.4	9.4	9.4	4.9
1984				1.6	4.3	4.3	4.3	3.8
1985				1.1	2.9	2.9	2.9	3.4
Subtotal				9.0	22.4	22.4	22.4	
Total	9317	393.4	5517.2	7942.6	26401.3	16019.4	13320.4	

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.

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	12.200
86		11.586	11.586
87		13.500	13.500
88	11.000	11.483	11.483
89		9.250	9.250
90		8.915	9.933
91		6.070	8.600
92			11.560

The maximum economic rate for the existing multiyear contract, which includes production at two tank plants, is 90/mo. or 1080 units per year. This is not shown below as FY89 and prior are considered to be in the past. The maximum economic rate drops to 900/yr when continued production at just one tank plant is assumed. Also, because other service components are presently supplementing the Army's budget, the annualized rates in the table below support the National Guard's FY89 requirement for 55 tanks and the Marine Corps' FY89-91 procurements of 66, 155, and 255 tanks, respectively.

	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	840
1985	360	NA	840	840
1986	360	NA	840	840
1987	360	NA	720	720
1988	360	NA	720	720
1989		NA	720	720
1990		NA	603	900
1991		NA	516	900
1992		NA	516	900
1993		NA	516	
1994		NA	516	

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

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	7942.6	+205.9	7736.7
(TY $)	NA	NA	26401.3	+1009.5	25391.8
PAUC (BY $)	NA	NA	0.9	+0.1	0.8
(TY $)	NA	NA	2.8	+0.1	2.7

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 Data (Mo/Yr)	NA	NA	2/80	NA	2/80
Duration (in Months)	NA	NA	194	+24	170
End Date (Mo/Yr)	NA	NA	4/96	NA	4/94

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

	To Date
RDT&E	13/13
Procurement	5504/5534

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 -- NA

b. Costs -- NA

c. Contractor Support Costs --

(Then-Year Dollars in Millions)

	FY1989 & Prior 1/	FY1990 Year	FY1991 Year	Balance To Complete	Total
O&M	103.1	47.9	45.9	--	196.9

1/ Includes FY88-89.

A-3 AH-64

~~CONFIDENTIAL~~

(38-113)

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: AH-64 (APACHE)

AS OF DATE: December 31, 1988

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~~CLEARED~~

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1. (U) Designation and Nomenclature (Popular Name): AH-64A/Advanced Attack Helicopter (APACHE)

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

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

RDT&E: PE 23744 Project D425 (SUNK) D423
PE 64180 Project DB54 (Shared Funding-FY 1988 only)

PROCUREMENT: APPN 2031 SSN A06605/AA0951/AA0968/A09000

MILCON: Project 1304/2131/9186310/9248660/9221240/9186320

5. (U) Related Programs: HELLFIRE, 30MM Ammunition, AH-64 Combat Mission Simulator, 2.75" Rockets.

6. (U) 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

~~MAR 1989~~

OASD(PA) DFOISR 89 -T- 0560

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~~DECLASSIFY ON: 31 DEC 77~~

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6. (U) Mission and Description (Cont'd):
includes the HELLFIRE anti-tank missile system, 30MM automatic gun and 2.75" kets. This aircraft is the platform for the Target Acquisition Designation ht/Pilot Night Vision Sensor (TADS/PNVS) which will provide day and night uisition and designation of targets and hand-off capabilities in support of HELLFIRE and other guided munitions. APACHE's Stage I of a Multistage Improvement Program (MSIP) 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. 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 McDonnell Douglas Helicopter Company (MDHC) 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 November 1981. The Defense Systems Acquisition Review Council (DSARC III), at which initial production of e APACHE was approved, was held on 26 March 1982. Production contracts for e first production quantity of 11 aircraft and associated equipment were awarded to Hughes, MMOA and General Electric in April 1982. 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. FUE was 10 May 1986. IOC was 22 July 1986. First two production Combat Mission Simulators (CMSs) were installed at Fts. Rucker and Hood.

b. (U) Significant Developments Since Last Report -- A total of 427 production APACHEs have been delivered through 31 December 1988. This completed the fifth Production Lot of Air vehicles on schedule. On 12 August 1988, MDHC received a $19.1 million contract for the MSIP, Phase I, Stage I and $3.7 million was awarded incrementally in August and December 1988. Currently 10 Attack Helicopter Battalions (AHBs) have been fielded and are combat ready-5 at Ft. Hood, 3 in USAREUR, 1 with the North Carolina Army National Guard, and 1 at Ft. Bragg. The 2-6th CAV performed well in REFORGER 88 with a mission capable rate above 85 percent. In 1988, AH-64s were provided to North Carolina, South Carolina and Florida Army National Guard Units. The first overseas fielding of the Electronic Equipment Test Facility took place 15 October 1988. As of 31 December 1988, fielded APACHEs had flown approximately 125,000 hours. The AH-64 system is expected to satisfy the mission requirements.

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

8. Threshold Breaches: There are currently no DAE Baseline, DCP (dated 1 March 1982); SDDM (dated 15 April 1982); or CSA Program Decision ltr (dated 21 September 1984) threshold breaches.

9. (U) Schedule:

a. (U) 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
Eng Design Test 3 Completed	Jul 79	N/A	N/A
Competitive TADS Fly-Off Compl	Dec 79	N/A	Mar 80
Engineering Design Test 4 Comp	N/A	N/A	Nov 80
Engineering Design Test 5 Compl	N/A	N/A	Jan 81
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 Ch-1
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 Ch-1
Third Prod Contract Award (FY84)	N/A	Nov 83	Nov 83 Ch-1
Production Tests Verification and Validation Start (Ongoing)	N/A	Jan 84	Jan 84 Ch-1
First Prod Deliveries Start	Jun 82	Jan 84	Jan 84
Fourth Prod Contract Award (FY85)	N/A	Nov 84	Nov 84 Ch-1
Second Prod Deliveries Start	N/A	Dec 84	Dec 84 Ch-1
Fifth Prod Contract Award (FY86)	N/A	Nov 85	Nov 85 Ch-1
Third Prod Deliveries Start	N/A	Dec 85	Dec 85 Ch-1
First Unit Equipped (Initial Deployment) (CONUS)	N/A	Apr 86	Apr 86 Ch-1
IOC (Initial IOC)	May 83	Jul 86	Jul 86
Prod Tests: First Article Test Complete	N/A	Oct 86	Oct 86 Ch-1
Sixth Prod Contract Award (FY87)	N/A	Nov 86	Nov 86 Ch-1
Fourth Prod Deliveries Start	N/A	Nov 86	Nov 86 Ch-1
Full Rate Prod (12 A/C per month)	N/A	Jan 87	Jan 87 Ch-1
Production Tests Verification and Validation Complete	N/A	Oct 87	Oct 87 Ch-1
Seventh Prod Contract Award (FY88)	N/A	Nov 87	Nov 87 Ch-1
Fifth Prod Deliveries Start	N/A	Jan 88	Jan 88 Ch-2
First Unit Equipped (USAREUR)	N/A	Feb 88	Feb 88 Ch-1
Contract Award (Preliminary MSIP Design AH-64)	N/A	Aug 88	Aug 88 Ch-3
Contract Award (Preliminary MSIP Design TADS/PNVS)	N/A	Sep 88	Sep 88 Ch-3
Sixth Prod Deliveries Start	N/A	Dec 88	Dec 88 Ch-2
Eighth Prod Contract Award (FY89)	N/A	Dec 88	Dec 88 Ch-2
APACHE MSIP Program Review - DA	N/A	May 89	May 89 Ch-3
Seventh Prod Deliveries Start	N/A	Nov 89	Nov 89 Ch-2
Ninth Prod Contract Award (FY90)	N/A	Nov 89	Nov 89 Ch-2
Eighth Prod Deliveries Start	N/A	Jul 90	Jul 90 Ch-2

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

	Development Estimate	Approved Program	Current Estimate
Tenth Prod Contract Award (FY91)	N/A	Nov 90	Nov 90 Ch-2
Ninth Prod Deliveries Start	N/A	Jul 91	Jul 91 Ch-2
Eleventh Prod Contract Award (FY92)	N/A	Nov 91	Nov 91 Ch-2
Tenth Prod Deliveries Start	N/A	Jul 92	Jul 92 Ch-2
Twelfth Prod Contract Award (FY93)	N/A	Nov 92	Nov 92 Ch-2
Eleventh Prod Deliveries Start	N/A	Jul 93	Jul 93 Ch-2
Twelfth Prod Deliveries Start	N/A	Jul 94	Jul 94 Ch-2
Final Prod Delivery	N/A	May 95	May 95 Ch-2
Last Unit Equipped (LUE) 1/	N/A	Sep 95	Sep 95 Ch-2

1/ Equipped dates for units fielding in FY93 and beyond are to be determined. (HDQA, MSG 092125Z Nov 88, subject: Extended APACHE Fielding Plan).

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.

c. (U) Current Change Explanation --

(Ch-1) Added to agree with 1 March 1989 D A E Approved AAH Production Baseline.

(Ch-2) Contract schedule change due to program restructuring.

(Ch-3) Reflects incorporation of Stage I of MSIP.

d. (U) References --

(U) Development Estimate: Dep Sec Def Memo, January 5, 1977, subject: "Advanced Attack Helicopter (AAH) DSARC II."

(U) Approved Program: DAE Baseline March 1989.

(b)(1)

[redacted]

(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

(b)(1)

[redacted]

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

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: DAE Baseline March 1989.

AH-64A, December 31,1988

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

(U) Cost --	Development Estimate	Approved Program 1/	Current Estimate
Development	$609.4	$850.9	$850.9
Procurement	1283.0	3635.0	3635.0
Acft Flyaway	(998.0)	(2770.3)	(2770.3)
HF Launcher (APA)	(-0-)	(20.6)	(20.6)
HF Launcher (Other)	(15.4)	(5.5)	(5.5)
Total Flyaway	(1013.4)	(2796.4)	(2796.4)
Initial Spares (Acft)	(136.0)	(356.9)	(356.9)
Initial Spares (HF)	(1.3)	(5.6)	(5.6)
Other Wpn Sys Cost	(132.3)	(476.1)	(476.1)
Construction	-0-	36.0	36.0
Total FY 72 Base Year	1892.4	4521.9	4521.9
Escalation	1897.4	9323.5	9323.5
Development (RDT&E)	(326.3)	(644.1)	(644.1)
Procurement	(1571.1)	(8613.0)	(8613.0)
Acft	((1556.1))	((8541.7))	((8541.7))
HF Launcher (APA)	((-0-))	((61.6))	((61.6))
HF Launcher (Other)	((15.0))	((9.7))	((9.7))
Construction (MILCON)	(-0-)	(66.4)	(66.4)
Total Then-Year $	$ 3789.8	$13,845.4	$13,845.4
b. (U) Quantities --			
Development(RDT&E)	9	9	9
Procurement	536	975	975
Total	545	984	984

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:
FY 1990-91 President's Budget.

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:
urrent (Then-Year) Dollars in Millions)

		Current Year		Budget Year
		Current Est (Dec 88 SAR)	UCR Baseline (Dec 87 SAR)	UCR Baseline (Dec 88 SAR)
a.	(U) Program Acquisition --			
	(1) (U) Cost	13845.4	10015.4	13845.4
	(2) (U) Quantity	984	684	984
	(3) (U) Unit Cost	14.07	14.64	14.07
b.	(U) Current Procurement --	(FY 1989)	(FY 1989 Appn)	(FY 1990)
	(1) (U) Cost	1016.0	1016.0	902.5
	Less CY Adv Proc	76.0	76.0	90.0
	Plus PY Adv Proc	46.0	36.0	56.5
	Net Total	986.0	976.0	869.0
	(2) (U) Quantity	72	72	72
	(3) (U) Unit Cost	13.69	13.56	12.07

13. (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	+24.5	+639.9	-10.2	+654.2
Quantity	--	+655.9	--	+655.9
Schedule	+200.4	+407.2	--	+607.6
Engineering	+61.9	+194.2	--	+256.1
Estimating	+200.6	+2566.3	+74.9	+2841.8
Other	--	--	--	--
Support	+32.4	+1177.6	--	+1210.0
Subtotal	+519.8	+5641.1	+64.7	+6225.6
Current Changes:				
Economic	- 1.1	-2.6	- .3	- 4.0
Quantity	--	+2025.2	--	+2025.2
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+40.6	+760.9	+38.0	+839.5
Other	--	--	--	--
Support	--	+969.3	--	+969.3
Subtotal	+39.5	+3752.8	+37.7	+3830.0
Total Changes	+559.3	+9393.9	+102.4	10055.6
Current Estimate	1495.0	12248.0	102.4	13845.4

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	--	+206.9	--	+206.9
Schedule	+94.6	+46.2	--	+140.8
Engineering	+27.6	+62.4	--	+90.0
Estimating	+100.3	+759.1	+23.0	+882.4
Other	--	--	--	--
Support	+17.4	+291.0	--	+308.4
Subtotal	+239.9	+1365.6	+23.0	+1628.5
Current Changes:				
Quantity	--	+527.4		+527.4
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+1.6	+207.4	+13.0	+222.0
Other	--	--	--	--
Support	--	+251.6	--	+251.6
Subtotal	+1.6	+986.4	+13.0	+1001.0
Total Changes	+241.5	+2352.0	+36.0	+2629.5
Current Estimate	850.9	3635.0	36.0	4521.9

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.

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).

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.

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.

(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 89 economic escalation rates. (Economic)	N/A	- 1.1
Multi Stage Improvement Program increase. (Estimating)	+1.6	+40.6
(2) (U) Procurement		
Revised Jan 89 economic escalation rate. (Economic)	N/A	-2.6

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

Increase of fleet from 675 to 975.	+958.6	+3650.3
o Addition of 300 aircraft. (Quantity)	(+527.4)	(+2025.2)
o Changes applicable to additional 300 aircraft and period of performance. (Estimating)	(+207.4)	(+760.9)
o Increase of Special Mission Kits, ASE suites Ground Spt Equipment, and Spares as the result of larger fleet size (975 vs 675). (Support)	(+223.8)	(+864.2)
HQDA policy change to include funding of Flight Simulators and Procedures Training Devices in the Procurement line in FY 88 and beyond. (Support)	+27.8	+105.1

(3) (U) MILCON

Revised Jan 89 economic escalation rates (Economic)	N/A	-.3
Increase due to addition of FY 92 and FY 94 system specific construction projects for APACHE Estimating)	+13.0	+38.0

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	
3.743	1.520	.090	.742	.486	.237	.058	.078	3.211	6.954

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

PAUC (Dev Est)	Changes								PAUC (Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
6.954	+.661	-.378	+.618	+.260	+3.741	--	+2.215	+7.117	14.071

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

(U) Procurement --

Airframe	Initial Contract Price Target	Ceiling	Qty
McDonnell Douglas Helicopter Co. Mesa, AZ DAAJ09-85-C-A004, FFP, Award: November 11, 1984 Definitized: March 29, 1985	$72.1	N/A	N/A

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
79.7	N/A	N/A	79.7	79.7

Note: For FFP contracts, cost and schedule variance information is not required.

TADS/PNVS-Hardware	Initial Contract Price Target	Ceiling	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 Target	Ceiling	Qty 1/	Estimated Price at Completion Contractor	Program Manager
$377.7	N/A	292	$377.7	$377.7

Note: For FFP contracts, cost and schedule variance information is not required.

1/ Quantity increased from 261 to 292 to complete the support of the Lot 7 Buy through 603 aircraft.

Engine	Initial Contract Price Target	Ceiling	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 Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$286.2	N/A	652	$286.2	$286.2

Note: For FFP contracts, cost and schedule variance information is not required.

1/ Quantity increased from 632 to 652 due to increased aircraft buy.

15. (U) 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
$ 89.3	N/A	N/A	$ 89.3	$ 89.3

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
$1606.3	N/A	284	$1606.3	$1606.3

Note: For FFP contracts, cost and schedule variance information is not required.

	Target	Ceiling	Qty
TADS/PNVS-Services Martin Marietta Orlando Aerospace Orlando, FL DAAJ09-88-C-A007, FFP, Award: December 23, 1987 Definitized: December 23, 1987	$317.6	N/A	261

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$ 49.5	N/A	N/A	$ 49.5	$ 49.5

Note: For FFP contracts, cost and schedule variance information is not required.

AH-64A, December 31,1988

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

a. (U) Program Status --

(1) (U) Percent Program Completed: 77.3% (17 yrs/22 yrs)

(2) (U) Percent Program Cost Appropriated: 71.0% (9826.9/13845.4)

b. (U) 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	1305.1	84.3	61.0	44.6	1495.0
Procurement	8475.2	902.5	848.8	2021.5	12248.0
MILCON	64.2	0.0	0.0	38.2	102.4
Total	9844.5	986.8	909.8	2104.3	13845.4

c. (U) Annual Summary --

Fiscal Year	Qty	Flyaway FY72 Dollars Nonrec	Flyaway FY72 Dollars Rec	Total Base Year $	Total Program	Then-Year $ Obligated	Then-Year $ Expended	Escl Rate (%)
Appropriation: RDT&E								
1973				19.2	20.0	20.0	20.0	4.4
1974	2			43.6	49.1	49.1	49.1	8.0
1975				48.7	60.8	60.8	60.8	11.0
1976				55.4	73.9	73.9	73.9	9.8
1977	7			13.1	17.9	17.9	17.9	2.9
1977				93.0	130.8	130.8	130.8	2.6
1978				110.8	166.4	166.4	166.4	5.8
1979				110.2	179.4	179.4	179.4	8.4
1980				97.7	176.0	176.0	176.0	10.6
1981				86.8	172.8	172.8	172.8	10.6
1982				42.8	91.7	91.7	91.7	7.6
1983				9.8	22.1	22.1	22.1	4.9
1984				9.5	22.0	22.0	22.0	3.8
1985				10.3	24.9	24.3	20.0	3.4
1986				5.2	13.5	13.2	7.0	2.8
1987				0.0	0.0	0.0	0.0	2.7
1988				12.8	34.5	34.0	13.9	3.1
1989				17.7	49.5	6.2	.1	4.0
1990				29.2	84.3	0.0	0.0	3.6
1991				20.5	61.0	0.0	0.0	3.3
1992				14.5	44.5	0.0	0.0	2.8
Subtotal	9			850.9	1495.0	1260.6	1223.9	

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

c. (U) 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) 1/								
1981	LLT	7.7	12.5	23.5	61.2	61.2	61.2	11.6
1982	11	44.5	112.4	197.1	545.7	545.7	544.3	14.3
1983	48	18.1	203.9	310.1	909.7	909.7	900.7	9.0
1984	112	15.4	336.0	443.3	1354.1	1354.1	1343.8	8.0
1985	138	1.3	360.5	454.1	1428.8	1428.8	1408.4	3.4
1986	116	.1	292.8	370.5	1212.9	1207.0	1092.0	2.8
1987	101	0.0	254.3	327.4	1094.6	1067.0	752.6	2.7
1988	77	0.0	200.5	244.5	852.2	755.7	236.6	3.1
1989	72	2.7	211.1	282.3	1016.0	92.8	0.0	4.0
1990	72	0.0	194.5	243.6	902.5	0.0	0.0	3.6
1991	72	0.0	170.2	223.6	848.8	0.0	0.0	3.3
1992	72	0.0	183.5	246.8	958.0	0.0	0.0	2.8
1993	72	0.0	159.2	218.5	863.0	0.0	0.0	2.3
1994	12	0.0	15.2	49.7	200.5	0.0	0.0	1.8
Subtotal	975	89.8	2706.6	3635.0	12248.0	7422.0	6339.6	
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			(4.7)	(4.7)	(13.7)	(13.7)	(13.7)	9.0
1984			(3.7)	(3.7)	(11.5)	(10.8)	(10.4)	8.0
1985			(3.8)	(3.8)	(12.0)	(10.1)	(7.9)	3.4
1986			(2.8)	(2.8)	(9.1)	(7.6)	(3.3)	2.8
1987			(1.8)	(1.8)	(6.1)	(3.7)	(3.2)	2.7
1988			(1.0)	(1.0)	(3.7)	(1.8)	(.2)	3.1
1989			(1.5)	(1.5)	(5.6)	(0.0)	(0.0)	4.0
1990			(1.9)	(1.9)	(6.9)	(0.0)	(0.0)	3.6
1991			(1.5)	(1.5)	(5.7)	(0.0)	(0.0)	3.3
1992			(1.5)	(1.5)	(5.8)	(0.0)	(0.0)	2.8
1993			(1.5)	(1.5)	(5.8)	(0.0)	(0.0)	2.3
1994			(.5)	(.5)	(1.9)	(0.0)	(0.0)	1.8
Subtotal			(31.7)	(31.7)	(103.0)	(62.9)	(55.9)	
Appropriation: MILCON								
1983				3.8	8.7	8.7	8.7	4.9
1984				1.3	3.1	3.1	3.1	3.8
1985				6.3	15.6	15.6	15.6	3.4
1986				3.7	9.3	9.3	9.3	2.8
1987				1.4	3.7	3.7	3.7	2.7
1988				0.0	0.0	0.0	0.0	3.1
1989				7.9	23.8	0.0	0.0	4.0
1990				0.0	0.0	0.0	0.0	3.6
1991				0.0	0.0	0.0	0.0	3.3
1992				8.2	26.8	0.0	0.0	2.8
1993				0.0	0.0	0.0	0.0	2.3
1994				3.4	11.4	0.0	0.0	1.8
Subtotal				36.0	102.4	40.4	40.4	
Total	984			4521.9	13845.4	8723.0	7603.9	

1/ Revisions made to correct Flyaway categories.

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	116
1987	96	56	101	101
1988	60	--	77	77
1989	--	--	72	72
1990	--	--	72	144
1991	--	--	72	144
1992	--	--	72	12
1993	--	--	72	--
1994	--	--	72	--

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	+1808.3	4520.5	-5.0	4515.5
	(TY $)	7402.4	+6443.0	13845.4	-923.9	12921.5
PAUC	(BY $)	5.18	-.59	4.59	--	4.59
	(TY $)	14.13	-.08	14.07	-.94	13.13

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)	64	+86	150	-35	115
End Date (Mo/Yr)	4/89	+7/+7	7/96	-11/-2	8/93

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

	To Date
RDT&E	9/9
Procurement	426/427

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

	Development Estimate	(Average Unit Flyaway Cost) Current Estimate	Lastest Approved Threshold
@ Qty: 515		975	
@ Peak Rate: 12/mo		12/mo	
FY 72 Base Year $	1.804	2.87	3.314
Then-Year $	4.511	9.64	10.660

18. (U) Operating and Support Costs:

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

a. Assumptions and Ground Rules -- N/A

b. Costs -- N/A

c. Contractor Support Costs --

(Then-Year Dollars in Millions)

	FY1989 & Prior 1/	FY1990 Year	FY1991 Year	Balance to Complete	Total
O&M	118.1	87.0	125.8	--	330.9

1/ Includes FY 1988 and FY 1989

N-10 CG-47 AEGIS
(2)

SAR-88-010

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

PROGRAM: CG 47 Class Guided Missile Cruiser

AS OF DATE: December 31, 1988

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AS AMENDED

MAR 03 1989

1. Designation and Nomenclature (Popular Name): CG 47 AEGIS Cruiser Class/Guided Missile Cruiser (AEGIS Cruiser)

2. DoD Component: Department of the Navy

3. Responsible Office and Telephone Number:

AEGIS Shipbuilder Program Manager, PMS 400
Naval Sea Systems Command

PM: RADM J.B. Greene, Jr., USN
ASSIGNED: June 11, 1987
AUTOVON: 222-7395
COMMERCIAL: (202) 692-7395

4. Program Elements/Procurement Line Items:

RDT&E: PE 0604567N Project 0857 (Shared)
PE 0604567N Project 1803 (Shared)

PROCUREMENT (SCN): PE 24292N/APPN 1611N

MILCON: N/A

5. 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.

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~~Declassify on: OADR~~

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OASD(PA) DFOISR 89-T-0584

6. 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.

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. Program Highlights:

a. 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 was 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. In November 1986, Bath Iron Works (BIW) requested and Navy negotiated revised delivery dates for the BIW ships under construction. In December 1987, BIW requested revised delivery dates for the CG 60, 61, and 63. In February 1988, Navy approved the request for revised delivery dates.

b. Significant Developments Since Last Report -- The contracts for the FY88 ships were awarded in February of 1988. CG 69, 71, 72 and 73 will be constructed by Ingalls Shipbuilding, Pascagoula, Mississippi. BIW, Bath, Maine, will build the CG 70. Both contracts are fixed price incentive. The keel was laid on two ships in 1988 - CG 65 in July and CG 64 in August. Three ships were launched in 1988 - CG 60 in March, CG 62 in July, and CG 61 in October. Two ships were commissioned in 1988 - USS SAN JACINTO (CG 56) in January and USS LAKE CHAMPLAIN (CG 57) in August. With the commissioning of USS LAKE CHAMPLAIN (CG 57) there are now eleven AEGIS Cruisers in active service. The CG 47 Class has satisfied all mission requirements.

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

8. Threshold Breaches: There are currently no DAE baseline breaches or DCP (dated March 1978) threshold breaches.

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

8. Threshold Breaches: There are currently no DAE baseline breaches or DCP (dated March 1978) threshold breaches.

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9. Schedule:

a.

Milestones --	Production Estimate	Approved Program	Current Estimate
DSARC III	Jan 78	Jan 78	Jan 78
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 (CH-1)
TICONDEROGA Deployed	N/A	Oct 83	Oct 83
Ship Commissioning, YORKTOWN (CG 48)	N/A	Jul 84	Jul 84
Ship Commissioning, VINCENNES (CG 49)	N/A	Jul 85	Jul 85
Ship Commissioning, VALLEY FORGE (CG 50)	N/A	Jan 86	Jan 86
Ship Commissioning, BUNKER HILL (CG 52)	N/A	Sep 86	Sep 86
Ship Commissioning, MOBILE BAY (CG 53)	N/A	Feb 87	Feb 87
Ship Commissioning, ANTIETAM (CG 54)	N/A	Jun 87	Jun 87
Ship Commissioning, THOMAS S. GATES (CG 51)	N/A	Aug 87	Aug 87
Ship Commissioning, LEYTE GULF (CG 55)	N/A	Sep 87	Sep 87
Ship Commissioning, SAN JACINTO (CG 56)	N/A	Jan 88	Jan 88
Ship Commissioning, LAKE CHAMPLAIN (CG 57)	N/A	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 --

(CH-1) From Sep 83 to Jul 83 - correction.

d. References --

Production 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 17 February 1988.

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10. Technical/Operational Characteristics ~~CONFIDENTIAL~~

a. Technical --	Prod Est	Approved Program Goal/ Threshold	Demon-strated Perf	Current Estimate
(1)(U) Ship:				
(U)(a) Length (overall, in ft)	563	567	567	567
(U)(b) Beam (ft)	55	55	55	55
(U)(c) Draft Navigational (ft)	31.7	31.7	31.7	31.7
(U)(d) Displacement (LT)	9100	9600	10200	9500
(U)(e) Propulsion				
1. Type	LM 2500 Gas Turbine	LM 2500 Gas Turbine	LM 2500 Gas Turbine	LM 250Q Gas Turbine
2. Horsepower (2 Shafts)	80000	80000	80000	80000
(U)(f) Accommodations				
1. Officers	33	33	37	37
2. CPO's and Enlisted	327	342	372	372

b. Operational --

(1)(U) Ship:

(U)(a) Speed, sustained (@ 80%

(b)(1)

(U)(c) Armament

(U)1. Anti-Submarine Warfare				
(U)a. Under Water Fire Control System	MK-116 Mod4	MK-116 Mod6	MK-116 Mod6	MK-116 Mod6
(U)b. Sonar System	AN/SQS-53A	AN/SQS-53C	AN/SQS-53B	AN/SQS-53C
(U)c. Towed-Array Sonar System	AN/SQR-19	AN/SQR-19	AN/SQR-19	AN/SQR-19
(U)d. Helo System	Seahawk	Seahawk	Seahawk	Seahawk
(U)e. MK-46 Torpedoes	MK-46	MK-46	MK-46	MK-46
(U)f. Anti-Submarine Rocket	ASROC	VLA	ASROC	VLA
(U)2. Anti-Air Warfare				
(U)a. AEGIS Weapon System	MK-7 Mod 3	MK-7 Mod 3	MK-7 Mod 3	MK-7 Mod 5
(U)b. Guided Missile Launching System	MK-26 Mod 1	MK-41 VLS	MK-41 VLS	MK-41 VLS
(U)c. Long Range Air Search Radar System	AN/SPS-49	AN/SPS-49	AN/SPS-49	AN/SPS-49
(U)d. PHALANX	MK-15 Mod 0	MK-15 Mod 2 Block I	MK-15 Mod 0	MK-15 Mod 2 Block I
(U)e. Electronic Warfare	SLQ-32	SLQ-32	SLQ-32	SLQ-32
(U)f. STANDARD Missile	SM-2	SM-2	SM-2	SM-2
(U)3. Anti-Surface Warfare				
(U)a. Surface Search Radar	AN/SPS-55	AN/SPS-55	AN/SPS-55	AN/SPS-55
(U)b. HARPOON Weapon System/Launchers	Quad Can.	Quad Can.	Quad Can.	Quad Can.
(U)c. 5"54 Rapid Fire Guns	MK-45	MK-45	MK-45	MK-45
(U)d. Cruise Missile Control System	N/A	TOMAHAWK	TOMAHAWK	TOMAHAWK

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

c. 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-053B. 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. Current Change Explanations -- None

e. References --

Production 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 17 February 1988.

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

a. Cost --	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	$ 55.5	$ 68.2	$ 68.2
Procurement (SCN)	8958.2	14258.8	14258.8
Basic Ship Costs	(3440.3)	(5064.5)	(5064.5)
AEGIS Weapon System	(2598.8)	(3532.4)	(3532.4)
Other GFE	(1874.6)	(5025.2)	(5025.2)
Other Costs	(832.9)	(217.5)	(217.5)
OF/PD	(211.6)	(419.2)	(419.2)
Construction (MILCON)	0.0	14.4	14.4
Total FY78 Base-Year $	9013.7	14341.4	14341.4
Escalation	5069.8	9729.5	9729.5
Development (RDT&E)	(1.8)	(7.9)	(7.9)
Procurement (SCN)	(5068.0)	(9712.3)	(9712.3)
MILCON	(0.0)	(9.3)	(9.3)
Total Then-Year $	$ 14083.5	$ 24070.9	$ 24070.9
b. Quantities --			
Development (RDT&E)	0	0	0
Procurement (SCN)	16	27	27
Total	16	27	27

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

c. Foreign Military Sales -- None.

d. Nuclear Cost -- None.

e. References

Production Estimate: AEGIS DCP #16 Revision #2 and CG 47 Class Guided Missile Cruiser DCP #134 were approved 2 March 1978.

Approved Program: FY 1990-1991 President's Budget

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

	Current Year		Budget Year
	Current Est (Dec 88 SAR)	UCR Baseline (Dec 87 SAR)	UCR Baseline (Dec 88 SAR)
a. Program Acquisition --			
(1) Cost	24070.9	24227.0	24070.9
(2) Quantity	27	27	27
(3) Unit Cost	891.5	897.3	891.5
b. Current Procurement --	(FY 1989)	(FY 1989)	(FY 1990)
(1) Cost	80.1	72.9	85.9
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Less OF/PD	-80.1	-72.9	-85.9
Net Total	-	-	-
(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	SCN	MILCON	TOTAL
Production Estimate	57.3	14026.2	0.0	14083.5
Previous Changes:				-
Economic	+1.8	-777.3	-0.9	-776.4
Quantity	-	+11739.0	-	+11739.0
Schedule	-	+435.4	-	+435.4
Engineering	+9.7	+970.9	-	+980.6
Estimating	+7.3	-2715.1	-	-2707.8
Other	-	-	-	-
Support	-	+448.1	+24.6	+472.7
Subtotal	+18.8	+10101.0	+23.7	+10143.5
Current Changes:				
Economic	-	-120.4	-	-120.4
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-32.6	-	-32.6
Other	-	-	-	-
Support	-	-3.1	-	-3.1
Subtotal	-	-156.1	-	-156.1
Total Changes	+18.8	+9944.9	+23.7	+9987.4
Current Estimate	76.1	23971.1	23.7	24070.9

13. Cost Variance Analysis (Cont'd):

(FY 1978 (Base-Year) Dollars in Millions)

	RDT&E	SCN	MILCON	TOTAL
Production 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	-960.0	-	-954.9
Other	-	-	-	-
Support	-	+209.2	+14.4	+223.6
Subtotal	+12.7	+5324.0	+14.4	+5351.1
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-21.7	-	-21.7
Other	-	-	-	-
Support		-1.7	-	-1.7
Subtotal	-	-23.4	-	-23.4
Total Changes	+12.7	+5300.6	+14.4	+5327.7
Current Estimate	68.2	14258.8	14.4	14341.4

b. Previous Change Explanations --

RDT&E

Economic: Revised escalation indices.
Engineering: HDF and SDMS design changes.
Estimating: Refinement of RDT&E estimates.

SCN

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.

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanations -- (Dollars in Millions)

	Base-Year	Then-Year
(1) RDT&E		
	N/A	N/A
(2) SCN		
Revised Jan 89 economic escalation rates. (Economic)	N/A	-120.4
Revised estimates for all ship systems and adjustments to projected ship construction contract requirements. (Estimating)	-21.7	-32.6
Adjustment of outfitting and post delivery costs corresponding to program changes. (Support)	-1.7	-3.1
(3) MILCON		
	N/A	N/A

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

a. Initial SAR Estimate to Production Estimate -- Not Applicable.

b. Production Estimate to Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
880.2	-33.2	+76.2	+16.1	+36.3	-101.5	--	+17.4	+11.3	891.5

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

a. RDT&E -- Not Applicable.

b. SCN --

Ship Construction (CG 62, 65)	Initial Contract Price Target	Ceiling	Qty
Ingalls Shipbuilding Inc. Pascagoula, Mississippi			
N00024-85-C-2035, FPI	$238.6	$267.5	1
(Mod)	$480.1	$537.1	2

Awarded/Definitized: November 26, 1984 for CG 62 and modified January 8, 1986 for CG 65

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion 1/ Contractor	Program Manager
$507.5	$556.7	2	$478.8	$468.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ +23.4	$ -6.6
Cumulative Variances To Date (11/88)	$ +47.9	$ -20.6
Net Change	$ +24.5	$ -14.0

Explanation of Change: Cost variance results primarily from contractor's favorable performance in labor (Hull Structure). Unfavorable schedule performance is due to material which is not a true schedule indicator and will not impact ship delivery dates. The program manager's assessment at completion remains well below target price.

Ship Construction (CG 60, 61, 63, 64)	Initial Contract Price Target	Ceiling	Qty
Bath Iron Works Bath, Maine			
N00024-85-C-2036, FPI	$383.6	$430.4	2
(Mod)	$770.2	$864.0	4

Awarded/Definitized: November 26, 1984 for CG 60/61 and modified January 8, 1986 for CG 63/64

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion 1/ Contractor	Program Manager
$777.6	$872.2	4	$860.1	$897.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -17.6	$ + 7.5
Cumulative Variances To Date (11/88)	$ -38.6	$ -11.4
Net Change	$ -21.0	$ -18.9

Explanation of Change: All major milestones for AEGIS Cruisers under construction at BIW are being accomplished on schedule. Increased manning levels, a new three year labor contract, and other management initiatives are expected to result in an improved learning curve and more favorable performance on this contract.

1/ Estimated Price at Completion for ship construction contracts incorporates authorized change orders and cost overrun/underrun estimates which are not included in Current Contract Target and Ceiling Price.

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

Ship Construction (CG 66, 68)	Initial Contract Price Target	Ceiling	Qty
Ingalls Shipbuilding Inc. Pascagoula, Mississippi N00024-87-C-2030, FPI Awarded/Definitized: April 16, 1987	$368.0	$390.6	2

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion 1/ Contractor	Program Manager
$373.7	$397.4	2	$403.9	$398.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ N/A	$ N/A
Cumulative Variances To Date (11/88)	$ + 8.9	$ +10.0
Net Change	$+ 8.9	$ +10.0

Explanation of Change: This contract was awarded in April 1987 and has not experienced significant activity to date.

Ship Construction (CG 69,71,72,73)	Initial Contract Price Target	Ceiling	Qty
Ingalls Shipbuilding Inc. Pascagoula, Mississippi N00024-88-C-2034, FPI Awarded/Definitized: February 25, 1988	$769.1	$819.0	4

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion 1/ Contractor	Program Manager
$772.2	$824.2	4	$799.6	$811.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ N/A	$ N/A
Cumulative Variances To Date (11/88)	$ + .4	$ - 1.6
Net Change	$ + .4	$ - 1.6

Explanation of Change: This contract was awarded in February 1988 and has not experienced significant activity to date.

1/ Estimated Price at Completion for ship construction contracts incorporates authorized change orders and cost overrun/underrun estimates which are not included in Current Contract Target and Ceiling Price.

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

AEGIS Weapon System (CG 63, 64, 65)	Initial Contract Price Target	Ceiling	Qty
GE Government Systems Division Moorestown, New Jersey N00024-86-C-5102, FPI Awarded/Definitized: March 31, 1987	$255.9	$282.6	3

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$255.1	$282.9	3	$253.8	$253.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ + 3.5	$ - 2.4
Cumulative Variances To Date (10/88)	$ + 6.8	$ - 2.0
Net Change	$ + 3.3	$ + 0.4

Explanation of Change: Current variances are not significant. Contractor is expected to complete this contract below target.

AEGIS Weapon System (CG 66-73 and DDG 52,53) 1/	Initial Contract Price Target	Ceiling	Qty
GE Government Systems Division Moorestown, New Jersey N00024-88-C-5140, FPI	$365.2	$393.3	5
(Mod)	$697.0	$749.5	10
Awarded/Definitized: January 14, 1988 for CG 66,67,68 and DDG 52,53 and modified January 19, 1988 for CG 69-73			

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$697.9	$750.5	10	$728.8 2/	$728.8 2/

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ N/A	$ N/A
Cumulative Variances To Date (10/88)	$ + 5.3	$ - 4.6
Net Change	$ + 5.3	$ - 4.6

Explanation of Change: Current variances are not significant at the early stage of this contract.

c. MILCON -- Not Applicable.

1/ This is a combined procurement contract for the CG 66-73 and DDG 52, 53. It is reported in the SARs of each program.

2/ Includes $25.6 for Amortization of Special Tooling and Special Test Equipment not reported in the contract price.

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

a. Program Status --

(1) Percent Program Completed: 70.6% (12 yrs/17 yrs)

(2) Percent Program Cost Appropriated: 98.7% ($23759.7/$24070.9)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years	Budget Year	Budget Year	Balance to Complete	TOTAL
	(FY78-89)	(FY90)	(FY91)	(FY92-94)	
RDT&E	76.1	-	-	-	76.1
SCN	23659.9	85.9	77.0	148.3	23971.1
MILCON	23.7	-	-	-	23.7
TOTAL	23759.7	85.9	77.0	148.3	24070.9

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY 78 Dollars		Total Base Year $	Total Then-Year Dollars			Escl Rate (%) 1/
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
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	.5	.5	.5	2.7
Subtotal				68.2	76.1	76.1	76.1	

1/ Since spend-out rates are not shown, the escalation rates cannot be used to verify the composite index.

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

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY 78 Dollars		Total Base Year $	Total Then-Year Dollars			Escl Rate (%) 1/
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: SCN								
1978	1		667.1	667.1	927.9	927.9	920.4	-
1979	-		0.0	0.0	1.7	1.7	1.7	9.6
1980	1		498.3	498.3	797.0	797.0	775.6	9.9
1981	2		1012.6	1013.7	1785.8	1785.3	1749.0	9.6
1982	3		1793.8	1796.0	2738.2	2708.9	2570.3	7.5
1983	3		1524.5	1535.5	2446.6	2387.5	2200.0	3.8
1984	3		1659.4	1675.9	2745.7	2634.8	2219.7	3.6
1985	3		1534.1	1559.2	2705.7	2249.4	1647.6	2.1
1986	3		1426.3	1462.7	2508.3	1985.9	1245.8	1.0
1987	3		1507.9	1568.9	2740.1	1876.5	668.3	1.5
1988	5		2215.6	2265.7	4182.8	2675.2	164.2	2.6
1989				47.0	80.1	.2		4.0
1990				48.7	85.9			3.6
1991				42.2	77.0			3.3
1992				37.9	71.1			2.8
1993				31.9	61.3			2.3
1994				8.1	15.9			1.8
Subtotal	27		13839.6	14258.8	23971.1	20030.3	14162.6	
Appropriation: MILCON								
1982				1.2	1.9	1.9	1.9	7.6
1983				6.8	10.8	10.8	10.8	4.9
1984				2.6	4.2	4.2	4.2	3.8
1987				3.8	6.8	6.8	6.8	2.7
Subtotal				14.4	23.7	23.7	23.7	
Total	27		13839.6	14341.4	24070.9	20130.1	14262.4	

1/ Since spend-out rates are not shown, the escalation rates cannot be used to verify the composite index.

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17. Production Rate Data:

a. Annualized Production Rates -- Not Applicable.

b. Cost Variance -- Not Applicable.

c. Schedule Variance -- Not Applicable.

d. Deliveries (Plan/Actual) -- Not Applicable.

e. 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.

(Average Unit Sailaway Cost)

	Prod Estimate	Current Estimate	Latest Approved Threshold
FY78 Base-Year $	540.0	534.8	N/A
Then-Year $	864.8	867.1	N/A

18. Operating and Support Costs:

a. Assumptions and Ground Rules -- Not Applicable.

b. Costs -- Not Applicable.

c. Contractor Support Costs -- The Contractor Support Costs are combined costs for both the CG 47 AEGIS Class Cruiser and DDG 51 Class Destroyer programs.

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N-18 · CVN 68-2

SAR-88-003

[redacted]

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

Program: CVN 68 CLASS (CVN-72/73 and CVN-74/75)
As Of Date: December 31, 1988

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[redacted]



1. Designation/Nomenclature: CVN 72, ABRAHAM LINCOLN; CVN 73, GEORGE WASHINGTON; CVN 74; CVN 75.

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. [redacted], USN
Assigned: August 23, 1985
Phone number: (202) 692-7280
Autovon number: 8-222-7280

4.(U) Program Elements:
RDT&E: PE 0604567N Project 1803 (shared)
PE 0603564N Project 0408 (shared)
PROCUREMENT: 1611 24112N

5.(U) Related Programs: SSN new construction, submarine and carrier overhauls

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OASD(PA) DFOISR 88-T-0591

6.(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 96,000 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 four ships have been delivered. The USS NIMITZ (CVN 68), USS DWIGHT D. EISENHOWER (CVN 69), USS CARL VINSON (CVN 70) and USS THEODORE ROOSEVELT (CVN 71) were delivered in 1975, 1977, 1982 and 1986, respectively. There are four additional CVN 68 class CVN's being constructed at Newport News Shipbuilding, the ABRAHAM LINCOLN (CVN 72), the GEORGE WASHINGTON (CVN 73), and the CVN 74 and CVN 75. Construction of the ABRAHAM LINCOLN AND GEORGE WASHINGTON began in [redacted]ruary 1983. Contract delivery dates are January 1990 for CVN 72 and [redacted]y 1992 for CVN 73. CVN 74 construction began in November 1988. Target [redacted]ivery date is December 1995 and contract delivery date is June 1996. CVN 75 construction is scheduled to begin in November 1989 and contract delivery date is June 1998.

b. Significant Developments Since Last Report -- NONE

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

8.(U) Threshold Breaches: There are currently no DAE baseline breaches. A baseline breach was reported for CVN-73 in July 1988.

9.(U) 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	1/90(CH-1)
(8) Complete Final Contract Trial	6/90	6/90	6/90
(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	9/90(CH-2)
(5) Complete Acceptance Trial	9/91	N/A	9/91
(6) Contract Delivery	12/91	7/92	7/92
(7) War Ready	2/93	2/93	2/93
Milestones (CVN 74)			
(1) Definitization of Contract	8/88	11/89	6/88
(2) Start Production	1/89	12/89	11/88
(3) Lay Keel	10/91	12/90	12/90
(4) Launch	1/94	11/93	12/93
(5) Contract Delivery	FY96	11/95	6/96 1/
Milestones (CVN 75)			
(1) Definitization of Contract	8/88	11/93	6/88
(2) Start production	1/89	12/92	11/89
(3) Lay Keel	4/93	12/92	8/92
(4) Launch	7/96	6/95	12/95
(5) Contract Delivery	FY97	6/97	6/98

1/ Target delivery date is 12/95.

9. 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 estimate dates reflect schedule IAW contract awarded 6/30/88.

c. Current change explanations:
(CH-1)Contract mod to extend delivery date of CVN-72 as a result of adverse weather.
(CH-2) Revised date to coincide with later delivery date.

d. References:
Development Estimate: Defense Appropriation Act of 1979
Approved Program:
DAE Baseline, approved February 1988, updated December 1988

(b)(1)

a. Technical	Dev Est	Approved Program Goal/Threshold	Demonstrated 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(CH-1)
(5) Displacement (tons)	96,300	96,300	93,405 1/	97,337(CH-1)
(6) Propulsion	Nuclear	Nuclear	Nuclear	Nuclear

(b)(1)

(9) Num of reactors	2	2	2	2
(10) Crew including air wing	6,280	N/A	6,040	6,048(CH-2)

(b)(1)

of aircraft (deck multiple in A4 equivalents) 3/	151	151	151	151

c. Previous change explanations: NONE

d. Current change explanations:
(CH-1) CVN-72 projected estimates at delivery.
(CH-2) Reflects 122 accommodations which have been converted to training spaces.

e. References ---
Development Estimate: Defense Appropriations Act of 1979
Approved Program:

DAE Baseline approved February 1988, updated December 1988

1/ Actual based on CVN 68c1 standardization trials.
2/ Requires extensive operational data and is dependent on actual core life. A CVN-68 class ship has not been refueled.
3/ The operational number of aircraft (deck multiple) in A7 equivalents is 156.

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	5338.1
Basic Ship Costs	(3261.4)	(3631.4)	(3631.4)
Government furn. equip costs	(1900.7)	(1569.0)	(1569.0)
Other Costs	(14.3)	(32.7)	(32.7)
Total production costs	(5176.4)	(5233.1)	(5233.1)
Ship Design	(0.9)	( )	( )
Outfitting & Post Delivery	(88.2)	(105.0)	(105.0)
Total FY 82 Base-Year $	5265.5	5339.6	5339.6
Escalation			
Development	(--)	(0.1)	(0.1)
Procurement	(2153.4)	(983.9)	(983.9)
Total Then-Year $	7418.9	6323.6	6323.6
b. Quantities			
Procurement	2	2	2
Total	2	2	2

c. Foreign Military Sales -- NONE

d. Nuclear Costs -- Not available.

e. References --
Approved Program: FY 1990/91 President's Budget

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

	Current Year(FY88)		Budget Year(FY89)
	Current Est (DEC 88 SAR)	UCR Baseline (DEC 87 SAR)	UCR Baseline (DEC 88 SAR)
a. Program Acquisition			
(1) Cost	6323.6	6120.0	6323.6
(2) Quantity	2	2	2
(3) Unit Cost	3161.8	3060.0	3161.8
b. Current Procurement	(1989)	(1989)	(1990)
(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	15.1	25.0	51.3
Net Total	15.1	25.0	51.3
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

rogram Acquisition Cost:(Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	--	--	--
Procurement	5911.0	5815.8	5815.8
Basic Ship Costs	(3744.9)	(3696.1)	(3696.1)
Government furn. equip costs	(1998.1)	(1971.9)	(1971.9)
Other Costs	(28.4)	(27.9)	(27.9)
Total production costs	(5771.1)	(5695.9)	(5695.9)
Ship Design	(0)	( )	( )
Outfitting & Post Delivery	(139.9)	(119.9)	(119.9)
Total FY 88 Base-Year $	5911.0	5815.8	5815.8
Escalation			
Development	(--)	(--)	(--)
Procurement	(1055.0)	(564.3)	(564.3)
Total Then-Year $	6966.0	6380.1	6380.1 1/
b. Quantities			
Procurement	2	2	2
Total	2	2	2

oreign Military Sales -- NONE

uclear Costs -- Not available.

e. References --
Approved Program: FY 1990/91 President's Budget

1/ Excludes advance procurement for ships beyond FY 1994.

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

	Current Year(FY88)		Budget Year(FY89)
	Current Est (DEC 88 SAR)	UCR Baseline (DEC 87 SAR)	UCR Baseline (DEC 88 SAR)
a. Program Acquisition			
(1) Cost	6380.1	6325.0	6380.1
(2) Quantity	2	2	2
(3) Unit Cost	3190.1	3162.5	3190.1
b. Current Procurement	(1989)	(1989)	(1990)
(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

3. Cost Variance Analysis

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

	RDT&E	PROC	TOTAL
Development Estimate	-	7418.9	7418.9
Previous Changes			
Economic	-	-836.0	-836.0
Estimating	1.6	-464.3	-462.7
Support	-	-0.2	-0.2
Subtotal	1.6	-1300.5	-1298.9
Current Changes			
Economic	-	-12.3	-12.3
Estimating	-	230.3	230.3
Support	-	-14.4	-14.4
Subtotal	-	203.6	203.6
Total Changes	1.6	-1096.9	-1095.3
Current Estimate	1.6	6322.0	6323.6

1982 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	TOTAL
Development Estimate	-	5265.5	5265.5
Previous Changes	-		
Estimating	1.5	-117.8	-116.3
Support	-	4.4	4.4
Subtotal	1.5	-113.4	-111.9
Current Changes	-	-	-
Estimating	-	198.0	198.0
Support	-	-12.0	-12.0
Subtotal	-	186.0	186.0
Total Changes	1.5	72.6	74.1
Current Estimate	1.5	5338.1	5339.6

Cost Variance Analysis

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

	RDT&E	PROC	TOTAL
Development Estimate	-	6966.0	6966.0
Previous Changes			
Economic	-	3.4	3.4
Schedule	-	-644.4	-644.4
Support	-	-	0.0
Subtotal	0.0	-641.0	-641.0
Current Changes			
Economic	-	34.7	34.7
Estimating	-	-134.7	-134.7
Support	-	155.1	155.1
Subtotal	-	55.1	55.1
Total Changes	0.0	-585.9	-585.9
rent Estimate	0.0	6380.1	6380.1

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
Support	-	-	-
Subtotal	0.0	-124.1	-124.1
Current Changes	-	-	-
Estimating	-	-91.0	-91.0
Support	-	119.9	119.9
Subtotal	-	28.9	28.9
Total Changes	0.0	-95.2	-95.2
Current Estimate	0.0	5815.8	5815.8

Previous Change Explanations --

Estimating: Revised Requirement.

rocurement

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 estimates.
Support: Revised estimates for outfitting.

c. Current Change Explanation --

(1) Procurement	(Dollars in Millions) Base-Year	Then-year
Revised economic indicies. (Economic)	0	-12.3
Increased shipbuilding contract costs.	186.7	218.0
ncrease to offset new economic cies. (Estimating)	11.3	12.3
Revised estimates for Outfitting amd Post Delivery costs (Support).	-12.0	-14.4

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	-418.0				-122.4	-7.3		-547.8	3161.8

b. Previous Change Explanations --

Procurement

Schedule: Funding of two ships in FY 1988 vice one in Fy 1990 and one in FY 1993.

c. Current Change Explanations --

(1) Procurement	(Dollars in Millions) Base-Year	Then-year
Revised Dec 88 economic rates. (Economic)	N/A	34.7
Congressional reduction.	-91.0	-100.0
An increase to offste new economic indicies. (Estimating)		-34.7
Revised Outfitting and Post Delivery estimates (Support).	119.9	155.1

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 (Current
(DE)	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	Estimate)
3483.0	19.1		-322.2		-67.4	77.6		-293.0	3190.1

5. Contract Information:

T&E -- N/A
ocurement --

hipbuilding Contract	Target	Ceiling	Qty
ewport News Shipbuilding and ry Dock Co. Newport News,Va.	3143.0	3454.0	2

N00024-83-C-2033, FPIF
Award/Definitized: December 27, 1982

Current Target Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
3269.9	3555.8	2	3319.9	3517.1

Explanation of Change: This contract does not contain a provision requiring C/SSR reporting.

Nuclear Components Contracts	Initial Contract Price Target	Ceiling	Qty
General Electric Co. Schenectady, New York	399.8	--	--

N00024-82-C-4004, CPFF
Award/Definitized:December 29, 1982

Current Target Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
[redacted]9.8	N/A	N/A	339.8	339.8

epartment of Energy	Initial Contract Price Target	Ceiling	Qty
N00024-67-F-5110 Economy Act Order			
Award/Definitized:December 30,1982	460.1	--	--

Current Target Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
330.0	N/A	N/A	330.0	330.0

Westinghouse Electric Corp. Pittsburgh,Pa	Initial Contract Price Target	Ceiling	Qty
N00024-82-C-5002, CPFF			
Award/Definitized:December 29,1982	540.1	--	--

Current Target Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
530.1	N/A	N/A	530.1	530.1

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
3674.0	4318.6	2	3674.0	3674.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances To Date (12/31/88)	$ 0.0	$ 0.0
Net Change	$ 0.0	$ 0.0

Explanation of Change: Variance data has not be received from the shipbuilder as of report submission date.

Nuclear Components Contracts	Initial Contract Price Target	Ceiling	Qty
General Electric Co. Schenectady, New York N00024-88-C-4008, CPFF Award/Definitized: February 2,1988	204.6	--	--

Current Target Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
204.6	N/A	N/A	204.6	204.6

Department of Energy N00024-67-F-5110 Economy 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
454.3	N/A	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
506.2	N/A	N/A	506.2	506.2

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

a. Program Status --

(1) Percent Program Completed: 55.5% (5 Yrs/9 Yrs)

(2) Percent Program Cost Appropriated: 98.4% ($6225.0\$6323.6)

b. Appropriation Summary --

(Then-year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-95)	TOTAL
RDT&E	1.6	-	-	-	1.6
Procurement	6223.4	51.3	15.8	31.5	6322.0
Total	6225.0	51.3	15.8	31.5	6323.6

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	-	-	433.1	433.1	475.0	464.8	423.4	7.5
1983	2	-	4800.0	4800.0	5713.9	5298.8	3679.9	3.8
1987	-	-	-	6.5	7.3	7.3	5.3	1.5
1988	-	-	-	10.4	12.0	11.4	6.3	2.6
1989	-	-	-	12.5	15.1	0.2	-	4.0
1990	-	-	-	40.7	51.3	-	-	3.6
1991	-	-	-	11.9	15.8	-	-	3.3
1992	-	-	-	21.5	29.3	-	-	2.8
1993	-	-	-	1.6	2.2	-	-	2.3
1994	-	-	-	-	-	-	-	1.8
Total	2	-	5233.1	5338.1	6322.0	5782.5	4114.9	

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

Program Status --

(1) Percent Program Completed: 11.1% (1 Yrs/9 Yrs)

(2) Percent Program Cost Appropriated: 97.6% ($6225.0\$6380.1)

b. Appropriation Summary --

(Then-year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-95)	TOTAL
RDT&E	-	-	-	-	0
Procurement	6225.0	-	-	155.1	6380.1
Total	6225.0	0.0	0.0	155.1	6380.1

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	-	5695.9	5695.9	6225.0	5598.6	37.6	2.6
1993	-	-	-	15.0	18.4	-	-	1.8
1994	-	-	-	9.8	12.3	-	-	1.8
CTC	-	-	-	95.1	124.4	-	-	1.8
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
Total	2	-	5695.9	5815.8	6380.1	5598.6	37.6	

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	0/0

18. a.- c. Operating and Support Costs: N/A

AF 22 NAVSTAR GPS ~~SECRET~~

~~SAR-88-070~~

[U] SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
[U] PROGRAM: (NAVSTAR GPS)/USER EQUIPMENT

AS OF DATE: December 31, 1988

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SAF/PAS
89-0036-T
#16

1. [U] Designation and Nomenclature (Popular Name): Navstar GPS/Navstar Global Positioning System (Navstar)

2. [U] DoD Component: U.S. Air Force (Lead Service User Equipment), U.S. Army, U.S. Navy.

3. [U] 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. [U] Program Elements/Procurement Line Items:

RDT&E: PEs 0603421F, 0604478F, 0305164F, 0305165F (Shared Funding)
0604777N, 0604778A
PROCUREMENT: AF - APPN 3020 ICN MGPS 00 NAVY APPN 1810 ARMY APPN 2031
AF - APPN 3010 ICN Multiple NAVY APPN 1506 ARMY APPN 2035
AF - APPN 3080 ICN 833280
MILCON: PE 0305165F
O&M: AF - APPN 3400

5. [U] Related Programs: NUDET Detection System (NDS); Space Shuttle Operations (PAM-D, Shuttle); and Space Boosters Program (Delta II)

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OASD(PA) DFOISR 89-T-0265

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 ultimately provide precise, continuous, all-weather, common grid worldwide positioning, navigation and time reference capability to a multiplicity 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 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.

Ten Block I satellites have been launched to support user equipment testing. In September 1982 the long lead contract for the 28 Block II GPS satellite fixed price multiyear production was awarded. In May 1983 the full multiyear production contract was awarded. 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 will be launched on the Medium Launch Vehicle, under development, and the Shuttle. The Block II qualification satellite successfully completed qualification testing in May 1986. The multiyear production contract is being restructured to stretch production and meet the current launch manifest. This was the lowest cost restructure option. Navstar satellites 3 and 4 have experienced gradual degradation of solar array output and Navstar 4 atomic clock appears to have failed resulting in usage of its less accurate crystal oscillator.

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 to correct reliability deficiencies. Based upon these improvements and upon completion of an integrated multi-service

7. [U] Program Highlights (Cont'd)

test plan for production equipment, the Low Rate Initial Production of user equipment was approved in June 1986. The first production satellite (GPS 13) was accepted in May 1987. The Air Force exercised option 3 of the user equipment contract to procure 428 user sets under the Low Rate Initial Production (LRIP) program. In addition, the JRMB Milestone IIIB has slipped from Mar 89 to Sept 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 Army re-baselined the GPS program in FY88 and deleted the requirement for 297 user equipment sets. The ground control segment program management responsibility transferred to Warner Robins Air Logistics Center on 1 Oct 87.

b. Significant Developments Since Last Report -- The Air Force accepted delivery of three production Block II satellites which will be launched during FY89. The first production satellite was prepared for a Feb 89 launch at Cape Canaveral. The mission operation support complex became operational at Rockwell International, Seal Beach. In addition, a contract modification restructure of the production satellite 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 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 Jun 90. In addition, flight test has begun on 14 aircraft and 10 Army and Navy platforms. The total quantity of user equipment sets decreased 1536 to accompany revised schedule and force structure requirements. The Army has changed the procurement appropriation for aircraft user equipment sets to the other appropriation for sets procured starting in FY88.

The Navstar GPS system is expected to satisfy the mission requirement.

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

8. [U] Threshold Breaches: There are currently no DCP (dated Jun 1986) threshold breaches. The Milestone DAB IIIB date has breached the milestone date established in the DAE baseline (dated February 1988).

9. [U] 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		
System Design Review	Jan 80/N/A	Jan 80
Preliminary Design Review	Mar 80/N/A	Mar 80
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/Jan 89	Feb 89 (CH-1)
Block IIR Contract Award (CH-2)	N/A/N/A	Jun 89
First Block IIR Satellite Launch	N/A/N/A	Mar 96 (CH-2)
Control Segment		
Development Contract Award	Sep 80/N/A	Sep 80
Operational Control Segment (FOC)	Nov 87/Apr 91	Apr 91
Control Segment Turnover to AFSPACECOM	N/A /N/A	6 mos after 3rd launch (CH-2)
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
Source Selection	Apr 85/N/A	Apr 85
Phase III PDR	Dec 85/N/A	Dec 85
Production Contract Award	Jan 84/N/A	Aug 86
Phase III CDR	Jun 86/N/A	Dec 86
AF Begin/End DT User Equipment (CH-2)	N/A/N/A	Jul 88/Mar 89
Begin/End UE OT&E (CH-2)	N/A/N/A	Apr 89/Aug 89
First Full-Rate UE Production Delivery	N/A/N/A	Dec 91 (CH-2)

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

	Development Estimate/ Approved Program	Current Estimate
Program		
*JRMB Milestone IIIA	Sep 83/Jun 86	Jun 86
3-Dimensional Capability (24 hrs/day)	Dec 87/Sep 92	Sep 92 (CH-3)
*DAB IIIB	Mar 89/Sep 89	Jun 90 (CH-4)

* Formerly DSARC

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 satellite slipped from Aug 86 to Jan 87 due to first satellite production problems. 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 slip 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. In addition, 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 congressional approval for a full rate production decision. The launch schedule has been normalized to assure consistent support, constellation build, and to smooth resulting satellite replenishment requirement.

9. [U] Schedule (cont'd):

c. Current Change Explanations --

(CH-1) Delay in Delta II initial launch capability to Feb 89.

(CH-2) Previously not reported.

(CH-3) Delayed Delta II launches have slipped the three dimensional capability dates.

(CH-4) 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.

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 February 1988.

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	N/A/+/-100	+/-25	+/-100
User Equipment Reliability Mean Time Between Maintenance (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)	N/A	N/A/N/A	4480	4480 (Ch-1)

(b)(1)

[U] 3-D Position Accuracy				
[U] of User Equipment B/				
[U] Spherical Error				
[U] Probable (SEP)(m)	16	N/A/16	10 F/	16

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

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf A/	Current Estimate
(b)(1)				

10. (U) Technical Operations Cont'd

[U] 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.
[U] B/ DCP Threshold.
[U] C/ Approved program changes requirement to measure mean time between operational failures.
[U] D/ Probability that a minimum of 21 satellites are operational at any time.
[U] E/ Approved program changed requirement to measure mean time to repair I-level.
[U] F/ The 16 meter objective (21 satellite constellation) corresponds to 10 meters achieved with DT&E satellite spacing.
[U] 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.
[U] H/ Time required to change the degradation level of the selective availability.

c. [U] 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 --

(CH-1) Previously not reported.

e. [U] References:
Development Estimate: Decision Coordinating Paper (DCP) #133, Revision B, dated 1 Feb 80.

Approved Program: DAE baseline dated February 1988.

11. [U] Program Acquisition Cost: Satellite (Air Force)

(Current Estimate in Millions of Dollars)

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	$ 967.6	$ 919.3	$ 919.3
Procurement	623.4	1435.3	1435.3
Spacecraft Flyaway	(583.6)	(1267.9)	(1267.9)
Other Weapon System Cost	(39.8)	(167.4)	(167.4)
Construction (MILCON)	8.4	4.7	4.7
Total FY 79 Base-Year $	1599.4	2359.3	2359.3
Escalation	707.3	1681.1	1681.1
Development (RDT&E)	(204.9)	(273.4)	(273.4)
Procurement	(496.1)	(1405.1)	(1405.1)
Construction	(6.3)	(2.6)	(2.6)
Total Then-Year $	$2306.7	4040.4	4040.4
b. Quantities			
Development (RDT&E)	12	12	12
Procurement	28	48	48
Total	40	60	60

c. Foreign Military Sales -- None.

d. Nuclear Costs -- None.

e. References --

Development Estimate: Decision Coordinating Paper (DCP) #133, Revision B, dated 1 Feb 80.

Approved Program: FY1990-91 President's Budget.

11. [U] 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	$ 847.0
Procurement	1613.1	1372.4	1372.4
Flyaway Cost	(1115.9)	(1100.5)	(1100.5)
Other Weapon System Cost	(497.2)	(271.9)	(271.9)
O&M	0	32.6	32.6
Total FY 79 Base-Year $	2554.9	2252.0	2252.0
Escalation	2320.9	1878.0	1878.0
Development (RDT&E)	(441.9)	(368.1)	(368.1)
Procurement	(1879.0)	(1479.7)	(1479.7)
O&M	0	(30.2)	(30.2)
Total Then-Year $	$4875.8	$4130.0	$4130.0
b. Quantities			
Development (RDT&E)	129	202	202
Procurement	27210	25377	25377
Total	27339	25579	25579

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 Coordinating Paper (DCP) dated Jun 86.

Approved Program: FY1990-91 President's Budget.

12. [U] Program Acquisition/Current Procurement Unit Cost Summary:
Satellite (Air Force)

(Current (Then-Year) Dollars in Millions)

a. Program Acquisition --	Current Estimate (Dec 88 SAR)	Current Year UCR Baseline (Dec 87 SAR)	Budget Year UCR Baseline (Dec 88 SAR)
(1) Cost	4040.4	4280.2	4040.4
(2) Quantity	60	60	60
(3) Unit Cost	67.340	71.337	67.340
b. Current Procurement --	(FY 1989)	(FY 1989 APPN)*	(FY 1990)
(1) Cost	74.5	74.5	70.3
Less CY Adv Proc	--	--	--
Plus PY Adv Proc	--	--	--
Net Total	74.5	74.5	70.3
(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 88 SAR)	Current Year UCR Baseline (Dec 87 SAR)	Budget Year UCR Baseline (Dec 88 SAR)
(1) Cost	4130.0	4108.6	4130.0
(2) Quantity	25579	27042	25579
(3) Unit Cost	0.161	0.152	0.161
b. Current Procurement --	(FY 1989)	(FY 1989 APPN)*	(FY 1990)
(1) Cost	151.9	151.9	208.2
Less CY Adv Proc	--	--	--
Plus PY Adv Proc	--	--	--
Net Total	151.9	151.9	208.2
(2) Quantity	1320	1320	1999
(3) Unit Cost	0.115	0.115	0.104

* Adjusted to reflect FY89 Appropriations Act in accordance with congressional change to SAR law.

13. [U] 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	-37.7	-62.6	-1.4	-101.7
Quantity	--	+844.9	--	+844.9
Schedule	+6.8	+629.2	--	+636.0
Engineering	+269.1	+344.0	--	+613.1
Estimating	-277.6	-66.4	+0.5	-343.5
Other	--	--	--	--
Support	+58.8	+272.4	-6.5	+324.7
Subtotal	+19.4	+1961.5	-7.4	+1973.5
Current Changes:				
Economic	-0.9	-20.2	--	-21.1
Quantity	--		--	--
Schedule	--	-12.4	--	-12.4
Engineering	--	--	--	--
Estimating	+1.7	-208.0	--	-206.3
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+0.8	-240.6	--	-239.8
Total Changes	+20.2	+1720.9	-7.4	+1733.7
Current Estimate	1192.7	2840.4	7.3	4040.4

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13. [U] Cost Variance Analysis: Satellite (Air Force) (Cont'd)

(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	-236.1	+164.8	+0.4	-70.9
Other	--	--	--	--
Support	+33.1	+127.6	-4.1	+156.6
Subtotal	-49.1	+907.4	-3.7	+854.6
Current Changes:				
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+0.8	-95.5	--	-94.7
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+0.8	-95.5	--	-94.7
Total Changes	-48.3	+811.9	-3.7	+759.9
Current Estimate	919.3	1435.3	4.7	2359.3

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. Increase 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 FY87 to allow more Phase II host vehicle integration studies and in FY86-88 for necessary control segment modifications for interface with Block II satellites. Funds decreased due to reduced testing of Phase IIB User Equipment, FY84 contingent liabilities withdrawal, engineering change order reduction to absorb congressional/DoD unspecified funding cuts for FY86-91, and adjustment made for prior year escalation changes.

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

Support: Funding reduced for delay in Beneficial Occupancy Date for Master Control Station move into Consolidated Space Operations Center and decreased level of FCRC support. Additional costs to continue the 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.
Engineering: Funding reduced with the deletion of crosslink ranging, additional hardening and autonomous housekeeping. Engineering variances associated with the increase in 20 replenishment satellite.

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 multi-year 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 (ECO) reduced to absorb congressional/DoD unspecified funding cuts for FY86-91. Correction to recategorize current & 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 withthe addition 20 replenishment satellites.

Construction:

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.

13. [U] Cost Variance Analysis (Cont'd):

c. Current Change Explanations --

(Dollars in Millions)

	Base-Year $	Then-Year $
(1) RDT&E:		
Revised economic escalation indices. (Economic)	--	-0.9
Adjustment for current and prior year escalation change (Estimating)	-0.2	-0.3
Correction of FY87 funding which did not include Block IIR Funding (Estimating)	+4.4	+7.2
Program funding reductions associated with Block IIR (Estimating)	-3.4	-5.2
(2) Procurement:		
Revised economic escalation indices. (Economic)	--	-20.2
Savings applicable to changing the 20 replenishment satellites to multi-year procurement (Estimating)	-96.1	-209.2
Decreased costs attributable to changing replenishment satellite procurement to four per year (Schedule)	--	-12.4
Adjustment for current and prior year escalation change (Estimating)	+0.6	+1.2

(3) MILCON: None.

13. [U] 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	-8.1	-176.1	--	-184.2
Quantity	--	-13.9	--	-13.9
Schedule	--	+57.2	--	+57.2
Engineering	--	--	--	--
Estimating	-100.8	-255.6	--	-356.4
Other	--	--	--	--
Support	--	-269.9	--	-269.9
Subtotal	-108.9	-658.3	--	-767.2
Current Changes:	--	--	--	--
Economic	-0.6	-37.0	--	-37.6
Quantity	--	-66.1	--	-66.1
Schedule	--	+75.2	--	+75.2
Engineering	--	-54.9	--	-54.9
Estimating	-59.1	+296.8	+62.8	+300.5
Other	--	--	--	--
Support	--	-195.7	--	-195.7
Subtotal	-59.7	+18.3	+62.8	+21.4
Total Changes	-168.6	-640.0	+62.8	-745.8
Current Estimate	1215.1	2852.1	62.8	4130.0

13. [U] Cost Variance Analysis (Cont'd): 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	--	-6.0	--	-6.0
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-61.4	-121.6	--	-183.0
Other	--	--	--	--
Support	--	-134.5	--	-134.5
Subtotal	-61.4	-262.1	--	-323.5
Current Changes:				
Quantity	--	-29.0	--	-29.0
Schedule	--	--	--	--
Engineering	--	-24.8	--	-24.8
Estimating	-33.4	+186.0	+32.6	+185.2
Other	--	--	--	--
Support	--	-90.8	--	-90.8
Subtotal	-33.4	+21.4	+32.6	+20.6
Total Changes	-94.8	-240.7	+32.6	-302.9
Current Estimate	847.0	1372.4	32.6	2252.0

b. Previous Change Explanations:

RDT&E:

Economic: Revised economic escalation indices.
Schedule: None.
Engineering: None.
Estimating: Decreased aircraft integration efforts and prior year escalation. Platform integration estimates revised for aircraft manufacturers.
Support: None.

Procurement:

Economic: Revised economic escalation indices.
Quantity: Reduce production procurement of Army user (-297) equipment sets.
Schedule: Procurement schedule restructured toward the outyears due to revised force structure requirements.
Engineering: None.
Estimating: Decreased aircraft modification efforts and prior year escalation. Decrease engineering change proposals. Adjustment for prior year escalation.
Support: The associated savings with reduced aircraft modification efforts. Decreased initial spares and support equipment associated with the reduced user equipment procurement (297 sets).

O&M: None.

13. [U] Cost Variance Analysis (Cont'd): User Equipment (Tri-Service)

c. Current Change Explanations:

(Dollars in Millions)

	Base-Year $	Then-Year $
(1) RDT&E None		
Revised economic escalation indices (Economic)		-0.6
Adjustment for current and prior year escalation change (Estimating)	+0.4	+0.6
Revised platform integration estimates from aircraft manufacturers (Estimating)	-33.8	-59.7
(2) Procurement		
Revised economic escalation indices (Economic)		-37.0
Adjustment for current and prior year escalation change (Estimating)	-0.9	-1.6
Reduced production procurement of user equipment sets. This reduced the total tri-service procurement from 26913 to 25377 (-1536).	-104.6	-188.6
Reduction in flyaway cost associated with the decrease in quantity of 7684 aircraft user equipment sets (Quantity)	(-170.5)	(-352.6)
Decreased initial spares and support equipment associated with the reduced user equipment procurement (Support)	(-78.4)	(-163.9)
Increase in flyaway cost associated with the increase in quantity of 6148 other procurement appropriation user equipment sets (Quantity)	(+141.5)	(+286.5)
Increased initial spares and support equipment associated with the increase user equipment procurement (Support)	(+62.0)	(+126.8)
Estimating changes applicable to type of units procured and reduced quantities (Estimating)	(-59.2)	(-85.4)

13. [U] Cost Variance Analysis (Cont'd): User Equipment (Tri-Service)

	Base-Year $	Then-Year $
Correction of previous SARs related to change in quantity of aircraft user equipment sets. (Estimating)	+164.5	+255.1
Incorporation of Value Engineering Change Proposal for User Equipment Receiver (Engineering)	-24.8	-54.9
Procurement schedule revised for force structure requirements (Schedule)	0.0	+75.2
Reduction in FY88-89 support equipment and technical data estimates (Support)	-12.8	-29.9
Correction of Prior Allocation of flyaway and support cost for aircraft user equipment sets.	0.0	0.0
Reduce support (Support)	(-61.6)	(-128.7)
Increase flyaway (Estimating)	(+61.6)	(+128.7)
(3) O&M		
Installation funding for Air Force user equipment modifications which will be preformed at Air Force logistics centers (Estimating)	+32.6	+62.8

14. [U] Program Acquisition Unit Cost (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 (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
57.668	-2.047	-5.141	+10.393	+10.218	-9.163	--	+5.412	+9.672	67.340

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

User Equipment (Tri-Service)

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	
0.178	-0.009	+0.009	+0.005	-0.002	-0.002	--	-0.018	-0.017	0.161

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

(Major Joint Project Office Contracts)

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
$122.2M	$124.3M	202	$127.8M	$130.7M

	Cost Variance	Schedule Variance
Previous Cumulative Variance	-$9.8M	-$6.5M
Cumulative Variances to Date (9/30/88)	$13.5M	-$3.5M
Net Change	-$3.7M	+$3.0M

Explanation of Change:

Cost Variance:

The major cost variance driver is the 5 channel receiver for both the air and sea application, automatic test equipment, and platform integration efforts.

Impact to Program: The program office expects further cost variances as the program continues. At present it appears the contract will exceed the point of total assumption, however, since the contract has been budgeted to ceiling, there will be no impact to the program.

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

Schedule Variance:

The schedule variance is due to delays in the hardware/software integration of the 2 channel receiver and delays in the Electromagnetic Interference and Environmental testing for 5 channel receivers.

Impact to Program: Currently there is minimal impact to the program due to the schedule variance. Aircraft managers expecting integration equipment are receiving pre-production equipment to be updated at a later date. No additional costs are being incurred due to late hardware deliveries.

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

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
1345.0	N/A	28	1345.0	1345.0

	Cost Variance	Schedule Variance
Previous Cumulative Variance	+$9.5M	-$0.6M
Cumulative Variances to Date (9/30/88)	+$1.5M	-$0.2M
Net Change	-$8.0M	+$0.4M

Explanation of Change:

Cost Variance:

The cumulative cost variance is caused primarily by earlier than scheduled launch processing of GPS Satellites 15 and 16. The cost variance will continue until a revised launch schedule is approved.

Impact to Program: None.

Schedule Variance:

The cumulative schedule variance is primarily due to delays in earlier than scheduled processing of GPS 15 and 16. The schedule variance will continue until a revised launch schedule is approved.

Impact to Program: None.

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

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	$55.3M	$56.9M	356

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$200.3M	$209.1M	5927	$210.1M	$219.6M

	Cost Variance	Schedule Variance
Previous Cumulative Variance	$0.0M	-$2.8M
Cumulative Variances to Date (9/30/88)	-$4.5M	-$13.6M
Net Change	-$4.5M	-$10.8M

Explanation of Change:

Cost Variance:

The major cost variance is caused by increased effort for software integration and testing for both the 1 and 2 channel receivers.

Impact to Program: The program manager estimate indicates the contractor will exceed the target price. The program office has budgeted to the contract ceiling price, therefore, there is no impact to the program.

Schedule Variance:

The cumulative schedule variance is caused by manufacturing start-up problems, material (i.e electronic piece parts) on back order, and delay of the R&D Functional Configuration Audit/Physical Configuration Audit (FCA/PCA).

Impact to Program: The contractor has implemented a work around procedure to prevent overall hardware delivery delays. There is no impact to the total program schedule due to development sets being used for integration to support test requirements. We anticipate delivery to be on schedule as soon as R&D FCA/PCA is completed.

c. MILCON -- No MILCON contracts.

16. [U] Program Funding Summary: Satellite (Air Force)
(Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 57.1% (16 yrs/28 yrs)

(2) Percent Program Cost Appropriated: 54.5% ($2200.1/$4040.4)

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

Appropriation	Prior Yrs (FY74-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-01)	Total
RDT&E	1017.8	33.3	30.7	110.9	1192.7
Procurement	1175.0	70.3	200.8	1394.3	2840.4
MILCON	7.3	--	--	--	7.3
Total	2200.1	103.6	231.5	1505.2	4040.4

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

User Equipment (Tri-Service)

a. Program Status --

(1) Percent Program Completed: 51.6% (16 yrs/31 yrs)

(2) Percent Program Cost Appropriated: 36.6% ($1509.7/$4130.0)

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

Appropriation	Prior Yrs (FY74-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-04)	Total
AF RDT&E	364.1	35.6	32.9	36.1	468.7
Navy RDT&E	459.5	44.3	45.9	42.4	592.1
Army RDT&E	137.6	8.2	8.5	--	154.3
TOTAL RDT&E	(961.2)	(88.1)	(87.3)	(78.5)	(1215.1)
AF Aircraft	320.1	105.3	132.0	1407.9	1965.3
Navy Aircraft	25.8	41.6	35.4	135.9	238.7
Army Aircraft	25.5	--	--	--	25.5
Total Aircraft	(371.4)	(146.9)	(167.4)	(1543.8)	(2229.5)
AF Other	56.2	13.9	8.4	24.9	103.4
Navy Other	69.3	18.1	13.2	39.9	140.5
Army Other	51.6	29.3	33.8	264.0	378.7
Total Other	(177.1)	(61.3)	(55.4)	(328.8)	(622.6)
Total Procurement	(548.5)	(208.2)	(222.8)	(1872.6)	(2852.1)

16. [U] 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 (FY92-04)	Total
AF O&M	(0.0)	(3.5)	(7.7)	(51.6)	(62.8)
GRAND TOTAL	1509.7	299.8	317.8	2002.7	4130.0

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	Obli-gated	Ex-pended	
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	33.3	2.8
1987	-	-	-	19.9	32.3	32.0	25.6	2.7
1988	-	-	-	15.5	26.2	24.9	3.1	3.1
1989	-	-	-	27.2	47.6	2.1	0.1	4.0
1990	-	-	-	18.4	33.3	-	-	3.6
1991	-	-	-	16.5	30.7	-	-	3.3
1992	-	-	-	18.5	35.2	-	-	2.8
1993	-	-	-	9.2	17.9	-	-	2.3
1994	-	-	-	9.3	18.3	-	-	1.8
1995	-	-	-	5.1	10.2	-	-	1.8
1996	-	-	-	4.0	8.3	-	-	1.8
1997	-	-	-	3.6	7.5	-	-	1.8
1998	-	-	-	2.8	6.0	-	-	1.8
1999	-	-	-	2.1	4.5	-	-	1.8
2000	-	-	-	1.4	3.0	-	-	1.8
Sub-total	12	-	-	919.3	1192.7	970.7	928.7	

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	-	25.7	152.8	256.0	256.0	252.0	8.0
1985	6	-	128.7	192.9	331.4	331.4	304.0	3.4
1986	9	-	188.4	113.4	203.4	203.4	112.5	2.8
1987	8	-	158.6	46.6	86.7	86.7	20.6	2.7
1988	4	-	68.7	47.5	91.4	68.7	7.1	3.1
1989	-	11.2		37.5	74.5	42.3	0.1	4.0
1990	-	9.4		34.4	70.3	-	-	3.6
1991	-	67.6		96.2	200.8	-	-	3.3
1992	4	-	130.3	149.6	318.4	-	-	2.8
1993	4	-	110.6	123.4	267.3	-	-	2.3
1994	4	-	109.6	124.4	274.4	-	-	1.8
1995	4	-	100.5	101.9	228.8	-	-	1.8
1996	4	-	104.0	105.4	240.9	-	-	1.8
1997	-	6.0		6.0	14.0	-	-	1.8
1998	-	6.0		6.0	14.3	-	-	1.8
1999	-	5.9		5.9	14.3	-	-	1.8
2000	-	5.9		5.9	14.5	-	-	1.8
2001	-	3.0		3.0	7.4	-	-	1.8
Sub-total	48	137.6	1222.7	1435.3	2840.4	1120.1	827.9	
Appropriation: MILCON								
1984	-	-	-	4.7	7.3	7.3	7.3	3.8
Sub-Total	-	-	-	4.7	7.3	7.3	7.3	
Total	60	22.6	1245.3	2359.3	4040.4	2098.1	1763.9	

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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 (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	84.7	2.8
1987	-	-	-	59.8	97.1	97.1	65.2	2.7
1988	-	-	-	58.0	97.8	93.8	40.7	3.1
1989	-	-	-	56.3	98.4	23.9	1.3	4.0
1990	-	-	-	48.7	88.1	-	-	3.6
1991	-	-	-	47.0	87.3	-	-	3.3
1992	-	-	-	29.0	55.1	-	-	2.8
1993	-	-	-	5.4	10.4	-	-	2.3
1994	-	-	-	2.4	4.7	-	-	1.8
1995	-	-	-	4.1	8.3	-	-	1.8
Sub-total	202	-	-	847.0	1215.1	882.7	759.7	

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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 (Air Force)								
1974	-	-	-	1.5	1.0	1.0	1.0	
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	21.1	2.8
1987	-	-	-	17.4	28.3	28.3	17.6	2.7
1988	-	-	-	22.7	38.2	35.6	8.1	3.1
1989	-	-	-	26.9	47.0	0.3	0.0	4.0
1990	-	-	-	19.7	35.6	-	-	3.6
1991	-	-	-	17.7	32.9	-	-	3.3
1992	-	-	-	6.7	12.7	-	-	2.8
1993	-	-	-	5.4	10.4	-	-	2.3
1994	-	-	-	2.4	4.7	-	-	1.8
1995	-	-	-	4.1	8.3	-	-	1.8
Sub-Total	100	-	-	333.1	468.7	314.8	271.6	

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	Obli-gated	Ex-pended	
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	43.1	2.7
1988	-	-	-	29.4	49.6	48.5	25.7	3.1
1989	-	-	-	24.4	42.7	23.4	1.2	4.0
1990	-	-	-	24.5	44.3	-	-	3.6
1991	-	-	-	24.7	45.9	-	-	3.3
1992	-	-	-	22.3	42.4	-	-	2.8
1993	-	-	-	-	-	-	-	2.3
1994	-	-	-	-	-	-	-	1.8
1995	-	-	-	-	-	-	-	1.8
Sub-total	89	-	-	393.5	592.1	439.1	362.2	

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	1.6	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	9.7	6.9	3.1
1989	-	-	-	5.0	8.7	0.2	0.1	4.0
1990	-	-	-	4.5	8.2	-	-	3.6
1991	-	-	-	4.6	8.5	-	-	3.3
1992	-	-	-	-	-	-	-	2.8
1993	-	-	-	-	-	-	-	2.3
1994	-	-	-	-	-	-	-	1.8
1995	-	-	-	-	-	-	-	1.8
Sub-total	13	-	-	120.4	154.3	128.8	125.9	

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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: Procurement (Tri-Service)								
1985	0	0.0	0.0	4.6	8.0	8.0	7.3	3.4
1986	322	16.6	21.4	59.0	101.0	100.4	71.0	2.8
1987	800	6.1	36.3	71.0	126.8	118.1	53.2	2.7
1988	1074	14.2	40.6	87.2	160.8	123.8	25.6	3.1
1989	1320	14.7	45.2	79.3	151.9	9.8	0.0	4.0
1990	1999	14.0	75.8	105.8	208.2	-	-	3.6
1991	2258	8.9	88.3	109.9	222.8	-	-	3.3
1992	2770	12.0	109.2	142.8	296.2	-	-	2.8
1993	2921	6.0	111.7	142.4	302.2	-	-	2.3
1994	3096	12.3	121.5	159.8	345.4	-	-	1.8
1995	2874	1.0	116.7	144.8	319.2	-	-	1.8
1996	2365	2.2	99.9	108.9	244.2	-	-	1.8
1997	1644	2.0	61.9	70.6	160.7	-	-	1.8
1998	749	0.2	26.5	29.5	68.1	-	-	1.8
1999	422	0.2	16.4	24.1	56.6	-	-	1.8
2000	183	0.0	4.2	7.3	17.2	-	-	1.8
2001	148	0.0	3.7	6.7	16.1	-	-	1.8
2002	148	0.2	3.6	6.5	16.0	-	-	1.8
2003	148	0.2	3.6	6.5	16.3	-	-	1.8
2004	136	0.0	3.2	5.7	14.4	-	-	1.8
Sub-Total	25377	110.8	989.7	1372.4	2852.1	360.1	157.1	

1 . (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	Obli-gated	Ex-pended	
Appropriation: Aircraft Procurement (Air Force)								
1985	0	0.0	0.0	4.6	8.0	8.0	7.3	3.4
1986	70	7.6	10.3	27.8	49.1	49.1	35.1	2.8
1987	300	3.4	21.3	40.4	74.0	69.2	32.7	2.7
1988	377	9.3	21.1	55.2	104.8	79.9	22.0	3.1
1989	258	11.6	17.3	42.9	84.2	8.6	0.0	4.0
1990	397	13.1	32.2	52.2	105.3	-	-	3.6
1991	770	8.0	50.4	63.8	132.0	-	-	3.3
1992	1137	12.0	69.6	93.4	197.2	-	-	2.8
1993	1389	6.0	80.4	103.4	222.6	-	-	2.3
1994	1484	12.3	91.2	123.3	270.0	-	-	1.8
1995	1525	1.0	92.0	115.7	258.1	-	-	1.8
1996	1262	2.2	81.0	86.7	196.8	-	-	1.8
1997	832	2.0	48.9	55.3	127.8	-	-	1.8
1998	361	0.2	19.5	21.0	49.4	-	-	1.8
1999	160	0.2	8.4	14.4	34.4	-	-	1.8
2000	72	0.0	2.1	4.3	10.5	-	-	1.8
2001	72	0.0	2.1	4.3	10.6	-	-	1.8
2002	72	0.2	2.1	4.2	10.7	-	-	1.8
2003	72	0.2	2.1	4.2	10.9	-	-	1.8
2004	60	0.0	1.7	3.4	8.9	-	-	1.8
Sub-total	10670	89.3	653.7	920.5	1965.3	214.8	97.1	

16. (U) Program Funding Suummary (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	
		Appropriation: Aircraft Procurement (Navy)						
1985	-	0.0	0.0	0.0	0.0	0.0	0.0	N/A
1986	-	0.0	0.0	0.0	0.0	0.0	0.0	N/A
1987	1	0.0	0.3	0.3	0.6	0.6	0.4	2.7
1988	21	0.0	1.2	1.4	2.6	1.8	0.1	3.1
1989	179	0.0	9.6	11.5	22.6	0.0	0.0	4.0
1990	349	0.0	17.4	20.6	41.6	-	-	3.6
1991	326	0.0	14.4	17.1	35.4	-	-	3.3
1992	360	0.0	14.2	16.9	35.7	-	-	2.8
1993	307	0.0	11.4	13.5	29.0	-	-	2.3
1994	256	0.0	8.8	10.4	22.8	-	-	1.8
1995	213	0.0	7.3	8.7	19.3	-	-	1.8
1996	132	0.0	4.4	5.3	12.0	-	-	1.8
1997	56	0.0	1.9	2.3	5.3	-	-	1.8
1998	28	0.0	1.0	1.2	2.9	-	-	1.8
1999	70	0.0	3.1	3.7	8.9	-	-	1.8
2000	-	-	-	-	-	-	-	-
2001	-	-	-	-	-	-	-	-
2002	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-
2004	-	-	-	-	-	-	-	-
Sub-total	2298*	0.0	95.0	112.9	238.7	2.4	0.5	

*Embedded and miniaturized Navy user equipment sets are not included in the above quantities; this affects approximately 3700 sets. Embedded GPS user sets will be procured by the Navy and are not included in this SAR.

*The total aircraft requirement for Navy GPS sets is 5992.

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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)								
1985	-	0.0	0.0	0.0	0.0	0.0	0.0	N/A
1986	67	3.6	4.1	7.8	13.8	13.7	13.7	2.8
1987	139	0.8	4.5	6.4	11.7	10.2	9.5	2.7
1988	-	-	-	-	-	-	-	3.1
1989	-	-	-	-	-	-	-	4.0
1990	-	-	-	-	-	-	-	3.6
1991	-	-	-	-	-	-	-	3.3
1992	-	-	-	-	-	-	-	2.8
1993	-	-	-	-	-	-	-	2.3
1994	-	-	-	-	-	-	-	1.8
1995	-	-	-	-	-	-	-	1.8
1996	-	-	-	-	-	-	-	1.8
1997	-	-	-	-	-	-	-	1.8
1998	-	-	-	-	-	-	-	1.8
1999	-	-	-	-	-	-	-	1.8
2000	-	-	-	-	-	-	-	1.8
2001	-	-	-	-	-	-	-	1.8
2002	-	-	-	-	-	-	-	1.8
2003	-	-	-	-	-	-	-	1.8
2004	-	-	-	-	-	-	-	1.8
Sub-total	206	4.4	8.6	14.2	25.5	23.9	23.2	

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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	2.7	2.5	5.7	9.3	8.8	6.7	2.8
1987	121	0.6	2.4	6.5	11.0	8.6	1.7	2.7
1988	303	0.1	4.3	10.7	18.7	9.5	0.8	3.1
1989	531	0.3	8.1	9.5	17.1	0.0	0.0	4.0
1990	609	0.0	6.7	7.5	13.9	-	-	3.6
1991	250	0.0	3.1	4.4	8.4	-	-	3.3
1992	150	0.0	1.8	4.8	9.4	-	-	2.8
1993	150	0.0	1.8	4.1	8.1	-	-	2.3
1994	150	0.0	1.8	3.7	7.4	-	-	1.8
1995	-	-	-	-	-	-	-	-
1996	-	-	-	-	-	-	-	-
1997	-	-	-	-	-	-	-	-
1998	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-
Sub-Total	2351	3.7	32.5	56.9	103.4	26.9	9.2	

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	Obli-gated	Ex-pended	
Appropriation: Other Procurement (Navy)								
1986	28	0.0	1.5	12.0	19.6	19.6	6.3	2.8
1987	179	0.0	6.5	14.3	24.2	24.2	3.6	2.7
1988	176	0.0	7.6	7.6	13.2	13.2	0.9	3.1
1989	194	0.0	6.8	6.8	12.3	1.2	0.0	4.0
1990	177	0.0	8.2	9.7	18.1	-	-	3.6
1991	135	0.0	6.3	6.9	13.2	-	-	3.3
1992	133	0.0	5.4	6.8	13.2	-	-	2.8
1993	106	0.0	3.3	4.1	8.2	-	-	2.3
1994	93	0.0	2.9	2.9	5.9	-	-	1.8
1995	82	0.0	1.9	2.4	4.9	-	-	1.8
1996	60	0.0	1.3	1.6	3.4	-	-	1.8
1997	35	0.0	0.4	0.5	1.0	-	-	1.8
1998	35	0.0	0.4	0.5	1.1	-	-	1.8
1999	35	0.0	0.4	0.5	1.1	-	-	1.8
2000	35	0.0	0.4	0.5	1.1	-	-	1.8
Sub-total	1503	0.0	53.3	77.1	140.5	58.2	10.8	

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	Obli-gated	Ex-pended	
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	197	4.8	6.4	12.3	21.5	19.4	1.8	3.1
1989	158	2.8	3.4	8.6	15.6	0.0	0.0	4.0
1990	467	0.9	11.3	15.8	29.3	-	-	3.6
1991	777	0.9	14.1	17.7	33.8	-	-	3.3
1992	990	0.0	18.2	20.9	40.7	-	-	2.8
1993	969	0.0	14.8	17.3	34.3	-	-	2.3
1994	1113	0.0	16.8	19.5	39.3	-	-	1.8
1995	1054	0.0	15.5	18	36.9	-	-	1.8
1996	911	0.0	13.2	15.3	32.0	-	-	1.8
1997	721	0.0	10.7	12.5	26.6	-	-	1.8
1998	325	0.0	5.6	6.8	14.7	-	-	1.8
1999	157	0.0	4.5	5.5	12.2	-	-	1.8
2000	76	0.0	1.7	2.5	5.6	-	-	1.8
2001	76	0.0	1.6	2.4	5.5	-	-	1.8
2002	76	0.0	1.5	2.3	5.3	-	-	1.8
2003	76	0.0	1.5	2.3	5.4	-	-	1.8
2004	76	0.0	1.5	2.3	5.5	-	-	1.8
Sub-total	8349	13.4	146.6	190.8	378.7	33.9	16.3	
Appropriation: O&M (Air Force)								
1990	-	-	-	2.0	3.5	-	-	
1991	-	-	-	4.2	7.7	-	-	3.3
1992	-	-	-	5.4	10.3	-	-	2.8
1993	-	-	-	6.8	13.2	-	-	2.3
1994	-	-	-	14.2	28.1	-	-	1.8
Sub-Total	-	-	-	32.6	62.8	-	-	
Total	25579	110.8	989.7	2252.0	4130.0	1242.8	916.8	

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.

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1984	.3	.3	.3	.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	0.8
1992	0.0	0.0	1.0	3.0
1993	0.0	0.0	1.0	4.0
1994	0.0	0.0	1.0	3.0
1995	0.0	0.0	1.0	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$)	1599.4	+759.9	2359.3	-40.7	2400.0
	(TY$)	2306.7	+1733.7	4040.4	-75.8	4116.2
PAUC	(BY$)	39.985	-0.663	39.322	-0.678	40.000
	(TY$)	57.668	+9.672	67.340	-3.960	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

17. [U] Production Rate Data: Satellite (Air Force) (cont'd):

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 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. Annual Production Rates -- Annual production rates shown differ from the annual funded quantities because the funded delivery period is 30 months.

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1986	142.4	199.6	128.8	212.2
1987	269.2	269.2	320.0	784.2
1988	382.4	382.4	429.6	1168.4
1989	974.8	1023.6	528.0	1192.4
1990	1781.2	1781.2	799.6	2042.0
1991	1954.8	1954.8	903.2	1954.8
1992	1972.8	1972.8	1108.0	1972.8
1993	1318.0	1318.0	1168.4	1456.8
1994	694.0	694.0	1238.4	N/A
1995	456.0	456.0	1149.6	N/A
1996	317.6	317.6	946.0	N/A
1997	256.8	256.8	657.6	N/A
1998	141.6	141.6	299.6	N/A
1999	198.4	198.4	168.8	N/A
2000	24.0	24.0	73.2	N/A
2001	0.0	0.0	59.2	N/A
2002	0.0	0.0	59.2	N/A
2003	0.0	0.0	59.2	N/A
2004	0.0	0.0	54.4	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$)	2554.9	-302.9	2252.0	+272.0	1980.0
	(TY$)	4875.8	-442.9	4130.0	+754.5	3375.5
PAUC	(BY$)	0.093	-0.005	0.088	+0.015	0.073
	(TY$)	0.178	-0.017	0.161	+0.036	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 --

	Development Estimate	(Average Unit Flyaway Cost) 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: 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)	1.6	1.5	1.6	TBD	4.7
Industrial Fund	0	0	0	TBD	0.0
Total	1.6	1.5	1.6	TBD	4.7

SAR-88-014

N-7 AV-8B

(2)

~~CONFIDENTIAL~~

AV-8B, December 31, 1988

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: AV-8B

AS OF DATE: DECEMBER 31, 1988

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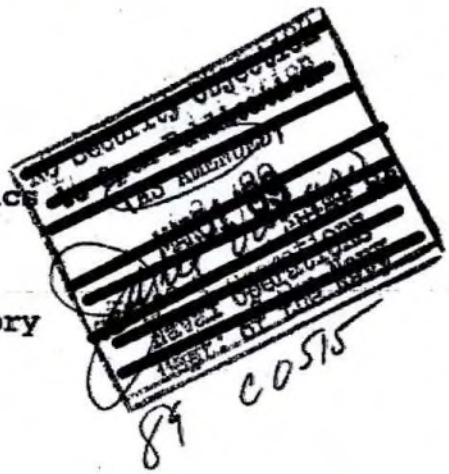

89 C0515

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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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), is scheduled for fleet introduction in September 1989.

7. Program Highlights:

a. Significant Historical Developments: DSARC I (March 1976) authorized two prototype aircraft, designated YAV-8B's, to be built in order to validate aspects of the AV-8B. As a result of this flight demonstration phase (FDP) involving the validation of maximum weight vertical 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 TAV-8B and AV-8B development program continued with all milestones met or exceeded.

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 5 OFP software to provide expanded weapons delivery capability and development and operational testing of the AV-8B Night Attack System. Development testing of an upgraded engine commenced in September 1988. 46 AV-8B aircraft (41 AV-8B and 5 TAV-8B) were delivered in CY-88. A total of 148 production aircraft (139 AV-8B and 9 TAV-8B) have been delivered through December 1988. Night Attack capability is being incorporated in production aircraft with first fleet delivery scheduled for September 1989. A three year multiyear procurement (FY89-FY91) was approved in the amended FY89 Biannual budget.

The AV8B is expected to satisfy the mission requirement.

c. Changes Since "as of" Date: None.

8. Threshold Breaches: There are currently no Decision Coordinating Paper (DCP) (revised 10 October 1986) threshold breaches.

9. Schedule:

a. Milestone

Milestone	Development Estimate	Approved Program	Current Estimate
rogram Initiated (DSARC I)	Mar 76	Mar 76	Mar 76
First Flight YAV-8B Prototype	Dec 78	Nov 78	Nov 78
DSARC 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 (CH-1)
IOC (Night Attack)	N/A	N/A	May 90 (CH-2)

b. Previous Change Explanations - Technical performance slipped 5 months due to lack of sufficient instrumented test program.

c. Current Change Explanations: (CH-1) New milestone. Delivery of 7th TAV-8B September 1988. (CH-2) New milestone. Delivery of the 20th Night Attack airplane.

d. References:

Development Estimate: DCP 160 dtd 10 October 1986 and approved 16 January 1987.

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 5 OFP software to provide expanded weapons delivery capability and development and operational testing of the AV-8B Night Attack System. Development testing of an upgraded engine commenced in September 1988. 46 AV-8B aircraft (41 AV-8B and 5 TAV-8B) were delivered in CY-88. A total of 148 production aircraft (139 AV-8B and 9 TAV-8B) have been delivered through December 1988. Night Attack capability is being incorporated in production aircraft with first fleet delivery scheduled for September 1989. A three year multiyear procurement (FY89-FY91) was approved in the amended FY89 Biannual budget.

The AV8B is expected to satisfy the mission requirement.

c. Changes Since "as of" Date: None.

8. Threshold Breaches: There are currently no Decision Coordinating Paper (DCP) (revised 10 October 1986) threshold breaches or DAE (dated February 1988) breaches.

9. Schedule:

a. Milestone	Development Estimate	Approved Program	Current Estimate
gram Initiated (DSARC I)	Mar 76	Mar 76	Mar 76
First Flight YAV-8B Prototype	Dec 78	Nov 78	Nov 78
DSARC 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)			Sep 88 (CH-1)
IOC (Night Attack)			May 90 (CH-2)

b. Previous Change Explanations - Technical performance slipped 5 months due to lack of sufficient instrumented test program.

c. Current Change Explanations: (CH-1)

d. References:

Development Estimate: DCP 160 dtd 10 October 1986 and approved 16 January 1987.

Approved Program: DAE Baseline approved 17 February 1988.

(b)(1)

(b)(1)

c. (U) 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) changed to reflect demonstrated performance.

d. (U) Current Change Explanations:

(CH-1) -- Maximum short gross take-off (STO) changed to reflect demonstrated performance with RR-406A engine.
(CH-2) -- Weapons Accuracies (DMMH/FH) changed to reflect demonstrated performance.
(CH-3) -- Weapons Accuracies (Mils.) changed to reflect demonstrated performance.

e. References - -

Development Estimate: DCP dated 16 January 1987.

Approved Program: DAE Baseline approved 17 Feb 1988.

Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost - -	Development Estimate	APPROVED Program	Current Estimate
Development (RDT&E)	$872.7	$1,116.1	$1,116.1
Procurement	4,862.4	3,673.1	3,673.1
Airframe	(2650.5)	(2,104.7)	(2104.7)
Engine	(899.0)	(423.8)	(423.8)
Avionics	(258.9)	(195.0)	(195.0)
Other GFE	(145.5)	(40.0)	(40.0)
Total Flyaway	(3953.9)	(2,763.5)	(2763.5)
Other Wpns Sys Cost	(439.3)	(551.8)	(551.8)
Initial Spares	(469.2)	(357.8)	(357.8)
Construction (MILCON)	5.5	5.5	5.5
Total FY79 Base-Year $	$5,740.6	$4,794.7	$4,794.7
Escalation	3384.9	3527.8	3527.8
Development (RDT&E)	(185.3)	(323.7)	(323.7)
Procurement	(3196.8)	(3201.3)	(3201.3)
Construction(MILCON)	(2.8)	(2.8)	(2.8)
Total Then-Year $	$9,125.5	$8322.5	$8322.5
b. Quantities - -			
Development (RDT&E)	6	6	6
Procurement	336	276	276
Total	342	282	282

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: DCP dated 16 January 1987.

Approved Program: FY 1990/91 Presidents Budget.

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

	Current Est	UCR Baseline	UCR Baseline
a. Program Acquisition - -	(Dec 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	8322.5	8269.4	8322.5
(2) Quantity	282	282	282
(3) Unit Cost	29.5	29.3	29.5

	Current Year		Budget Year
b. Current Procurement - -	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	577.0	577.0	562.7
Less CY Adv Proc	-40.1	-40.1	-29.9
Plus PY Adv Proc	+70.0	+70.0	+70.1
Net Total	606.9	606.9	602.9
(2) Quantity	24	24	24
(3) Unit Cost	25.3	25.3	25.1

12. Cost Variance Analysis:

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

	RDTE	PROC	MILCON	TOTAL
DEVELOPMENT EST	1058.0	8059.2	8.3	9125.5
PREVIOUS CHANGES:				
ECONOMIC	+6.0	-749.7		-743.7
QUANTITY		-1473.7		-1473.7
SCHEDULE	+17.7	+1393.1		+1410.8
ENGINEERING	+181.1	+551.4		+732.5
ESTIMATING	+178.6	-1117.4		-938.8
OTHER				0.0
SUPPORT		+156.8		+156.8
SUBTOTAL	+383.4	-1239.5	0.0	-856.1
CURRENT CHANGES:				
ECONOMIC	-.3	-36.8		-37.1
QUANTITY				0.0
SCHEDULE				0.0
ENGINEERING				0.0
ESTIMATING	-1.3	-13.4		-14.7
OTHER				0.0
SUPPORT		+104.9		+104.9
SUBTOTAL	-1.6	+54.7	0.0	+53.1
TOTAL CHANGES	+381.8	-1184.8	0.0	-803.0
CURRENT ESTIMATE	1439.8	6874.4	8.3	8322.5

3. Cost Variance Analysis (Cont'd):

a. Summary - - (continued)

(FY 1979 Constant (Base Year) Dollars in Millions)

	RDTE	PROC	MILCON	TOTAL
DEVELOPMENT EST	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	-1627.4		-1510.5
OTHER				0.0
SUPPORT		+46.6		+46.6
SUBTOTAL	+243.4	-1227.4	0.0	-984.0
CURRENT CHANGES:				
QUANTITY				0.0
SCHEDULE				0.0
ENGINEERING				0.0
ESTIMATING	0	-11.6		-11.6
OTHER				0.0
SUPPORT		+49.7		+49.7
SUBTOTAL	0	+38.1	0.0	+38.1
TOTAL CHANGES	+243.4	-1189.3	0.0	-945.9
CURRENT ESTIMATE	1116.1	3673.1	5.5	4794.7

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.

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.

13. Cost Variance Analysis (Cont'd):

b. Previous Change Explanations: (continued)
Procurement (continued)

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 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.

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 as no FY-89 shown.

c. Current Change Explanations

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Economic: Revised escalation rate	N/A	-.3
Estimating: Increase for -408 Engine. Non-recurring recoupements are ongoing P3I efforts.	N/A	-1.3
(2) Procurement		
Economic: Revised escalation indices.	N/A	-36.8
Estimating: Revised estimating reduction based on last negotiation.	-11.6	-13.4
Support: Adjustment in support to procure required baseline FY88 Night Attack Avionics F406 -408 Engine and increased survivability improvement; including stand-up of Yuma.	+49.7	+104.9

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanations (continued)

	(Dollars in Millions) Base-Year	Then-Year
(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)	Changes								PAUC (Curnt Est)
	Econ	Qty	Sch	Eng	Est	Spt	Oth	Total	
26.683	-2.769	+.452	+5.003	+2.598	-3.387	+.928	0.0	+2.831	29.514

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			Estimated Price at Completion	
[illegible]rget	Ceiling	Qty	Contractor	Program Manager
[illegible]46.8	$ N/A	42	$146.8	$146.8

Variance analysis does not apply to FFP contracts.

Airframe	Initial Contract Price Target	Ceiling	Qty
McDonnell Douglas Corp. St. Louis, Mo. N00019-86-C-0302, FFP Award: July 31,1987 Definitized: May 31, 1988.	$254.1	$ N/A	24

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$254.1	$ N/A	24	$254.1	$254.1

Variance analysis does not apply to FFP contracts.

15. (Then Year Dollars in Millions)

Engine	Initial Contract Price Target	Ceiling	Qty
[illegible]olls Royce, Ltd. [illegible]ristol, England N00019-86-C-0281,FFP Award: July 13,1987 Definitized: May 26, 1988.	$118.6	$ N/A	24

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	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. N00019-88-C-0001, FFP Award: March 14, 1988 Definitized: Estimated Definitization April 1989	$25.0	$ N/A	24

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$124.0	$ N/A	24	$297.0	$297.0

Variance analysis does not apply to FFP contracts.

Engine	Initial Contract Price		
	Target	Ceiling	Qty
Rolls Royce, Ltd., Bristol, England N00019-88-C-0065 Award: May 26, 1988 Definitized: Estimated Definization April 1989	$36.7	$ N/A	24

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$133.6	$ N/A	24	$133.6	$133.6

Variance analysis does not apply to FFP contracts.

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

a. Program Status - -

(1) Percent Program Completed: 76% (13 yrs/17 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 86% ($7156.0/$8322.5)
(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 (FY92-94)	Total
RDT&E	1,380.0	29.5	30.3	0	1,439.8
PROCUREMENT	5,767.7	562.7	520.4	23.6	6,874.4
MILCON	8.3	0.0	0.0	0.0	8.3
TOTAL	7,156.0	592.2	550.7	23.6	8,322.5

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

c. Annual Summary

Fiscal Year	Qty	Flyaway FY79 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
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			158.9	168.7	168.7	168.7	8.4
1980				155.3	182.4	182.4	182.4	10.6
1981				186.6	239.1	239.1	235.6	10.6
1982	4			167.6	226.0	226.0	224.3	7.6
1983				83.2	117.3	117.3	111.9	4.9
1984				69.5	101.5	101.5	88.1	3.8
1985				40.8	61.4	61.4	60.0	3.4
1986				43.4	67.3	67.3	65.9	2.8
1987				26.5	42.3	42.1	34.6	2.7
1988				22.1	36.5	36.4	7.4	3.1
1989				22.7	38.8	26.4	0.3	4.0
1990				16.7	29.5			3.6
1991				16.6	30.3			3.3
1992				0	0			
1993				0	0			
1994				0	0			
SUBTOTAL	6			1116.1	1439.8	1367.3	1277.9	

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

c. Annual Summary (continued)

Fiscal Year	Qty	Flyaway FY79 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: Procurement								
1981	0	0.0	0.0	58.7	86.6	86.6	86.6	11.6
1982	12	14.1	325.0	410.7	657.2	657.2	628.7	14.3
1983	21	3.7	286.1	479.9	816.7	816.3	762.5	9.0
1984	27	0.9	270.5	449.5	795.9	795.8	742.7	8.0
1985	32	5.6	263.8	374.1	683.7	685.6	593.8	3.4
1986	46	0.3	348.2	466.6	876.0	875.9	767.5	2.8
1987	42	17.8	298.2	355.3	689.8	686.1	373.1	2.7
1988	24	12.4	178.3	290.7	584.8	458.5	60.5	3.1
1989	24	1.4	202.2	277.4	577.0	109.2	0.0	4.0
1990	24	0.0	205.7	262.7	562.7	0.0	0.0	3.6
1991	24	9.9	204.9	236.9	520.4	0.0	0.0	3.3
1992	0	0.0	0.0	10.6	23.6	0.0	0.0	2.8
1993	0			0.0	0.0	0.0	0.0	2.3
1994	0			0.0	0.0	0.0	0.0	1.8
1995	0			0.0	0.0	0.0	0.0	1.8
SUBTOTAL	276	66.1	2582.9	3673.1	6874.4	5171.2	4015.4	
Appropriation: MILCON								
1983				3.2	4.6	4.6	4.6	4.9
1986				2.3	3.7	3.7	3.7	2.8
SUBTOTL	0	0.0	0.0	5.5	8.3	8.3	8.3	3.4
TOTAL	282	66.1	2582.9	4794.7	8322.5	6546.8	5301.6	

7. 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	46
1988	54	42	24	46
1989	30	42	24	72
1990		42	24	
1991		22	24	
992			0	

17. Production Rate Data (Cont'd):

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$)	4794.7	0.0	4794.7	+360.8	4433.9
(TY$)	8322.5	0.0	8322.5	+623.9	7698.6
PAUC (BY$)	17.0	0.0	17.0	+1.1	15.9
(TY$)	29.5	0.0	29.5	+2.2	27.3

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)	118	+21	139	-33	106
End Date (Mo./Yr.)	9-91	N/A	6-93	N/A	9-90

d. Deliveries (Plan/Actual) - -

	To Date
RDT&E	6/6
Procurement	148/148

e. Approved Design to Cost Goals. N/A

18. Operating and Support Costs: Not Applicable.

a. N/A

b. 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&MN(A,N,AF)	8.9	5.7	6.5	0	21.1
Industrial Fund	6.6	3.4	3.3	0	13.3
Total	15.5	9.1	9.8	0	34.4

(2)

SAR-88-061

AF-4 B-1B

SELECTED ACQUISITION REPORT (RCS: DD-COMP (QA) 823)

PROGRAM: B-1B AS OF: 31 December 1988

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1. Designation/Nomenclature (Popular Name): B-1B

2. DOD Component: US Air Force

3. Responsible Office and Telephone Number:
B-1B System Program Office — PM: 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:
RDTE: PE 0604226F APPN: 3600 (Baseline Program Content Only)
PE 0604270F APPN: 3600 (RWR) (Shared Funding)
Procurement: PE 0101126F APPN: 3010 ICN# BOO1BO
PE 0708011F APPN: 3010 (Shared Funding)
MILCON: None

5. Related Programs:
B-1B Simulator, Common Strategic Rotary Launcher (CSRL), Air Launched Cruise Missile (ALCM), Advanced Cruise Missile (ACM), 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 (GPS).

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 conventional bomber, cruise missile launch platform and a nuclear weapon delivery system in both the 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.

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 A/C, 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 improves on the capabilities of the ALQ-161 as well as adding smart jamming enhancements and a Tail Warning Function. The B-1B weapon system will be 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 successfully launched a live ALCM from the CSRL on 24 November 1987. Both B-1B and ALCM missions' objectives were met.

7. Program Highlights (Cont'd)

b. Significant Developments Since Last Report —

The last production B-1B aircraft was delivered to SAC on 30 April 88, two months ahead of schedule.

The B-1B's automatic terrain following performance for training has improved significantly. Two hundred feet above the ground flight testing is complete and this capability is released to SAC to fly training missions in the softride mode at this altitude. 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. The hardride mode release to SAC for training at 200 feet above ground should be completed in Jan 89.

Flight control modifications are underway to improve the B-1B's penetration range capability. The first modification, Stall Inhibitor System 1 (SIS1), completed flight testing in Mar 88 and was installed on fifteen B-1B's by Jul 88. The Stall Inhibitor System 2/Stability Enhancement Function (SIS2/SEF) modification is in flight testing and should be completed by 1 Mar 89. Stall Inhibitor System 2 capability was released to SAC in Jul 88. The SEF function shall be activated on retrofitted aircraft after completion of flight testing. A total of 24 aircraft have received this modification, seven aircraft are in work continually at Palmdale, CA, and the entire fleet should be retrofitted by the end of FY 92.

Two operational B-1B's (aircraft No. 23 and 36) were lost due to catastrophic crashes in Oct and Nov 88, respectively.

The Program Management Responsibility Transfer (PMRT) plan has been approved and management responsibility for the B-1B weapon system will transfer to OC-ALC on 1 Jan 1989.

An AIL Global recovery program was agreed to by the Air Force in Feb 88. This program was to correct lingering deficiencies in the ECM development and to fix system deficiencies in delivered hardware. The first major milestone in the Global program was a Block 4.0 software flight test. This test revealed serious deficiencies in the ECM receiver/processor architecture which were not being fixed in AIL's Global proposal. Therefore, the Air Force issued a stop work order to the contractor on 21 June 88. After a period of evaluation, the Air Force requested AIL to submit a proposal for a program of reduced scope (complexity and performance). This effort was named the Core program, and AIL submitted it's technical proposal for the effort in Dec 88.

The Office of the Secretary of Defense has directed the Air Force to pursue a stand-alone Radar Warning Receiver (RWR) to augment the ALQ-161. Risk reduction studies for integration of an "off-the-shelf" RWR into the B-1B weapon system are to be accomplished in FY 89. Development of RWR (ALR-56M) integration is projected to begin in FY 90 with Congressional approval and funding.

As of 31 December 1988, 31 B-1B aircraft were on station at Dyess AFB, 30 at Ellsworth, 17 at Grand Forks AFB, 17 at McConnell, and 2 at Edwards AFB.

7. Program Highlights (Cont'd)

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 (FY 81 $s) cap in FY 92. 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 Radar Warning Receiver Program will bring the current estimate at completion to $20.84 billion (FY 81 $s).

c. **Changes Since "As of" Date —**

Program Management Responsibility Transfer (PMRT) to Air Force Logistics Command (AFLC), Oklahoma City Air Logistics Center (OC-ALC), 1 January 1989.

8. Threshold Breaches:

There are several DAE Baseline (dated Dec 88), milestone breaches. There are no DCP (dated 30 Sep 83) or SDDM (dated 4 Nov 81) threshold breaches.

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(CH1)	Apr 82*
OSD Program Review	Sep 82/Feb 83(CH1)	Feb 83*
Configuration Review	Jan 83/Jan 83(CH1)	Jan 83*
DT&E/IOT&E Start	Apr 83/Mar 83(CH1)	Mar 83*
First Flight B-1/Aircraft #2	Apr 83/Mar 83(CH1)	Mar 83*
First B-1B Flight	Mar 85/Oct 84(CH1)	Oct 84*
FOT&E Phase I Start	Oct 85/Jul 85(CH1)	Jul 85*
DT&E/IOT&E Complete	Jun 86/ Sep 89	Jul 90(CH2)
IOC (15th Aircraft Delivery)	Sep 86/Sep 86	Sep 86*
FOT&E Phase I Complete	Oct 87/Mar 89(CH1)	Mar 89
Prod Complete (100 A/C Delivered)	Jun 88/Jun 88	Apr 88*(CH3)
Prog Mgmt Resp Transfer(PMRT)(CH4)	N/A /Jan 89	Jan 89
ECM Development Complete (CH4)	N/A /Sep 89	Feb 91(CH5)
ECM Retrofit Complete (CH4)	N/A /Mar 92	Apr 93(CH5)

* 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 AFOTEC. 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.

9. Schedule (Cont'd)

c. Current Change Explanations —
(CH1) Dates added by the DAE Baseline (Dec 1988).

(CH2) DT&E and IOT&E flight test completion has been extended due to the ECM program restructure (from May 89 to Jul 90).

(CH3) The delivery of aircraft #100 to SAC was completed 2 months ahead of schedule (from Jun 88 to Apr 88).

(CH4) New milestones added by the DAE Baseline dated Dec 1988.

(CH5) 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 PERBD is closed out. Current estimate for this activity is Feb 91. The retrofit is complete with the last aircraft retrofit in Apr 93. All support equipment deliveries are scheduled to be complete in Feb 94.

d. References —
Development Estimate: DCP dated 30 September 1983
Approved Program: DAE Baseline dated December 1988

10. (U) Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold**	Demonstrated Perf	Current Estimate
a. (U) Technical —				
(U) Speed (MACH #):				
(U) Best cruise at altitude	0.72	0.73/0.70(CH1)	0.72	0.72
(U) Penetration	0.85	0.87/0.83(CH1)	0.85	0.85
(U) Altitude envelope (ft)	0-25,000	0-25K/0-20K	0-25,000	0-25,000
(U) Weapon Carriage				
(U) AGM-69A (Internal)	24	24/24	16	24
(U) AGM-86B (Internal/ External)	8/14	8/12/8/12	8/ N/A	8/12
(U) B61/B83 (Internal)	24	24/24	24	24
(U) MK-82 AIR/36DST(AIR) (Internal)	84	84/84	N/A	84
(U) Takeoff Distance (feet)				
(U) 470,000 pound A/C	9,300	9,300/9,500	N/A	9,300
(U) 440,000 pound A/C	6,000	7,600/7,800	N/A	7,700(CH2)
(U) *Range (Nautical miles)	6,000	6,400/5,600(CH1)	5,880	5,880
(U) Weight empty (pounds)	186,000	186K/186K	188,407(CH3)	188,407(CH3)

*(U) Groundrules for range computation: (1) Assumes 24 SRAM - 53040 lbs
(2) Operating Weight - 191956 lbs (3) Take Off Gross Weight - 432850 lbs
(4) Single Enroute Refueling - 100000 lbs

**(U) Threshold at IOC.

10. Technical/Operational Characteristics (Cont'd)

	Dev Est	Approved Program Goal/Threshold**	Demon-strated Perf	Current Estimate

b. (U) Operational—

(b)(1)

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.

d. (U) Current Change Explanations — (U) (CH-1) Reflects DAE Baseline dated 2 Aug 1988.

(U) (CH-2) Revised estimate reflects the most current flight test results.

(U) (CH-3) Demonstrated performance and current estimate figures reflect the actual weight of B-1B A/C #100. The increased weight results from CCP/ECP changes that were added through the life of the program.

(U) (CH-4) The B-1B weapon system is performing better than originally anticipated. As the system matures, the maintainability parameters continue to improve.

e. (U) References —

Development Estimate: DCP dated 30 Sep 1983

Approved Program: DAE baseline dated December 1988.

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	3051.8
Procurement	17961.1	17251.4	17251.4
Airframe	(10584.9)	(10437.1)	(10437.1)
Engine	(1859.3)	(1239.4)	(1239.4)
Avionics	(2684.7)	(3150.1)	(3150.1)
Total Flyaway	(15128.9)	(14826.6)	(14826.6)
Peculiar Support	(1768.0)	(1569.4)	(1569.4)
Initial Spares	(1064.2)	(855.4)	(855.4)
Construction (MILCON)*	0	0	0
TOTAL FY 81 Base-Year$	20500.0	20303.2	20303.2
Escalation	9037.6	7134.5	7134.5
Development (RDT&E)	(583.2)	(698.7)	(698.7)
Procurement	(8454.4)	(6435.8)	(6435.8)
Construction (MILCON)*	0	0	0
TOTAL Then-Year$	29537.6	27437.7	27437.7
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: FY90-91 President's Budget

* 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 (Dec 88 SAR)	Current Year UCR Baseline (Dec 87 SAR)	Budget Year UCR Baseline (Dec 88 SAR)
a. Program Acquisition —			
1) Cost	27437.7	27042.7	27437.7
2) Quantity	100	100	100
3) Unit Cost	274.377	270.427	274.377

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	-112.8	-1680.0	-1792.8
Quantity			
Schedule			
Engineering			
Estimating	+567.3	-1020.3	-453.0
Other			
Support	0	-249.1	-249.1
SUBTOTAL	+454.5	-2949.4	-2494.9
Current Changes:			
Economic	+1.7	-9.5	-7.8
Quantity			
Schedule			
Engineering	+202.4	+273.6	+476.0
Estimating	-30.2	-43.1	-73.3
Other			
Support		+.1	+.1
SUBTOTAL	+173.9	+221.1	+395.0
TOTAL CHANGES	+628.4	-2728.3	-2099.9
Current Estimate	+3750.5	+23687.2	+27437.7

(FY81 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	Total
Development Estimate	+2538.9	+17961.1	+20500.0
Previous Changes:			
Quantity			
Schedule			
Engineering			
Estimating	+403.2	-432.8	-29.6
Other			
Support	0	-370.2	-370.2
SUBTOTAL	+403.2	-803.0	-399.8
Current Changes:			
Quantity			
Schedule			
Engineering	+132.9	+154.9	+287.8
Estimating	-23.2	-24.4	-47.6
Other			
Support		-37.2	-37.2
SUBTOTAL	+109.7	+93.3	+203.0
TOTAL CHANGES	+512.9	-709.7	-196.8
Current Estimate	+3051.8	+17251.4	+20303.2

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 Inovation 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

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

Support: Reestimate of inital spares requirement

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

Annual estimate revisions to realign support requirements

c. Current Change Explanations —

	(Dollars in Millions) Base-Year $	Then-Year $
1) RDT&E		
Revised Dec 88 economic escalation indices (Economic)	N/A	+1.7
"1122 "Antennas Redesign (Engineering)	+1.8	+2.4
New Requirement - Addition of Radar Warning Receiver (RWR) to B-1B (Engineering)	+131.1	+200.0
Prior year definitization of authorized effort (Estimating)	-14.8	-18.7
Reduction in Flight Testing due to reprogramming action (Estimating)	-7.1	-9.8
Adjustment of current and prior year escalation (Estimating)	-1.3	-1.7

2) Procurement	(Dollars in Millions) Base-Year $	Then-Year $
Revised Dec 88 economic escalation indices (Economic)	N/A	-9.5
New requirement - Addition of RWR production costs (Engineering)	+154.9	+273.6
Rockwell contract over-target - Funded with expired year funds Feb 88 (Estimating)	+113.4	+150.6
Boeing contract underrun - de-obligated Aug 88 (Estimating)	-36.1	-47.5
Withdrawn contingent liability (Estimating)	-108.1	-155.7
Definitization of support equipment requirements (Support)	-17.2	-23.3
Reduced spares estimate based on actual obligations (Support)	-164.5	-226.1
Addition of deferred ECM support equipment - FY 90-93 (Support)	+144.5	+249.5
Adjustment for prior and current year escalation (Estimating)	+6.4	+9.5

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	-18.006			+4.760	-5.263	-2.490		-20.999	274.377

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

a. RDT&E —

Airframe	Initial Contract Price Target	Ceiling	Qty
North American Rockwell F33657-81-C-0208, FPIF Award: 20 Jan 82 Definitized: 20 Jan 82	$1317.0	$1554.4	0

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$1810.6	$2116.2	0	$1821.3	$1821.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$6.5	-$8.6
Cumulative Variance to Date (2 Dec 88)	$8.4	-$3.9
NET CHANGE	$1.9	$4.7

Explanation of change: The increase in favorable cost variance is the result of catching up to original schedules on Support Equipment Requirement Document (SERD)'s 42A32, 42A33, 46A89 and 51A21 for Line Replaceable Unit (LRU) Test Program Sets (TPS) Contract Change Proposal (CCP) (CCP 149); and the transfer of CCP 322 Part Number Changes from the FSD contract to the Production contract. The decrease in unfavorable schedule variance is a result of catching up to original schedules on SERD's 42A32, 42A33, 46A89, and 51A21 for LRU TPS (CCP 149). No program impact.

15. Contract Information (Cont'd)

Avionics	Initial Contract Price Target	Ceiling	Qty
Boeing Military Airplanes F33657-81-C-0212, FPIF Award: 8 Jun 82 Definitized: 8 Jun 82	$435.0	$512.5	1

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$742.9	$840.4	1	$718.1	$716.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$15.5	-$1.1
Cumulative Variances to Date (24 Nov 88)	9.2	-$2.1
NET CHANGE	-6.3	-1.0

Explanation of change: The unfavorable cost variance results primarily from ALCM Interdepartmental Work Authorized (IDWA) work being performed on level of effort tasks that were scheduled in earlier time periods but have been accomplished late due to slides in flight test activities. The change in schedule variance is caused by several insignificant events of a small dollar value. No program impact.

b. Procurement —

Airframe	Initial Contract Price Target	Ceiling	Qty
North American Rockwell F33657-81-C-0210, FPIF Award: 20 Jan 82 Definitized: 20 Jan 82	$886.0	$1051.2	1

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$14434.0	$16943.1	100	$15060.2	$15001.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-$299.7	-$74.7
Cumulative Variances to Date (2 Dec 88)	-$471.8	-$48.3
NET CHANGE	-$172.1	$26.4

Explanation of Change: Unfavorable change in CV is due to labor volume and rate impacts at the manufacturing facilities; and surplusing of miscellaneous hardware, equipment, and material. The favorable change in SV is due to numerous schedules catching up to original planning. 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
$2081.6	$2313.7	100

Estimated Price At Completion	
Contractor	Program Manager
$2075.7	$2068.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$29.2	$-8.6
Cumulative Variances to Date (24 Nov 88)	$25.2	$-7.6
NET CHANGE	-4.0	+1.0

Explanation of Change: The cumulative favorable contract cost performance is primarily due to lower than planned labor rates, skill mixes, overhead usage, and travel expenditures. The schedule variance is showing improvement due to the recent delivery of TPS items which were the major cause of the behind schedule position. Continued improvement in the schedule variance is expected with continued deliveries in early 1989. 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
$143.8	$171.1	4.6

Current Contract Price		
Target	Ceiling	Qty
$2611.0	$2984.8	100

Estimated Price At Completion	
Contractor	Program Manager
$2760.8	$2785.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-$10.8	-$64.2
Cumulative Variances to Date (23 Oct 87)	$41.5	-$53.4
NET CHANGE	$52.3	$10.8

Explanation of Change: The favorable change in cost variance was caused by the transfer of costs to their global accounts. Before global (CORE) was authorized, these costs were booked as overruns and no earned value was taken. As these costs are transferred, earned value is taken causing the positive cost variance. The favorable change in schedule variance was caused by BCWP being taken for BAND 8 Traveling Wave Tubes (TWT's) from Raytheon and Teledyne. No Program Impact.

15. Contract Information (Cont'd)

Engine	Initial Contract Price Target	Ceiling	Qty
General Electric Co. (Lot III,IV,V) F33657-81-C2047, 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)

Explanation of Change: N/A

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

a. Program Status —

1) *Percent Program Completed: 60% (9yrs/15yrs)

2) Percent Program Cost Appropriated: 97.4% ($26714.6/$27437.7)

* 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	$3550.5	$46.2	$69.9	$83.9	$3750.5
Procurement	$23164.1	$10.0	$10.0	$503.1	$23687.2
MILCON	0	0	0	0	0
TOTAL	$26714.6	$56.2	$79.9	$587.0	$27437.7

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	*Obligated	*Expended	Escl Rate %
			Appropriation:	RDT&E				
1981				209.8	219.0	219.0	219.0	11.9
1982				421.9	470.9	470.5	470.5	9.2
1983				642.5	750.4	748.5	732.1	4.9
1984				603.0	731.4	730.8	708.6	3.8
1985				353.3	442.0	441.7	422.9	3.4
1986				186.8	240.1	238.3	230.1	2.8
1987				89.0	118.1	118.1	76.5	2.7
1988				259.3	357.0	294.8	51.8	3.1
1989				155.2	221.6	6.9	.3	4.0
1990				31.3	46.2	0.0	0.0	3.6
1991				46.0	69.9	0.0	0.0	3.3
1992				44.3	68.9	0.0	0.0	2.8
1993				9.4	15.0	0.0	0.0	2.3
SUBTOTAL				3051.8	3750.5	3268.6	2911.8	
			Appropriation:	Procurement				
1982	1	552.1	552.1	1313.5	1613.0	1613.0	1592.5	9.6
1983	7	786.7	1477.0	3020.3	3932.4	3932.4	3719.3	9.0
1984	10	820.2	1613.7	4362.2	5919.5	5919.5	5703.5	8.0
1985**	34	760.1	3560.7	5068.6	7106.2	7106.2	6208.4	3.4
1986	48	375.0	4174.1	3187.4	4593.0	4593.0	4231.2	2.8
1990***			0.0	6.1	10.0	0.0	0.0	3.6
1991***			0.0	5.9	10.0	0.0	0.0	3.3
1992***			6.6	93.6	161.0	0.0	0.0	2.8
1993***			76.3	121.8	213.6	0.0	0.0	2.3
1994***			70.7	70.7	126.1	0.0	0.0	1.8
1995***			1.3	1.3	2.4	0.0	0.0	1.8
SUBTOTAL	100	3294.1	11532.5	17251.4	23687.2	23164.1	21454.9	
TOTAL	100	3294.1	11532.5	20303.2	27437.7	26432.7	24366.7	

* Reflects Program Office records as of 31 Dec 1988.
** FY85 includes $52M for B-1B anechoic chamber (PE 78011F).
***RWR retrofit program and support equipment.

17. Production Rate Data:

a. Annual 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$)	20500.0	-196.8	20303.2	-	20303.2
	(TY$)	29537.6	-2099.9	27437.7	-	27437.7
PAUC	(BY$)	205.000	-1.968	203.032	-	203.032
	(TY$)	295.376	-20.999	274.377	-	274.377

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 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)	245.6	205.1	212.0	TBD	662.7
Industrial Fund	15.0	2.7	1.1	TBD	18.8
Total	260.6	207.8	213.1	TBD	681.5

N-34 PHOENIX

SAR-88-039

AS AMENDED

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A) 823)
PROGRAM: PHOENIX (AIM-54C)

AS OF DATE: December 31, 1988

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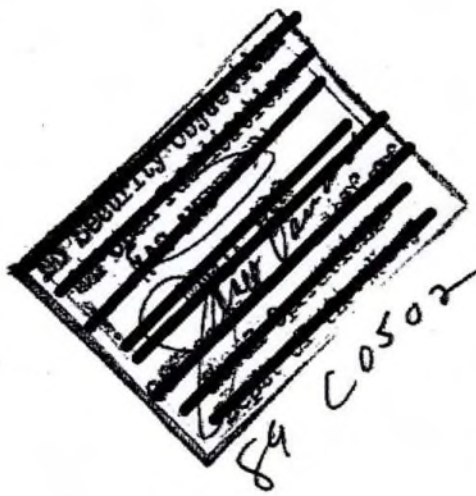

1. Designation/Nomenclature (Popular Name): PHOENIX (AIM-54C)

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

4. Program Elements:

RDT&E:	PE 0604364N	
PROCUREMENT:	PE 24162N	ICN: 2212 APPN: 1507
MILCON:	PE 72031N	

5. Related Programs: F-14A/D

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6. (U) 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. (U) Program Highlights:

a. (U) 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.

b. (U) Significant Developments Since Last Report: The Secretary of Defense recommended a change in the procurement strategy beginning in FY 1990 to a three year winner-take-all multi-year acquisition which would buy out the remaining requirements.

(U) The AIM-54C Phoenix Missile System satisfies the mission requirement.

c. (U) Changes since "as of" Date: Raytheon successfully competed head-to-head with HAC for the missiles from the planned procurement.

Both producers were awarded contracts in January 1989 totalling 403 missiles, a decrease of 47 missiles from the planned procurement.

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP (dated November 21, 1980) threshold breaches.

9. Schedule:

	Development Estimate	Approved Program	Current Estimate
Full Development Go-Ahead	Oct 76	N/A	Oct 76

9. Schedule: (Continued)

	Development Estimate	Approved Program	Current Estimate
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	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 CH-1
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-82) 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 December 1988 due to delay in OT-IIIB testing.

c. Current Change Explanations -- (CH-1)

Approval for Full Rate Production delayed from December 1988 to January 1989 as a result in delay in OT-IIIB testing. Approval was granted January 10, 1989.

d. References --

Development Estimate: DCP, dated November 21, 1980, subject "AIM-54 Improvement Program". Approved Program: DAE Approved Baseline dated February 17, 1988.

(b)(1)

b. (U) 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 Doppler, Semi-active/Active, HOJ Modes			
Propulsion:	Solid Boost			

c. (U) Previous Change Explanations: None.

d. (U) Current Change Explanations: None.

e. (U) References --

Development Estimate: DCP, dated November 21, 1980, subject "AIM-54 Improvement Program".
Approved Program: DAE Approved Baseline dated February 17, 1988.

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	1619.8	1619.8
Total Flyaway	231.6	1422.0	1422.0
Other WPN Sys Costs	56.9	170.8	170.8
Initial Spares	8.2	27.0	27.0
Construction	1.5	2.4	2.4
Total FY77 Base-Year $	372.0	1745.3	1745.3
Escalation	92.3	2015.6	2015.6
Development (RDT&E)	11.4	48.7	48.7
Procurement	80.7	1965.2	1965.2
Construction	0.2	1.7	1.7
Total Then-Year $	464.3	3760.9	3760.9

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11. (U) Program Acquisition Cost (Continued)

b. Quantities

Development (RDT&E)	30	45	45
Procurement	705	3356	3356
Total	735	3401	3401

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: FY 1990-91 President's budget.

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

	Current Est	UCR Baseline	UCR Baseline
a. Program Acquisition	(Dec 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	3760.9	3671.1	3760.9
(2) Quantity	3401	3401	3401
(3) Unit Cost	1.106	1.079	1.106

	Current Year		Budget Year
b. Current Procurement --	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	396.0	396.0	378.7
Less CY Adv Proc	0.0	0.0	50.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	396.0	396.0	328.7
(2) Quantity	450	450	420
(3) Unit Cost	.878	.878	.783

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3. (U) 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	-598.0	0.1	-586.2
Quantity		4750.0		4750.0
Schedule	10.1	418.6		428.7
Engineering	23.6	328.0		351.6
Estimating	41.2	-2150.7	-0.2	-2109.7
Support		331.4		331.4
Other	-	41.0	-	41.0
Subtotal	86.6	3120.3	-0.1	3206.8
Current Changes:				
Economic		-0.3		-0.3
Quantity		-		-
Schedule	-	88.8	-	88.8
Engineering	-	-5.2	-	-5.2
Estimating	-	- 5.1	-	- 5.1
Support	-	50.1	2.5	52.6
Other	-	-41.0	-	-41.0
Subtotal	-	87.3	2.5	89.8
Total Changes	86.6	3207.6	-2.4	3296.6
Current Estimate	171.8	3585.0	4.1	3760.9

(Current (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	73.8	296.7	1.5	372.0
Previous Changes:				
Quantity		1539.4		1539.4
Schedule	3.0	60.3		63.3
Engineering	16.0	143.9		159.9
Estimating	30.3	-584.1	-0.2	-554.0
Support	-	108.3	-	108.3
Other	-	20.5	-	20.5
Subtotal	49.3	1288.3	-0.2	1337.4
Current Changes:				
Quantity	-	-	-	-
Schedule	-	30.8	-	30.8
Engineering	-	-2.1	-	-2.1
Estimating	-	7.7	-	7.7
Support	-	18.9	1.1	20.0
Other	-	-20.5	-	-20.5
Subtotal	-	34.8	1.1	35.9
Total Changes	49.3	1323.1	0.9	1337.3
Current Estimate	123.1	1619.8	2.4	1745.3

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
Schedule: quantity shifts during the budget process
Engineering: guidance, control and thermal conditioning changes
Estimating: reduction due to introduction of contract actuals into model. Increased requirements for establishment of support NARF; additional support costs associated with additional quantity of missiles
Support: reassessment of spares and support equipment requirements

MILCON
Economic: revised escalation indices
Estimating: based on contract actual costs

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) Procurement		
Revised escalation rates (Economic)	N/A	-0.3
Increased cost resulting from procurement stretched thru FY92 (one additional year) (Schedule)	30.8	+88.8
Decrease effort for produceability upgrades (Engineering)	-2.1	-5.2
Reduction due to updated actuals, incorporation of multi-year strategy into cost estimate and reprogramming of funds to higher priority programs (Estimating)	-12.8	-46.1
Increase support costs due to rephasing of the schedule (Support)	+18.9	+50.1
Correction of error in Dec 87 SAR		
Estimating	+20.5	+41.0
Other	-20.5	-41.0
(2) MILCON		
Additional effort required for storage bunkers (Support)	+1.1	+2.5

14. **Program Acquisition Unit Cost (PAUC) History:**

a. Initial SAR Estimate to Current Baseline Estimate: same as current baseline.

b. Current Baseline Estimate to Current Estimate:

Changes (Then-Year Dollars in Millions)

PAUC Dev Est	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	PAUC Cur Est
0.632	-0.172	.901	0.152	0.102	-0.623	0.114	0.000	0.474	1.106

15. Contract Information:

a. RDT&E: none

b. Procurement:

Guidance Control & Airframe		Target	Ceiling	Qty
Hughes Aircraft Company, Tucson		378.0	378.0	530

N00019-84-C-0379, FFP
Award: March 1, 1985
Definitized:September 15, 1986

Current Contract Price			Estimate at Completion	
Target	Ceiling	Qty	Contract	Prog Manager
378.0	378.0	530	378.0	378.0

Explanation of Change: No variances are reported on FFP contracts.

Guidance Control & Airframe		Target	Ceiling	Qty
Raytheon, Lowell, MA	FY87	49.5	49.5	56
	FY88	135.9	135.9	180

N00019-86-C-0216, FPI
Award: May 15, 1986
Definitized: May 15, 1986

Current Contract Price			Estimate at Completion	
Target	Ceiling	Qty	Contract	Prog Manager
185.4	185.4	236	185.4	185.4

Explanation of Change: There are no variances to report.

Guidance Control & Airframe		Target	Ceiling	Qty
Hughes Aircraft Company, Tucson	FY87	118.3	118.3	149
	FY88	131.0	131.0	170

N00019-87-C-0283, FFP
Award: August 20, 1987
Definitized: August 20, 1987

Current Contract Price			Estimate at Completion	
Target	Ceiling	Qty	Contract	Prog Manager
249.4	249.4	329	249.4	249.4

Explanation of Change: No variances are reported on FFP contracts..

c. MILCON: none

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

a. Program Status:

Percentage of Program Completed: 76.5 % (13/17 years)
Percent of Cost Appropriated: 73.6% ($2,766.2/$3,760.9)

b. Appropriation Summary:

Appropriation	Prior Yrs (FY-77-89)	Budg Yr (FY90)	Budg Yr (FY-91)	Balance to Complete (FY92-93)	Total
RDT&E	171.8				171.8
Procurement	2,592.9	378.7	332.5	280.9	3,585.0
MILCON	1.6		0.0	2.5	4.1
Total	2,766.3	378.7	332.5	283.4	3,760.9

PHOENIX (AIM-54C) December 31, 1988

16. (U) 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
Subtotal	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	59.6	76.9	132.9	132.9	132.9	11.60
1982	72	7.1	53.5	84.2	157.2	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	144.7	297.4	297.4	293.6	8.00
1985	265	27.9	105.7	165.5	350.6	350.6	319.7	3.40
1986	265	24.1	98.7	133.6	292.0	292.0	194.2	2.80
1987	205	13.2	85.8	125.0	282.5	267.2	143.9	2.70
1988	360	9.2	141.1	146.2	342.6	332.9	71.2	3.10
1989	450	5.5	147.0	163.9	396.0			4.00
1990	420	3.1	117.2	152.3	378.7			3.60
1991	420	3.0	114.1	130.2	332.5			3.30
1992	406	.7	106.3	107.6	280.9			2.80
Subtotal	3357	139.0	1283.0	1619.8	3585.0	2171.8	1654.3	
Appropriation: MILCON								
1978				1.3	1.6	1.6	1.6	7.68
1993				1.1	2.5			2.30
Subtotal				2.4	4.1			
Total	3401	139.0	1283.0	1745.3	3760.9	2345.2	1827.7	

17. Production Rate Data:

a. Annual Production Rates:

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
		Production Rates (Quantity/Year)		
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	450	840
1990		560	420	866
1991		560	420	
1992		560	406	
1993		560		
1994		560		
1995		560		
1996		560		
1997		560		
1998		434		

b. Cost Variance

Item		Production Estimate	Variance CE - PdE	Current Estimate	Variance CE - Max	Maximum Economic
Prog Cost	BY$	1709.4	+35.9	1745.3	150.0	1595.3
	TY$	3671.1	+89.8	3760.9	266.7	3494.2
PAUC	BY$	0.503	+0.023	0.526	.057	0.469
	TY$	1.079	+0.053	1.132	.105	1.027

c. Schedule

Item	Production Estimate	Variance CE vs PdE	Current Estimate	Variance CE vs Max	Maximum Economic
Start Date	12/79	N/A	12/79	N/A	12/79
Duration	177	0	177	+12	165
End Date	9/94	N/A	9/94	N/A	9/93

d. Deliveries (Plan/Actual)

RDT&E	45/45
Procurement	1095/1065

e. (U) Approved Design to Cost Goals: None

18. **Operating and Support Costs:** Not Applicable.

a. N/A
b. N/A
c. Contractor Support Costs - -

	FY-89 & Prior	FY-90 Year	FY-91 Year	Balance to Complete	Total
O&M (Navy)	1.0	0.2	1.9	0.0	3.1
Industrial Fund	0.2	0.1	0.1	0.0	0.4
TOTAL	1.2	0.3	2.0	0.0	3.5

SAR-88-056

AF-18 JTIDS

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SELECTED ACQUISITION REPORT (RCS:DD - COMP (O&A)823)
PROGRAM: JTIDS Class 2 TDMA TERMINAL

AS OF DATE: December 31, 1988

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1. Designation and Nomenclature (Popular Name): Joint Tactical Information Distribution System 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

3. Responsible Office and Telephone Number:
JTIDS Joint Program Office (JPO)
Electronics Systems Division
Hanscom AFB, MA 01731-5000

Col Leonard R. Vernamonti
Assigned: Mar 15, 1988
AV: 478-5986 MITRE x3532
Commercial: (617) 274-3532

4. Program Element/Procurement Line Items:
RDT&E: 64754F (Shared Funding)
64771D (Shared Funding)
64702A
64232N (Shared Funding)
25604N
65130D

[redacted]

5. Related Programs: E-3 (AWACS), NATO Airborne Early Warning and Control System; 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;

[redacted] (THIS PAGE IS UNCLASSIFIED)

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5. Related Programs (Cont'd):

F-14D TOMCAT Carrier-Based Maritime Air Superiority Fighter; Joint Interoperability of Tactical Command and Control Systems (JINTACCS); Aircraft 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 family of JTIDS Class 2 TDMA terminals consists of the Class 2 (for Air Force and Navy tactical fighters), the Class 2H (High-powered terminal - for AF and Navy Command and Control platforms, Navy ships, and Air Force and Marine ground platforms),and the Class 2M (miniaturized Class 2 - for mobile Army platforms). This family of JTIDS Class 2 TDMA terminals will provide mobile tactical platforms with earliest jam-resistant, secure, digital communications (data) capability, and will include Tactical Air Navigation (TACAN) (Air Force and Navy only) and Time-of-Arrival (TOA) positioning functions and an inherent identification (ID) capability. 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 Air Force and Army terminals will also be interoperable with Class 1 TDMA JTIDS terminals in air (currently in AWACS) and ground systems (ASIT) in both United States and North Atlantic Treaty Organization (NATO) forces. 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 D$\emptyset$D system.

The Low Volume (LV) Multifunctional Information Distribution System (MIDS) terminal applies new technology to the existing Class 2 design through a cooperative development program with NATO. The MIDS terminal will be smaller, more reliable, lighter, fully compatible with and as capable as the Class 2 and will be designed primarily for fighter aircraft. The MIDS terminal is currently in the project definition phase.

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 communications 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.

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 development of Class 2 terminals for the E-2C, F-14D, and ships.

7. Program Highlights (Cont'd):

a. Significant Historical Developments (Continued) -- On 31 December 1985, Singer was given 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 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 Investigative 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.

b. Significant Developments Since Last Report - 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. In September 1988, Plessey Electronic Systems Corporation bought out Singer; henceforth, Singer will be known as Electronic Systems & Data Communications Corporation (ESDCC).

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 a point estimate Mean Time Between Failure (MTBF) of 316.5 hours in the laboratory.

The JTIDS Class 2 TDMA Terminal is expected to satisfy the mission requirements.

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

8. Threshold Breaches: DCP (dated 31 March 1981) and SDDM (dated 16 January 1981) threshold of Milestone III (Dec 1986) has been breached. Current projection is August 1989. The DCP and SDDM threshold breach was first reported in the December 1984 Air Force SAR. The DAE baseline dated February 1988 has been breached for the schedule milestone "Air Force Delivery of First Production Unit."

9. Schedule

a. Milestones	Development Estimate/ Approved Program	Current Estimate
Program Initiation	Mar 76/N/A	Mar 76
Class 2 TDMA ADM Delivery	Aug 78/N/A	Aug 78
Milestone II	Jan 81/Jan 81	Jan 81
TDMA Development Contract Award	Jan 81/N/A	Jan 81
Pod Preliminary OT&E	Jan 81/N/A	Jan 82
Delivery of First FSD Terminal		
Army (Class 2)	Apr 83/Mar 84	Mar 84
Air Force (F-15)	Jul 83/Jun 84	Jun 84
Navy	N/A /Jul 89	Sep 89
Army (Class 2M)	N/A /N/A	Feb 88 Ch-1
IOT&E/IOA Complete		
Army (Class 2)	Mar 87/Apr 87	Apr 87
Air Force (F-15)	Jan 86/Apr 87	Apr 87
Army (Class 2M)	N/A /N/A	Jun 91 Ch-2
Milestone IIIA		
Air Force (F-15)	Jun 86/Nov 87	Aug 89 Ch-3
Production Contract Award (AF)	Jun 86/N/A	Sep 89 Ch-3
Full Production		
Army (Class 2M)	N/A /N/A	Oct 91 Ch-2
Milestone III A (NPDM)		
LRIP (Navy)	N/A /Dec 91	Feb 91 Ch-4
Begin Navy TECHEVAL	N/A /N/A	Aug 92
Begin Navy OPEVAL	N/A /N/A	Feb 93
Milestone III B (NPDM)		
Full Production (Navy)	N/A /N/A	Sep 93
Delivery of First Production Unit		
Air Force (F-15)	Jun 88/Nov 89	Dec 91 Ch-5
Army (Class 2M)	N/A /N/A	Oct 93 Ch-2
Navy	N/A /Dec 93	Feb 93 Ch-4
IOC		
Army (Class 2M)	Oct 89/N/A	Apr 94 Ch-2 A/
Air Force (F-15)	Sep 88/Jul 90	N/A Ch-6
Navy	N/A /Dec 93	Sep 93 Ch-4

A/ If no Class 2M production units are available, then development terminals will be used.

Schedule (Cont'd

b. Previous Change Explanations --

In the December 1981 SAR, the DSARC Production Decision Milestone was revised from June 1986 to June 1985.

In the September 1982 SAR, the delivery of the Air Force and Army terminals was delayed one month. Also, the Army Unique Development and the AF Testing Complete Milestones were increased three months because the Test Program was reduced from a full production modification in the F-15 and F-16 DT&E/IOT&E to test-only modification of the F-15 only with a shortened test program (F-15 only IOT&E). This impacted the Production Decision which was changed to correspond with the end of DT&E testing. This in turn affected the Contract Award date and first production terminal delivery.

In the June 1983 and September 1983 SARs, milestones for Delivery of First FSD Terminal (Army and AF), Army Unique Development, AF Testing Complete, Milestone III, Production Decision, and Contract Award were adjusted 3 months respectively in order to accomplish design work associated with the PACKED 4 message structure and June 1983 TADIL J message implementation.

In the December 1983 SAR, the IOC was redefined from initial terminal delivery to F-15 to a full squadron of F-15s having JTIDS capability moving the IOC to December 1989. Also, due to a delay in the initial terminal delivery, DT&E/IOT&E testing announced a six month schedule slip.

In the December 1984 SAR, the milestone for the completion of Air Force testing was delayed eight months - six months because of hardware/software integration problems with the terminal and 2 additional months because of test asset availability and schedule adjustments mandated by new test time frame. This, in turn, caused an 8 month delay in Milestone III and the Production Decision. The Contract Award date Milestone was adjusted an additional two months because of anticipated delays in the new DT&E review cycle.

In the December 1985 SAR, completion of Air Force Testing was delayed two months due to the late arrival of F-15s at Eglin AFB. This, in turn, caused a 2 month slip to the Production Decision and Milestone III. Also, the Secretary of the Army deemed that the PLRS-JTIDS Hybrid (PJH) (now known as Army Data Distribution System) could continue into FSD without an ASARC.

In the September 1986 SAR, the Class 2 DT&E/IOT&E slipped 2 months which in turn caused a three month delay in JRMB III, Production Contract Award, and the Delivery of 1st Production Terminal; the PLRS extended reliability growth test caused a delay in the award of the initial production of the PLRS JTIDS Hybrid (PJH) which, in turn, caused the PJH First Unit Equipped (FUE) to slip from July 1988 to Aug 1989 (this is an Army PJH milestone reported in the Army PJH SAR and has no effect on the JTIDS Program - Air Force or Army); as the PJH FUE date was delayed, the Army PJH IOC (which will be approximately 8 months after the PJH FUE) was also delayed. JTIDS is not involved in the slipping of this milestone.

JTIDS Class 2 TDMA Terminal, December 1988

The revised Sep 86 Required Operational Capability (ROC) established two data distribution systems (EPLRS and JTIDS) in lieu of one data distribution system known as PLRS/JTIDS Hybrid. JTIDS and EPLRS now have separate Army fielding dates.

In the December 1986 SAR, the end of AF and Army testing slipped one month. This did not effect any other SAR milestones. Also, this was the first consolidated Tri-service SAR.

In the December 1987 SAR, planned milestones have slipped due to major program restructure resulting from FY 88 Congressional reductions in the Navy RDT&E, program. The first FSD terminal delivery was delayed due to a Navy decision to delay procurement until improvement of Class 2 terminal reliability. New Milestones added due to the Army's decision to use the Class 2M instead of the Class 2. The Production Decision slipped from Jun 1987 to May 1989 due to a Congressional requirement that the terminal demonstrate 400 hour MTBF (Lab) prior to a production decision. This change necessitated restructuring of the subsequent milestones. Last Report was for Class 2 in the PJH. This milestone is redefined to be the Class 2M in the FAADC²I.

c. Current Change Explanations:

Ch-1: The first Class 2M terminal was delivered one month early.

Ch-2: The Army Class 2M Milestones were rescheduled to coincide with the FAADC2 program schedule. The Class 2M is a primary subsystem of the FAADC2.

Ch-3: The schedule slipped due to delay in obtaining test assets for the pre-DAB testing at Eglin AFB, FL.

Ch-4: Milestones occurring earlier than anticipated due to major program restructuring.

Ch-5: The first F-15 production terminal will be delivered 27 months after contract award.

Ch-6: Only 20 F-15s will be equipped with JTIDS. IOC is not relevant.

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 dated February 1988.

(b)(1)

(U) Communication Range (nm)	300	300	290/495 D/	300/500
(U) Voice Channels	3	3	2	3 E/
(U) Coded Message Error Probability	.01	N/A	.01	.01

b. (U) Operational

(U) MTBF (hr) (Field)	120	120	28 F/	120
(U) MTBF (hr) (Lab)	500	N/A	316.5 (Ch-1)	500
(U) Mean Corrective Maintenance Time (min)	30	30	38	30

c. (U) Previous change Explanation: None

d. (U) Explanation of Changes: Ch-1 - RVT #2 demonstrated a new Lab MTBF point estimate.

e. (U) 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 dated February 1988.

10. Technical/Operational Characteristics: (Continued)

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 not demonstrated due to test limitations; however, indications showed the terminal would meet the requirement (i.e. three relays spaced at 300 NM apart).

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/ 290 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. Joint Operations Requirement (JOR) requires that the system shall have a sufficient data rate to support 3 voice channels per net.

F/ Apr 1987 OT results.

JTIDS Class 2 TDMA Terminal, December 31, 1988

11. PROGRAM ACQUISITION COST: (Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	$309.0	$1358.7	$1358.7
Procurement	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total FY 81 Base-Year $	309.0	1358.7	1358.7
Escalation	73.5	527.7	527.7
Development (RDT&E)	(73.5)	(527.7)	(527.7)
Procurement	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total Then-Year $	$382.5	$1886.4	$1886.4
b. Quantities --			
Development (RDT&E)	55	158	158 A/
Procurement	N/A	N/A	N/A
Total	55	158	158

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: FY 90/91 President's Budget

12. Program Acquisition/Current Procurement Unit Cost Summary: N/A

A/ Quantity increased from 129 to 158 from the December 1987 SAR as follows: 18 additional Class 2M; 6 additional MCE terminals; 2 additional E-3 terminals; 3 additional F-15 terminals. Not included in this report are 4 MCE terminals for USMC; 2 JINTACCS terminals for Army JINTACCS; and 8 F-15 terminals for JSTARS.

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	-46.4	-	-	-46.4
QUANTITY	+781.8	-	-	+781.8
SCHEDULE	+22.8	-	-	+22.8
ENGINEERING	+352.7	-	-	+352.7
ESTIMATING	-145.8	-	-	-145.8
OTHER	-	-	-	-
SUPPORT	+56.1	-	-	+56.1
SUBTOTAL	+941.2	-	-	+941.2
CURRENT CHANGES				
ECONOMIC	-1.7	-	-	-1.7
QUANTITY	+29.1	-	-	+29.1
SCHEDULE	-	-	-	-
ENGINEERING	-	-	-	-
ESTIMATING	+535.3	-	-	+535.3
OTHER	-	-	-	-
SUPPORT	-	-	-	-
SUBTOTAL	+562.7	-	-	+562.7
TOTAL CHANGES	+1503.9	-	-	+1503.9
CURRENT ESTIMATE	1886.4	-	-	1886.4

(FY 1981 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
DEVELOPMENT ESTIMATE	309.0	-	-	309.0
PREVIOUS CHANGES				
QUANTITY	+481.3	-	-	+481.3
SCHEDULE	-1.5	-	-	-1.5
ENGINEERING	+243.8	-	-	+243.8
ESTIMATING	-109.7	-	-	-109.7
OTHER	-	-	-	-
SUPPORT	+38.6	-	-	+38.6
SUBTOTAL	+652.5	-	-	+652.5
CURRENT CHANGES				
QUANTITY	+21.1	-	-	+21.1
SCHEDULE	-	-	-	-
ENGINEERING	-	-	-	-
ESTIMATING	+376.1	-	-	+376.1
OTHER	-	-	-	-
SUPPORT	-	-	-	-
SUBTOTAL	+397.2	-	-	+397.2
TOTAL CHANGES	+1049.7	-	-	+1049.7
CURRENT ESTIMATE	1358.7	-	-	1358.7

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; additional 24 terminals required for Navy integration, test and evaluation efforts

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 FSD 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; continuation DT/OT; Congressional budget cuts

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	-1.7
Adjustment for Current and Prior (Estimating)	-0.7	-0.7
Adjustment for FY 90 and Beyond (Estimating)	+0.1	+0.1
Change in Cost categories for previously added costs for 29 development terminals already included in Cost Estimate.	0.0	0.0
Cost due to Quantity increase of 29 additional terminals. (Quantity)	+21.1	+29.1
Decrease since funding for additional 29 terminals had been included in previous Cost Estimate. (Estimating)	-21.1	-29.1

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

	(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E (Cont'd)		
Prior Year OSD funding not previously reported. (Estimating)	+72.5	+93.3
FY 89 Congressional Undistributed cuts to OSD funds. (Estimating)	-5.8	-8.5
FY 90 - FY 94 increase to fund Follow-on developments, testing, and logistics in OSD line. (Estimating)	+147.1	+226.9
Prior estimates did not include platform integration costs associated with the terminals. Program restructuring reduced other engineering test, and logistic support activities and deleted Multi-Tadil test systems (MTTS). (Estimating)	+160.2	+215.8
FY 93 - FY 94 increase to fund USAF testing, integration, and MIDS development. (Estimating)	+25.7	+41.1
Non Programmatic PB reduction. (Estimating)	-1.9	-2.7

14. Program Acquisition Unit Cost (PAUC) History: N/A

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

a. RDT&E--

		Initial Contract Price		
(1)	Follow-on Development	Target	Ceiling	Qty
	Electronic Systems & Data Communications Corporation (ESDCC), Wayne NJ.	$23.6	$23.6	6
	F19628-86-C-0035, FFP			
	Award: December 31, 1985			
	Definitization: December 31, 1985			

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$267.3M (Ch-1)	$267.3M (Ch-1)	93 (Ch-2)	$267.3M (Ch-1)	$267.3M (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) Follow-on acquisition of Class 2M ($25.5M); b) Follow on Class 2 development for E-2C, F-14, Ships; Acquisition of DCT terminals; and MCE common hardware ($77.2M); Follow-on Class 2 development for [illegible] Various mods ($9.6M).

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

a. RDT&E (Cont'd)--

Ch-2 - Quantity increased from 27 to 93 (66 terminals) as follows: 18 additional Class 2M; 10 additional F-14; 8 additional E-2C; 8 additional Ships; 4 additional F-15 for JSTARS; 3 additional F-15 for Developmental Certification Testing (DCT); 3 additional MCE for DCT; 6 additional MCE for USAF; 4 additional MCE for USMC; 2 additional E-3 for DCT.

Explanation of Changes: FFP contract, Cost Performance Report is not on contract.

(2) F-14D/JTIDS Integration
Grumman Aerospace Co.,
Aircraft Systems
Bethpage, L.I., NY
N00019-84-C-0015, FFP
Award: July 31, 1984
Definitization: December 18, 1986

Initial Contract Price			
Target	Ceiling		Qty
$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: FFP contract, Cost Performance Report is not on contract.

(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

Initial Contract Price			
Target	Ceiling		Qty
$227.1M	A/	N/A	4

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$233.6M	N/A	4	$238.1M	$238.1M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-0.2	$-8.6
Cumulative Variances to Date (11/30/88)	$ 0.0	$-8.6
Net Change	$+0.2	$ 0.0

Explanation of Change: The schedule variance is based on an outdated 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 June 1989.

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.

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

b. Procurement -- None
c. Milcon -- None

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

a. Program Status --
(1) Percent Program Completed: 73.7% (14 yrs/19 yrs)
(2) Percent Program Cost Appropriated: 58.4% ($1102.0/$1886.4)

b. Appropriation on Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY76-89)	Budget Year (FY90)	Budget Year (FY 91)	Balance To Complete (FY92-94)	Total
RDT&E	$1102.0	$228.0	$211.3	$345.1	$1886.4

c. Annual Summary -- A/ B/

PROGRAM: JTIDS CLASS 2 TDMA TOTAL PROGRAM

Fiscal Year	Qty	Flyaway FY 81 Dollars Nonrec	Flyaway FY 81 Dollars Rec	Total Base Year$	Total Then-Year $ Program	Obligated	Expended	Escl Rate %
1976				0.1	0.1	0.1	0.1	6.9
1977				1.4	1.0	1.0	1.0	2.9
1978				1.1	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	43.8	4.9
1984				36.4	44.1	44.1	44.1	3.8
1985				64.8	81.1	81.1	70.4	3.4
1986				165.3	212.4	212.4	159.2	2.8
1987				138.8	184.2	184.2	142.9	2.7
1988				152.6	210.1	200.6	75.6	3.1
1989				167.5	239.3	60.6	2.6	4.0
1990				154.7	228.0			3.6
1991				139.1	211.3			3.3
1992				97.7	151.9			2.8
1993				66.6	105.6			2.3
1994				54.2	87.6			1.8
Total	158			1358.7	1886.4	913.8	625.6	

A/ FY 90/91 PB, 9 Jan 1989. 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/ Obligation and Expenditure information from JTIDS Program Office records as of 15 December 1988.

c. Annual Summary (Cont'd) --

PROGRAM: JTIDS Class 2 TDMA OSD (PE: 0604771D) A/ B/

Fiscal Year	Qty	Flyaway FY 81 Dollars Nonrec	Rec	Total Base Year$	Total Then-Year $ Program	Obli-gated	Ex-pended	Escl Rate %
				Appropriation: RDT&E (PE: 0604771D)				
1986				154.3	198.3	198.3	147.1	2.8
1987				110.8	147.0	147.0	108.2	2.7
1988				57.1	78.6	76.6	8.1	3.1
1989				42.8	61.1	8.0	0.5	4.0
1990				59.1	87.1			3.6
1991				57.8	87.8			3.3
1992				46.5	72.3			2.8
1993				35.7	56.6			2.3
1994				28.5	46.1			1.8
Total	112			592.6	834.9	429.9	263.9	

PROGRAM: MIDS (PE: 0605130D) B/ C/

				Appropriation: RDT&E (PE: 0605130D)				
1989				10.0	14.3	0.0	0.0	4.0
Total				10.0	14.3	0.0	0.0	

A/ FY 90/91 PB, 9 Jan 1989.

B/ Obligation and Expenditure information reflects Program Office records as of 15 December 1988.

C/ The remainder of the approved funding for MIDS is contained in PE 0604754F.

c. Annual Summary (Cont'd) -- A/ B/

PROGRAM: JTIDS Class 2 TDMA AIR FORCE PROGRAM (PE: 0604754F)

Fiscal Year	Qty	Flyaway FY 81 Dollars Nonrec	Rec	Total Base Year$	Total Then-Year $ Program	Obligated	Expended	Escl Rate %
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				15.8	21.8	14.4	2.1	3.1
1989				34.5	49.3	12.3	1.6	4.0
1990				30.1	44.4			3.6
1991				28.8	43.7			3.3
1992				12.9	20.0			2.8
1993				12.8	20.3			2.3
1994				12.9	20.8			1.8
Total	19			288.9	384.7	191.1	159.5	

A/ FY 90/91 PB, 9 Jan 1989. The Approved MIDS funding is included in FY 90 - 94 as follows: FY 90 - $9.0M; FY 91 - $9.0M; FY 92 - $8.0M; FY 93 - $8.0M; FY 94 - $8.0M. We believe that this funding will be moved to PE 0605130D at some time in the future.

B/ Obligation and Expenditure information reflects Program Office records as of 15 December 1988.

c. Annual Summary (Cont'd) -- A/ B/

PROGRAM: JTIDS CLASS 2 TDMA ARMY PROGRAM (PE: 0604702A)

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				1.1	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	19.9	4.9
1984				17.6	21.3	21.3	21.3	3.8
1985				18.1	22.7	22.7	20.6	3.4
1986				11.0	14.1	14.1	12.1	2.8
1987				0.0	0.0	0.0	0.0	2.7
1988				3.1	4.3	4.3	1.7	3.1
TOTAL	27			95.2	110.0	110.0	103.3	

PROGRAM: JTIDS CLASS 2 TDMA NAVY PROGRAM (PE: 0205604N) C/

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				28.0	37.2	37.2	34.7	2.7
1988				76.6	105.4	105.3	63.7	3.1
1989				80.2	114.6	40.3	0.5	4.0
1990				65.5	96.5			3.6
1991				52.5	79.8			3.3
1992				38.3	59.6			2.8
1993				18.1	28.7			2.3
1994				12.8	20.7			1.8
Total	0			372.0	542.5	182.8	98.9	

A/ FY 90/91 PB, 9 Jan 1989.

B/ Obligation and Expenditure information reflects Program Office records as of 15 December 1988.

C/ FY 88 funding was in PE 0604232N.

17. **Production Rate Data:**

a. **Annual Production Rates -- N/A**

b. **Cost Variance -- N/A**

c. **Schedule Variance -- N/A**

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

	RDT&E	To Date 71/68

18. **Operating and Support Costs:**

a. N/A

b. N/A

c. Contractor Support Costs - N/A

A-22 OH-58D

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SAR-88-101

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

PROGRAM: ARMY HELICOPTER IMPROVEMENT PROGRAM (AHIP)

AS OF DATE: December 31, 1988

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1. (U) Designation and Nomenclature (Popular Name): OH-58D Scout Helicopter (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
St. Louis, MO 63120-1798

Colonel James T. Huey
Assigned: April 1, 1988
AV: 693-1360; Comm: (314) 263-1360

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

RDTE: PE 64220 Project D518 (Sunk)
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

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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. With air-to-air-STINGER (ATAS), AHIP achieves self-protection from threat helicopters. The primary mission for the OH-58D will be reconnaissance, intelligence, surveillance, and target acquisition for field artillery and 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 will soon begin to air cavalry units.

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. Total quantity of OH-58D aircraft approved for production is 375 at the minimum sustaining rate of 36 per year through FY 93 and 24 in FY 94.

b. (U) Significant Developments Since Last Report -- Lot II aircraft production contract deliveries were completed 3Q87 and Lot III deliveries were completed 4Q88. The estimated completion date for deliveries of Lot IV is 4Q89. Of the 117 delivered aircraft, 24 are in TRADOC, 24 are in Europe, 6 are in Korea, 56 are in FORSCOM and 7 are in Army Materiel Command. In addition, 15 armed OH-58Ds were fielded to Task Force 118th, Ft. Bragg, NC. OH-58D participated in several national training center rotations during CY 1988. On 17 February 1989, the Secretary of the Army notified Congress of a 16.9% Program Acquisition Unit Cost threshold breach.

(U) The OH-58D helicopter is expected to satisfy mission requirements.

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

8. (U) Threshold Breaches: There are currently no DAE baseline breaches or SDDM (dated 31 August 1982 and 7 October 1985) threshold breaches.

9. (U) Schedule:

a. (U) Milestones —

	Development Estimate	Approved Program	Current Estimate	
FSD Contract Award	Sep 81	N/A	N/A	(Ch-1)
Long Lead Release	Jun 83	N/A	N/A	(Ch-1)
Development Test II (DT II)	N/A	Aug 84	Aug 84	(Ch-2)
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	(Ch-2)
Second Production Contract Award (44) (FY85)	Jun 85	Oct 85	Oct 85	
First Production Delivery Start	N/A	Dec 85	Dec 85	(Ch-2)
Second Production Delivery Start	N/A	Jun 86	Jun 86	(Ch-2)
Third Production Contract Award (39) (FY86)	N/A	Aug 86	Aug 86	(Ch-2)
Production Verification Test	N/A	Oct 86	Oct 86	(Ch-2)
First Unit Equipped (CONUS)	N/A	Mar 87	Mar 87	(Ch-2)
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	
DSARC Review of FOE (AAST) Results	N/A	N/A	Sep 87	
First Unit Equipped (USAREUR)	N/A	Jun 87	Jun 87	(Ch-2)
Production Reliability Scoring Conference	N/A	Jun 87	Jun 87	(Ch-2)
Third Lot Production Delivery Start	N/A	Jun 87	Jun 87	(Ch-2)
Fourth Production Contract Award (36) (FY87)	N/A	Sep 87	Sep 87	(Ch-2)
Production (RAMLOG) Scoring Conference	N/A	Feb 88	Feb 88	(Ch-2)
First Unit Equipped (EUSA)	N/A	Apr 88	Apr 88	(Ch-2)
Fourth Production Delivery Start	N/A	Jul 88	Jul 88	(Ch-2)
Production (RAMLOG) Scoring Conference	N/A	Aug 88	Aug 88	(Ch-2)
Production (RAMLOG) Scoring Conference	N/A	Oct 88	Oct 88	(Ch-2)
Fifth Production Contract Award (36) (FY88)	N/A	Dec 88	Dec 88	(Ch-2)
RAM Assessment	N/A	Jan 89	Jan 89	(Ch-2)
Sixth Production Contract Award (36) (FY89)	N/A	Jun 89	Jun 89	(Ch-2)
Fifth Production Delivery Start	N/A	Jul 89	Jul 89	(Ch-2)
Seventh Production Contract Award (36) (FY90)	N/A	Jun 90	Jun 90	(Ch-2)

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

a. (U) Milestones --

	Development Estimate	Approved Program	Current Estimate
Sixth Production Delivery Start	N/A	Jul 90	Jul 90 (Ch-2)
Eighth Production Contract Award (36) (FY91)	N/A	Jun 91	Jun 91 (Ch-2)
Seventh Production Delivery Start	N/A	Jul 91	Jul 91 (Ch-2)
Ninth Production Contract Award (36) (FY92)	N/A	Jun 92	Jun 92 (Ch-2)
Eighth Production Delivery Start	N/A	Jul 92	Jul 92 (Ch-2)
Tenth Production Contract Award (36) (FY93)	N/A	Jun 93	Jun 93 (Ch-2)
Ninth Production Delivery Start	N/A	Jul 93	Jul 93 (Ch-2)
Eleventh Production Contract Award (24) (FY94)	N/A	Jun 94	Jun 94 (Ch-2)
Tenth Production Delivery Start	N/A	Jul 94	Jul 94 (Ch-2)
Eleventh Production Delivery Start	N/A	Jul 95	Jul 95 (Ch-2)
Final Production Delivery	N/A	Mar 96	Mar 96 (Ch-2)
Last Unit Equipped	N/A	Mar 97	Mar 97 (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 Jun 86, 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 Jun 87 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.

c. (U) Current Change Explanations --

(Ch-1) No longer a measured stub item.

(Ch-2) Reflects AHIP Baseline Change Number 1.

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: DAE Baseline March 1989.

10. (U) Technical/Operational Characteristics:

a. (U) Technical --	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	1/ Current Estimate
(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
(b)(1)				
(U) Mean Time Between Mission Affecting Failure (HR) (4 hour mission)	4.4	4.4/4.4	8.7	8.7

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

b. (U) Operational (Cont'd) —	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	1/ Current Estimate
(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	1.8/3.0	1.8	1.8(Ch-1)
(U) Mean Time to Repair (HRS) (AVIM)	2	2.0/2.0	2.0	2.0
(U) Mean Time between Failure (Specification)	NA	6.98/6.98	7.2	7.2

c. (U) Previous Change Explanation —

Demonstrated Performance and Current Estimate updated to reflect results of OT II and production verification tests. 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.

d. (U) Current Change Explanation --

(Ch-1) Current Estimate updated to reflect results of OT II and production verification tests.

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: DAE Baseline March 1989.

1/ Revised Demonstrated Performance to reflect the "AHIP System Production Baseline", 26 February 1988.

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

a. (U) Cost —	Development Estimate	Approved Program	Current Estimate
Development	$ 213.5	$ 210.3	$ 210.3
Procurement	1454.4	2025.6	2025.6
Airframe	(329.7)	(493.0)	(493.0)
Engine	(67.6)	(48.9)	(48.9)
MMS/CDS	(559.1)	(747.9)	(747.9)
Other Avionics	(148.9)	(100.4)	(100.4)
Armament	NA	(111.5)	(111.5)
Non Rec	(47.6)	(20.9)	(20.9)
Total Flyaway	(1152.9)	(1522.6)	(1522.6)
Other Wpn Sys Cost	(220.9)	(326.7)	(326.7)
Initial Spares	(80.6)	(176.3)	(176.3)
Construction (MILCON)	0	0	0
Total FY 82 Base Year $	$1667.9	$2235.9	$2235.9
Escalation	863.7	935.2	935.2
Development (RDT&E)	(14.6)	(13.0)	(13.0)
Procurement	(849.1)	(922.2)	(922.2)
Construction (MILCON)	0	0	0
Total Then-Year $	$2531.6	$3171.1	$3171.1
b. (U) Quantities —			
Development	5	5	5
Procurement	578	375	375
Total	583	380	380

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: FY 90/91 President's Budget.

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1)	(U)	Cost	3171.1	1427.4	3171.1
(2)	(U)	Quantity	380	200	380
(3)	(U)	Unit Cost	8.35	7.14	8.35
b. (U)	Current Procurement —		(FY 1989)	(FY 1989 APPN)	(FY 1990) 2/
(1)	(U)	Cost	211.6	211.6	299.1
		Less CY Adv Proc	34.0	34.0	35.3
		Plus PY Adv Proc	22.0	22.0	34.0
		Net Total	199.6	199.6	297.8
(2)	(U)	Quantity	36	36	36
(3)	(U)	Unit Cost	5.54	5.54	8.27

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	-406.8		-410.2
Quantity	-	-1016.1		-1016.1
Schedule	-	+177.0		+177.0
Engineering	+13.4	+100.4		+113.8
Estimating	-14.8	+252.7		+237.9
Support	-	-206.6		-206.6
Subtotal	-4.8	-1099.4	0	-1104.2
Current Changes:				
Economic	-	+104.8		+104.8
Quantity	-	+518.1		+518.1
Engineering	-	+339.4		+339.4
Estimating	-	+354.4		+354.4
Support	-	+427.0		+427.0
Subtotal	0	+1743.7	0	+1743.7
Total Changes	-4.8	+644.3	0	+639.5
Current Estimate	223.3	2947.8	0	3171.1

2/ Configuration changes, including additional armament, are primary reasons for increase in current procurement cost.

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

(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	-	-694.0		-694.0
Schedule	-	+73.0		+ 73.0
Engineering	+11.1	+66.7		+ 77.8
Estimating	-14.4	+246.7		+232.3
Support	-	-158.4		-158.4
Subtotal	-3.3	-466.0	0	-469.3
Current Changes				
Quantity	-	+334.0		+334.0
Engineering	-	+216.0		+216.0
Estimating	+ .1	+212.4		+212.5
Support	-	+274.8		+274.8
Subtotal	+.1	+1037.2	0	+1037.3
Total Changes	-3.2	+571.2	0	+568.0
Current Estimate	210.3	2025.6	0	2235.9

b. (U) Previous Change Explanations --

(U) RDTE

Economic: Due to the application of February 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.

(U) Procurement

Economic: Due to the application of February 1988 and prior DA/OSD inflation guidance.

Quantity: Reduction of production program by 443 aircraft from 578 to 135. Increase of production program by 60 aircraft from 135 to 195.

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 (SINCGARS, GPS).
Inclusion of OIP.
Inclusion of ATAS and memory upgrade for the MMS and CDS.

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

Estimating:	Congressional cuts (IR&D).
	Revised SPM based on first production contract cost.
	Revised ECO costs for safety, RAM-D/O&S.
	Adjustments from learning curve differences for reduction of aircraft by 443 aircraft from 578 to 135.
	Adjustments from learning curve differences for 60 aircraft from 135 to 195.
Support:	Inclusion of warranty risk requirement.
	Increased initial spares estimate based on refined configuration data, changing LSA results.
	Reduction in initial spares and PGSE due to reduction in the production program by 443 aircraft.
	Increase in initial spares and PGSE due to increase in the production program by 60 aircraft.

(U) MILCON: None.

c. (U) Current Change Explanations —

	(Dollars in Millions) Base-Year	Then-Year
(1) (U) RDT&E		
Revised 5 Jan 89 escalation rate (Economic)	N/A	+ 0.0
Correction of rounding error from 31 Dec 87 SAR (Estimating)	+ 0.1	
(2) (U) Procurement		
Revised 5 Jan 89 escalation rates (Economic)	N/A	+104.8
Increase in production program by 180 aircraft from 195 to 375	+662.9	+1051.2
o Addition of 180 aircraft (Quantity)	(+334.0)	(+ 518.1)
o Estimating changes applicable to addition of 180 aircraft (Estimating)	(+212.4)	(+ 354.4)
o Support changes applicable to addition of 180 aircraft (Support)	(+116.5)	(+ 178.7)
Configuration changes to unarmed aircraft	+155.4	+ 244.4
o Engineering changes to airframe (Engineering)	(+ 49.9)	(+ 76.8)
o Engineering changes to MMS (Engineering)	(+41.4)	(+ 68.6)
o Engineering changes to CDS (Engineering)	(+ 15.5)	(+ 24.1)
o Addition of ATAS (Engineering)	(+ 48.6)	(+ 74.9)
Armed AHIP	+ 75.3	+ 117.4
o Engineering changes applicable to armed AHIP (Engineering)	(+ 60.6)	(+ 95.0)
o Support changes applicable to armed AHIP (Support)	(+ 14.7)	(+ 22.4)
Retrofit of fielded aircraft to Production Baseline (Support)	+143.6	+ 225.9
(3) (U) MILCON		
None		

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

(U) Current Baseline Estimate to Current Estimate -

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
4.3	-.80	+1.1	+.47	+1.19	+1.56	-	+.58	+4.1	8.4

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

Target	Ceiling	Qty
$180.8	N/A	39

Estimated Price at Completion

Contractor	Program Manager
$181.3	$181.3

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

Target	Ceiling	Qty
$ 58.8	N/A	36

Estimated Price at Completion

Contractor	Program Manager
$ 46.5	$ 46.5

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

Target	Ceiling	Qty
$ 79.9	N/A	39

Estimated Price at Completion

Contractor	Program Manager
$ 79.9	$ 79.9

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

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

Lot V (FY88) 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
$ 77.5	N/A	36

Current Contract Price		
Target	Ceiling	Qty
$ 91.5	N/A	36

Estimated Price at Completion	
Contractor	Program Manager
$ 77.5	$ 77.5

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: 67% (10 yrs/15 yrs).

(2) (U) Percent Program Cost Appropriated: 46% ($1471.6/$3171.1).

b. (U) Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-94)	Total
RDT&E	223.3	-	-	-	223.3
Procurement	1248.3	299.1	327.9	1072.5	2947.8
MILCON	0	0	0	0	0
TOTAL	1471.6	299.1	327.9	1072.5	3171.1

c. (U) Annual Summary — Program funding and quantities reflect the FY 90/91 President's Budget.

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDTE								
1980				8.4	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	37.5	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	45.3	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
Subtotal	5	22.3	128.4	210.3	223.3	223.3	223.3	

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16. (U) Program Funding 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: Procurement								
1983		2.4	25.0	32.2	38.3	38.3	33.4	9.0
1984	16	17.4	113.1	159.1	196.9	182.7	179.0	8.0
1985	44		142.2	181.7	231.7	205.0	203.0	3.4
1986	39		122.9	174.7	230.7	180.7	161.8	2.8
1987	36		103.4	133.6	180.4	148.6	98.6	2.7
1988	36		106.1	112.7	158.7	96.2	.6	3.1
1989	36		133.7	145.6	211.6	.9	0	4.0
1990	36	1.1	148.7	199.9	299.1	0	0	3.6
1991	36		160.8	213.8	327.9	0	0	3.3
1992	36		166.1	231.1	362.0	0	0	2.8
1993	36		156.0	225.4	359.8	0	0	2.3
1994	24		123.7	215.8	350.7	0	0	1.8
Subtotal	375	20.9	1501.7	2025.6	2947.8	852.4	676.4	
Appropriation: MILCON								
Subtotal		0	0	0	0	0	0	0
Total	380	43.2	1630.1	2235.9	3171.1	1075.7	899.7	

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	38
1990	120	116	36	-
1991	-	120	36	-
1992	-	82	36	-
1993	-	-	36	-
1994	-	-	24	-

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

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	141.5	2235.9	684.7	1551.2
	(ESC $)	2943.4	227.7	3171.1	1153.2	2017.9
PAUC	(82 $)	3.6	+2.1	5.9	+1.8	4.1
	(ESC $)	5.0	+3.1	8.4	+3.1	5.3

c. (U) Schedule Variance — (NOTE: Subject to the limitations on production rates above.)

	Production Estimate	Variance (CE vs PdE)	Current Estimate	Variance (CE vs Max)	Maximum Economic
Start Date (Mo/Yr)	12/85	N/A	12/85	N/A	12/85
Duration (in Months)	86	-19	64	20	44
End Date (Mo/Yr)	11/92	N/A	03/96	0	01/91

d. (U) Deliveries (Plan/Actual) —

	To Date
RDT&E	5/5
Procurement	117/117

e. (U) Approved Design to Cost Goal —

(Average Unit Flyaway Cost)

	Development Estimate	Current Estimate	Latest Approved Threshold
@ Qty:	578	375	
@ Peak Rate:	10/mo	4/mo	
FY 82 Base-Year $	1.99	4.06	4.60
Then-Year $	3.19	5.87	5.52
@ Qty:	116	99	
@ Peak Rate:	10/mo	4/mo	
FY 82 Base-Year $	2.80	4.27	5.29
Then-Year $	3.82	5.43	6.10

18. (U) Operating & Support Costs:

a. (U) Assumptions and Ground Rules — N/A

b. (U) Costs — N/A

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

c. (U) Contractor Support Costs —

(Then-Year Dollars in Millions)

	FY1989 & Prior 1/	FY1990 Year	FY1991 Year	Balance To Complete	Total
O&M	65.4	37.3	40.1	—	142.8

1/ Includes FY1988 and FY1989

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45 TRIDENT II SUB

89 C0507



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

PROGRAM: OHIO CLASS D-5 CAPABLE SUBMARINE

AS OF DATE: DECEMBER 31, 1988

INDEX

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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

4. Program Elements:

RDT&E: 0603371N, 0604363N (J1546 only) (Shared)
PROCUREMENT: 0101228N, APPN 1611 ICN 1040

~~AS AMENDED~~
~~FOR OPEN PUBLICATION~~
~~MAR 05 1989~~ 22
~~DIRECTOR, ADMINISTRATION AND SECURITY REVIEW (OASD-PA)~~
~~DEPARTMENT OF DEFENSE~~

5. Related Programs:

TRIDENT I Backfit and TRIDENT II (D-5) Missile, and TRIDENT I Systems.

~~Classified by:~~
~~OPNAVINST [illegible] Enclosure (27)~~
~~Declassify on: OADR~~

(This page is UNCLASSIFIED)

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OASD(PA) DFOISR 89-T-0572 ~~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.

b. Significant Development Since Last Report -- The December 1988 SAR Current Estimates are based on acquisition of thirteen OHIO Class D-5 Capable Submarines at a shipbuilding rate of 1,0,1,1,1,1,1,1,1,1,1,1,1,1 beginning in FY 1981 and continuing through FY 1994. 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. The OHIO class D-5 capable submarine is expected to satisfy the mission requirement.

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

8. Threshold Breaches:

a. DCP No. 67, 14 Sept 1971, as amended by Cover Sheet No. 3 of 17 Jan 1977.

b. There are currently no 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 (CH-1)
Launch:		
(1) First Ship	Nov 86	Dec 86
(2) Last Ship	Jul 92	Apr 99 (CH-1)
Acceptance Trials:		
(1) First Ship	Dec 88	Nov 88 (CH-2)
(2) Last Ship	Dec 93	Dec 99 (CH-1)
Delivery:		
(1) First Ship	Dec 88/Dec 88	Nov 88 (CH-2)
(2) Last Ship	Dec 93/Apr 98	Dec 99 (CH-1)
System IOC	Dec 89/Dec 89	Dec 89

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, acceptance trials, and delivery for the last ship was advanced. The predicted delay due to the deletion of advance procurement funding for contractor furnished equipment long leadtime items was not experienced.

The launch of the last ship was revised to reflect its relationship to the delivery schedule.

c. Current Change Explanations --

(CH-1) The Current Estimate for start of construction, launch, acceptance trials, and delivery for the last ship has been revised to reflect an increased number of submarines for the total program.

(CH-2) The Current Estimate for acceptance trials and delivery of the first ship has been revised to reflect the completion of those milestones.

d. References --

Production Estimate: USD (R&E) Memo of July 22, 1981, subject OHIO Class Submarine program.

Approved Program: DAE Baseline of 17 February 1988.

(b)(1)

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

	Production Estimate	DAE Baseline	Current Estimate
a. Cost --			
Development (RDT&E,N)	49.3	62.1	62.1
Procurement (SCN)	9,980.0	14,615.0	14,615.0
Construction (MILCON)	519.6	424.6	424.6
Total FY 1983 Base-Yr $	10,548.9	15,101.7	15,101.7
Escalation	3,536.3	2,967.9	2,967.9
Development (RDT&E,N)	3.6	4.6	4.6
Procurement (SCN)	3,416.8	2,888.7	2,888.7
Construction (MILCON)	115.9	74.6	74.6
Total Then-Yr $	14,085.2	18,069.6	18,069.6
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:
FY 1990/FY 1991 President's Budget.

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

	Current Estimate	UCR Baseline	UCR Baseline
a. Program Acquisition --	(DEC 88 SAR)	(DEC 87 SAR)	(DEC 88 SAR)
(1) Cost	17,883.3 *	16,451.5	17,883.3 *
(2) Quantity	13	11	13
(3) Unit Cost	1,375.6	1,495.6	1,375.6

	Current Year		Budget Year
b. Current Procurement --	(FY 1989)	(FY 1989)APPN	(FY 1990)
(1) Cost	1,219.4	1,219.4	1,251.1
Less CY Adv Proc	(92.4)	(92.4)	(91.4)
Plus PY Adv Proc	146.4	146.4	137.1
Less Outfit/PDel	(23.2)	(23.2)	(22.5)
Net Total	1,250.2	1,250.2	1,274.3
(2) Quantity	1.0	1.0	1.0
(3) Unit Cost	1,250.2	1,250.2	1,274.3

* Due to a misapplication of escalation indices the amounts budgeted for this program are understated as follows: FY89 -$45.0M, FY90 -$49.2M, and FY91 -$87.9M. The corresponding adjustments can be found in SSN-21 (BA2).

13. Cost Variance Analysis: (Current (Then-Year) Dollars in Millions)

a. Summary

	RDT&E,N	SCN	MILCON	TOTAL
Production Estimate	52.9	13,396.8	635.5	14,085.2
Previous Changes:				
Economic	(2.9)	(2,884.9)	(32.3)	(2,920.1)
Quantity	0.0	7,398.0	0.0	7,398.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	29.5	(2,030.3)	(110.8)	(2,111.6)
Other	0.0	0.0	0.0	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	26.6	2,482.8	(143.1)	2,366.3
Current Changes:				
Economic	0.0	(131.6)	(1.2)	(132.8)
Quantity	0.0	2,663.9	0.0	2,663.9
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	(12.8)	(1,094.5)	8.0	(1,099.3)
Other	0.0	0.0	0.0	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	(12.8)	1,437.8	6.8	1,431.8
Total Changes	13.8	3,920.6	(136.3)	3,798.1
Current Estimate	66.7	17,317.4	499.2	17,883.3

(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	5,013.8	0.0	5,013.8
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	23.0	(1,598.1)	(101.2)	(1,676.3)
Other	0.0	0.0	0.0	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	23.0	3,415.7	(101.2)	3,337.5
Current Changes:				
Quantity	0.0	1,935.5	0.0	1,935.5
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	(10.2)	(859.7)	6.2	(863.7)
Other	0.0	0.0	0.0	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	(10.2)	1,075.8	6.2	1,071.8
Total Changes	12.8	4,491.5	(95.0)	4,409.3
Current Estimate	62.1	14,471.5	424.6	14,958.2

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 and revised estimates.

Procurement

Economic: revised escalation indices.
Quantity: four 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 Jan 89 economic escalation rates. (Economic)	N/A	0.0
Reallocated to TRIDENT II (D-5) Missile and revised estimates. (Estimating)	-10.2	-12.8
(2) Procurement		
Revised Jan 89 economic escalation rates. (Economic)	N/A	-131.6
Increase is the result of the addition of two ships (FY 1993 and FY 1994) to the program. (Quantity)	+1935.5	+2663.9
Decrease due to revised estimates for shipbuilding and GFE costs. (Estimating)	-719.1	-912.4

13. Cost Variance Analysis (cont'd):

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

Due to misapplication of escalation indices the program is understated by these amounts. (Estimating)	-140.6	-182.1

(3) MILCON

Revised Jan 89 economic escalation rates. (Economic)	N/A	-1.2
Revised construction estimates for Kings Bay. (Estimating)	+6.2	+8.0

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 gram, 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	-234.838	-154.702	0.000	0.000	-246.992	0.000	0.000	-636.533	1375.638

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
1,696.7	1,922.3	3	1,609.4	1,625.3

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE VARIANCES	16.6	18.5
CUMULATIVE VARIANCES as of Sept 88	29.6	(6.1)
NET CHANGE	13.0	(24.6)

Explanation of Change: The net changes reflected are not significant in relation to the current contract target price. The favorable net change in cost variance is a result of slightly lower labor and material costs in a wide variety of cost accounts. The negative net change in schedule variance is a result of the Metal Trades Council strike (7/88-10/88) at Groton, CT. The strike did not impact delivery of SSBN 734 which was delivered ahead of schedule or the SSBN 735 which is estimated to be delivered on schedule. The contractor estimates a 5 month slip on delivery for SSBN 736. 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
1,213.7	1,424.8	2	1,230.1	1,213.7

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE VARIANCES	(14.3)	17.5
CUMULATIVE VARIANCES as of Sept 88	(24.9)	(21.8)
NET CHANGE	(10.6)	(39.3)

15. Contract Information (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

Explanation of Change: The net cost variance is not significant in relation to the current contract target price. The negative schedule variance is a result of the Metal Trades Council strike (7/88-10/88). The contractor estimates delivery slippages of 6 months (SSBN 737) and 5 months (SSBN 738) for ships under contract. 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			ESTIMATED PRICE AT COMPLETION	
TARGET	CEILING	QTY	Contractor	Program Manager
613.6	695.8	1	624.0	613.6

	Cost Variance	Schedule Variance
PREVIOUS CUMULATIVE VARIANCES	(3.2)	(.3)
CUMULATIVE VARIANCES as of Sept 88	(5.7)	11.7
NET CHANGE	(2.5)	12.0

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 ships
w/option for 1 ship in FY90)

INITIAL CONTRACT PRICE		
Target	Ceiling	Qty
1261.4	1425.9	2

CURRENT CONTRACT PRICE			ESTIMATED PRICE AT COMPLETION	
TARGET	CEILING	QTY	Contractor	Program Manager
1262.0	1426.5	2	1264.5	1262.0

	Cost Variance	Schedule Variance
PREVIOUS CUMULATIVE VARIANCES	N/A	N/A
CUMULATIVE VARIANCES as of Sept 88	(3.3)	(.7)
NET CHANGE	(3.3)	(.7)

Explanation of Changes: This procurement is too new to draw meaningful cost or schedule trend conclusions at this time. Note: The above information covers the first two ships of this contract. Data for the FY 90 option has not been included.

15. Contract Information (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

Nuclear:
Department of Energy
Germantown, MD
N00024-67-F-5110/EA0
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	60%
N00024-85-C-4011	50%

Nuclear:
General Electric Company
Schnectady, 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: 42.1% (8 yrs/19 yrs)

(2) Percent Program Cost Appropriated: 64.6% ($11561.4/$17883.3)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years	Budget Year	Budget Year	Balance to Complete	Total
	(FY 1981-89)	(FY 1990)	(FY 1991)	(FY 1992-00)	
RDT&E,N	65.9	0.8	0.0	(0.0)	66.7
SCN	11,021.2	1,251.1	1,275.0	3,770.1	17,317.4
MILCON	474.3	24.9	0.0	(0.0)	499.2
Total	11,561.4	1,276.8	1,275.0	3,770.1	17,883.3 *

*Due to a misapplication of escalation indices the amounts budgeted for this program are understated as follows: FY89 -$45.0M, FY90 -$49.2M, and FY91 -$87.9M. The corresponding adjustments can be found in SSN-21 (BA2).

15. Program Funding Summary: Continued.

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	Total Then-Year Dollars Obligated	Total Then-Year Dollars Expended	Escl Rate (%)
Appropriation: RDT&E,N								
1982				24.6	24.6	24.6	24.6	7.6
1983				0.0	0.0	0.0	0.0	4.9
1984				9.0	9.5	9.5	9.5	3.8
1985				8.6	9.4	9.4	8.1	3.4
1986				7.9	8.9	8.8	8.5	2.8
1987				5.2	6.0	5.8	2.8	2.7
1988				5.0	6.0	6.0	0.5	3.1
1989				1.2	1.5	0.0	0.0	4.0
1990				0.6	0.8	0.0	0.0	3.6
Subtotal	0	0.0	0.0	62.1	66.7	64.1	54.0	
Appropriation: SCN								
1981	1		1,362.8	1,437.8	1,465.3	1,430.0	1,375.3	9.6
1982	0		0.0	314.5	329.9	329.9	329.9	7.5
1983	1		1,348.5	1,156.7	1,233.3	1,203.4	991.0	3.8
1984	1		1,226.6	1,458.1	1,586.9	1,449.9	1,082.3	3.6
1985	1		1,191.8	1,172.6	1,304.0	1,141.4	665.3	2.1
1986	1		1,126.7	1,039.7	1,192.0	974.7	281.4	1.0
1987	1		1,170.0	1,151.3	1,363.6	1,048.4	187.7	1.5
1988	1		1,042.0	1,048.2	1,281.7	837.7	35.3	2.6
1989	1		993.6	969.1	1,219.4	724.0	4.3	4.0
1990	1		987.9	969.9	1,251.1			3.6
1991	1		1,014.5	967.6	1,275.0			3.3
1992	1		968.2	987.8	1,326.6			2.8
1993	1		967.5	878.7	1,201.7			2.3

16. Program Funding Summary: Continued.

1994	1		924.6	835.9	1,163.7			1.8
1995			0.0	15.7	22.3			1.8
1996			0.0	15.9	22.9			1.8
1997			0.0	17.4	25.6			1.8
1998			0.0	17.0	25.5			1.8
1999			0.0	10.2	15.5			1.8
2000			0.0	7.4	11.4			1.8
Subtotal	13	0.0	14,324.7	14,471.5	17,317.4	9,139.4	4,952.5	

Appropriation: MILCON

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				79.5	91.8	91.8	91.8	2.8
1987				109.8	131.1	131.1	131.1	2.7
1988				59.7	73.8	73.8	58.1	3.1
1989				28.7	36.7			4.0
1990				18.9	24.9			3.6
Subtotal	0	0.0	0.0	424.6	499.2	437.6	421.9	
Total	13	0.0	14,324.7	14,958.2	17,883.3	9,641.1	5,428.4	

*Due to a misapplication of escalation indices the amounts budgeted for this program are understated as follows: FY89 -$45.0M, FY90 -$49.2M, and FY91 -$87.9M. The corresponding adjustments can be found in SSN-21 (BA2).

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 Costs: Not applicable since OHIO Class D5 Capable Submarine is not a new SAR.

a. N/A
b. N/A
c. Contractor Support Costs - N/A.

17. Production Rate Data: Not applicable. Programs that produce at a rate less than six per year are not required to complete section 17.

Operating and Support Costs: Not applicable since OHIO Class D5 Capable Submarine is not a new SAR.

SAR-88-049

~~SECRET FORMERLY RESTRICTED DATA~~

~~SECRET FORMERLY RESTRICTED DATA~~

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

TRIDENT II MSL

PROGRAM: TRIDENT II (D-5) MISSILE

AS OF DATE: DECEMBER 31, 1988

INDEX

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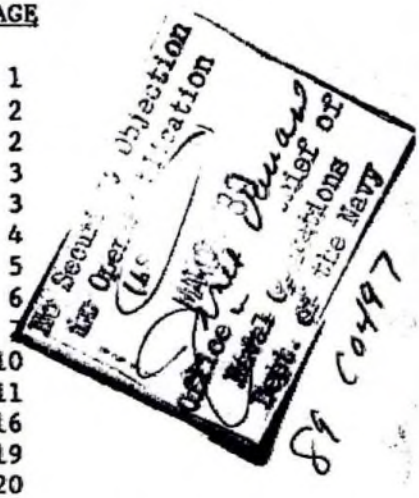

1. Designation and Nomenclature (Popular Name): Sea Launched Ballistic Missile-UGM 133A TRIDENT II (D-5) Missile.

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.

AS AMENDED
FOR OPEN PUBLICATION
MAR 02 1989

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~~Classified by~~
~~SECNAVINST S5513.5A Enclosure (27)~~

DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

(This page is unclassified)

~~SECRET FORMERLY RESTRICTED DATA~~ OASD(PA) DFOISR 88-T-0544

~~SECRET FORMERLY RESTRICTED DATA~~

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 Advanced Development phase included consideration of options which increased payload using Mark 4 and new higher yield Re-entry Bodies, enhanced range, and significantly improved accuracy over that of the currently deployed TRIDENT I (C-4) missile. The Secretary of Defense reaffirmed the need for an improved Sea Launched Ballistic Missile in his Decision Memorandum of 2 February 1981 and stated that the 7 March 1980 report to Congress "serves the role of a Mission Element Need Statement". 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 to the Secretary of the Navy 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 first development flight test was successfully launched from a flat pad at Cape Canaveral on January 15, 1987. The initial missile production contract was awarded April 8, 1987.

b. Significant Development Since Last Report -- Seventeen development flight tests have been conducted. Thirteen were fully successful and met all test objectives, 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 premature action by the range safety officer and is a "no test."

The estimates included in the December 31, 1988 SAR are based on:

(1) a development flight test program of nineteen flat pad test missiles and nine Performance Evaluation Missiles (PEM) flown from an SSBN leading to a December 1989 Initial Operational Capability.

(2) acquisition of 871 TRIDENT II missiles through FY 2001 to support eventual deployment of twenty-one OHIO Class submarines.

(3) a MILCON program to support establishment of a TRIDENT II missile processing capability at the Strategic Weapons Facility, Atlantic in Kings Bay, GA and the Strategic Weapons Facility, Pacific in Bangor, WA.

c. Changes Since "As of" Date -- Two additional fully successful development flight tests have been conducted. The flight testing from the flat pad at Cape Canaveral has been completed.

8. Threshold Breaches: There are currently no DCP (February 1987) 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	8/89	8/89
Confirmation of Full Scale Missile Production (Milestone III B)	9/89	9/89	9/89
Initial Operating Capability	12/89*	12/89*	12/89*

* May be less than full missile outload due to reduction of FY 1987 quantity to 21 D-5 missiles.

b. Previous Change Explanations -- The initial missile production contract was awarded April 8, 1987 (Milestone IIIA).

c. Current Change Explanation -- 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 dated February 1988.

10. Performance Characteristics:

a. Characteristics --

	Prod Est	Approved Program Goal/Threshold	Demon-Strated Perf	Current Estimate
(U) Max Range Full Payload (N		(b)(1);(b)(3):42 USC §2168(a) (1)(C)--(FRD)	N/A	(b)(1);(b)(3):42 USC §2168(a) (1)(C)--(FRD)
(S) System CEP (FEET)			N/A	
(S) System Reliability			N/A	
(S/RD) Max Payload and Yield			N/A	

b. Previous Change Explanations --

Maximum Range Full Payload estimate based on detailed evaluation of hardware testing.

Lastest 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.

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 dated February 17, 1988.

(b)(1) ; (b)(3):42 USC §2168(a) (1)(C) -(FRD)

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

	Current Estimate	UCR Baseline	UCR Baseline
a. Program Acquisition --	(DEC 88 SAR)	(DEC 87 SAR)	(DEC 88 SAR)
(1) Cost	35,486.6	34,871.6	35,486.6
(2) Quantity	899	843.0	899
(3) Unit Cost	39.5	41.4	39.5

	Current Year		Budget Year
b. Current Procurement --	(FY 1989)	(FY 1989)APPN	(FY 1990)
(1) Cost	1,868.6	1,868.6	1,816.2
Less CY Adv Proc	(228.1)	(228.1)	(216.1)
Plus PY Adv Proc	211.0	211.0	193.0
Net Total	1,851.5	1,851.5	1,793.1
(2) Quantity	66.0	66.0	63.0
(3) Unit Cost	28.1	28.1	28.5

13. Cost Variance Analysis:

a. Summary

(Current (Then-Year) Dollars in Millions)

	RDT&E,N	WPN	MILCON	TOTAL
Production Estimate	9,453.2	25,396.9	668.4	35,518.5
Previous Changes:				
Economic	(21.0)	204.6	2.3	185.9
Quantity	(48.0)	0.0	0.0	(48.0)
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	(1.4)	(781.1)	(2.3)	(784.8)
Other	0.0	0.0	0.0	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	(70.4)	(576.5)	0.0	(646.9)
Current Changes:				
Economic	(3.4)	(367.9)	(4.7)	(376.0)
Quantity	0.0	1,305.0	0.0	1,305.0
Schedule	0.0	278.8	0.0	278.8
Engineering	0.0	0.0	0.0	0.0
Estimating	22.2	(593.9)	(24.1)	(595.8)
Other	0.0	0.0	0.0	0.0
Support	0.0	3.0	0.0	3.0
Subtotal	18.8	625.0	(28.8)	615.0
Total Changes	(51.6)	48.5	(28.8)	(31.9)
Current Estimate	9,401.6	25,445.4	639.6	35,486.6

(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)	0.0	0.0	(40.0)
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	(0.5)	(574.4)	(1.9)	(576.8)
Other	0.0	0.0	0.0	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	(40.5)	(574.4)	(1.9)	(616.8)
Current Changes:				
Quantity	0.0	771.0	0.0	771.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	17.6	(390.6)	(17.6)	(390.6)
Other	0.0	0.0	0.0	0.0
Support	0.0	1.2	0.0	1.2
Subtotal	17.6	381.6	(17.6)	381.6
Total Changes	(23.0)	(192.8)	(19.5)	(235.2)
Current Estimate	8,412.0	17,395.7	513.4	26,321.1

13. Cost Variance Analysis (cont'd):

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

RDT&E
Economic: Revised escalation indices.
Quantity: Deleted 2 development flight test missiles.
Estimating: Transfer of funds to Small Business Innovative Research, revised estimates and inflation offset for current and prior years.

Procurement
Economic: Revised escalation indices.
Estimating: Congressional reduction, reduced guidance system requirements, latest repricing estimates and inflation offset for current and prior years.

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 Jan 89 economic escalation rates. (Economic)	N/A	-3.4
Reallocated from SLBM Effectiveness Enhancement, Ballistic Missile Defense Penetration System and TRIDENT II Submarine to compensate for FY 1989 and prior year reductions. (Estimating)	+27.9	+34.5
Transfer of funds to Small Business Innovative Research. (Estimating)	-10.3	-12.3

13. Cost Variance Analysis (Cont'd):

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

(2) Procurement		
Revised Jan 89 economic escalation rates. (Economic)	N/A	-367.9
Increases associated with addition of 56 missiles, which are required as a result of the OHIO Class Submarine Program quantity increase from nineteen to twenty-one submarines. (Quantity)	+771.0	+1305.0
Rephasing of TRIDENT II missile procurements to reflect delay in TRIDENT submarine backfit schedule. (Schedule)	-	+278.8
Expected savings from United Kingdom participation in the TRIDENT II program. (Estimating)	-131.0	-189.4
Revised Program Manager's estimates. (Estimating)	-259.6	-404.5
Revised estimates for initial spares. (Support)	+1.2	+3.0
(3) MILCON		
Revised Jan 89 economic escalation rates. (Economic)	N/A	-4.7
Revised construction estimates. (Estimating)	-17.6	-24.1

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	-0.211	-1.127	0.310	0.000	-1.536	0.000	0.003	-2.560	39.473

UNCLASSIFIED

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
335.9	N/A	1	344.3	344.3

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(24.3)	(7.4)
CUMULATIVE VARIANCES TO DATE (10/31/88)	(28.8)	(6.1)
NET CHANGE	(4.5)	1.3

Explanation of Change: The unfavorable cost variance is due to design changes - especially in the hoist area; extensive tooling; increased efforts to meet delivery schedules mostly in the Launch Tube and Vertical Support Group areas; and extensive subcontract work. 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 ($8.4M)

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
444.2	N/A	4	443.1	444.2

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CULUMATIVE	(5.2)	(4.3)
CUMULATIVE VARIANCES TO DATE (10/30/88)	(4.4)	(2.2)
NET CHANGE	.8	2.1

15. CONTRACT INFORMATION (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

Explanation of Change: The slight improvement in the cost variance is due primarily to efforts in the area of Quality Inspection Engineering and Electronics being less complex than originally planned for test equipment design, power supply design and development, and firmware development. The schedule variance continues to show improvement, as a result of resolution of all design and fabrication issues. Deliveries are occuring on or ahead of schedule, meeting all contractual milestones. No cost overrun at completion is expected.

Navigation:
Unisys Corporation
Shipboard and Ground Systems Group
Great Neck, NY
N00024-84-C-4003, CPIF
Award Date: December 21, 1983

INITIAL CONTRACT PRICE		
Target	Ceiling	Qty
644.6	N/A	1

CURRENT CONTRACT PRICE			ESTIMATED PRICE AT COMPLETION	
Target	Ceiling	Qty	Contractor	Program Manager
733.0	N/A	2	773.3	773.3

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(19.2)	(4.8)
CUMULATIVE VARIANCES TO DATE (09/30/88)	(35.3)	(5.1)
NET CHANGE	(16.1)	(.3)

Explanation of Change: The unfavorable cost variance is mainly due to various navigation subcontractors continued problems in cleaning up software amd material delivery delays as was expected when the navigation effort was replanned in 1987. The contract continues to experience schedule improvement as navigation development nears completion. The late deliveries will not impact any major TRIDENT II program milestones, however they will result in additional testing on the Navigation System before TRIDENT II deployment. The government projected RDT&E overrun of ($40.3M), vice ($59.5M) reported on our last report, reflects resolution of all significant technical and schedule problems.

Test Instrumentation
Interstate Electronics Corporation
Anaheim, CA
N00030-84-C-0090, CPIF
Award Date: October 21, 1983
Definitized Date: March 13, 1984

INITIAL CONTRACT PRICE		
Target	Ceiling	Qty
237.5	N/A	16

CURRENT CONTRACT PRICE			ESTIMATED PRICE AT COMPLETION	
Target	Ceiling	Qty	Contractor	Program Manager
246.7	N/A	16	258.1	258.1

15. CONTRACT INFORMATION (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	0.0	(.2)
CUMULATIVE VARIANCES TO DATE (10/30/88)	.8	(.4)
NET CHANGE	.8	(.2)

Explanation of Change: The cost improvement is primarily due to transfers of excess material from the RDT&E effort to production, thus affecting savings in RDT&E. The small amount of schedule worsening is due primarily to accounting anomalies that will soon be corrected. The government anticipates a price overrun at completion of ($11.4M).

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 CONTRACT PRICE		
Target	Ceiling	Qty
4,224.5	N/A	30

CURRENT CONTRACT PRICE			ESTIMATED PRICE AT COMPLETION	
Target	Ceiling	Qty	Contractor	Program Manager
4,251.6	N/A	30	4,251.6	4,251.6

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(240.6)	(56.2)
CUMULATIVE VARIANCES TO DATE (10/30/88)	(314.9)	(35.8)
NET CHANGE	(74.3)	20.4

Explanation of Change: The unfavorable cost variance is the result of investigations and corrective actions resulting from certain flight anomalies and the failure of the X-13 flight test. No program cost impacts expected since adequate contractor reserves exist. The favorable schedule variance is due to recovery from late delivery of flight test hardware, support equipment and late testing for certain propulsion hazards properties. No impact on program milestones is expected.

15. CONTRACT INFORMATION (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

Guidance:
Charles Stark Draper Laboratory
Cambridge, MA
N00030-84-C-0036, CPFF
Award Date: October 06, 1983
Definitized Date: March 07, 1984

INITIAL CONTRACT PRICE		
Target	Ceiling	Qty
846.4	N/A	-

CURRENT CONTRACT PRICE			ESTIMATED PRICE AT COMPLETION	
Target	Ceiling	Qty	Contractor	Program Manager
955.1	N/A	-	955.1	955.1

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	8.1	(17.3)
CUMULATIVE VARIANCES TO DATE (9/30/88)	.1	(5.7)
NET CHANGE	8.0	11.6

Explanation of Change: The favorable cost variance is the result of completion of three of the major line item efforts and closing out of accounting data and management reserve for those subcontracts. Cost is expected to continue to improve as the remainder of the contract is completed. Schedule variance continues to improve as contract completion nears. No program milestones have been missed and no impact to on line completion is anticipated. Since this contract is near completion, this will be the last time it is reported.

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 CONTRACT PRICE		
Target	Ceiling	Qty
1,473.0	N/A	52

CURRENT CONTRACT PRICE			ESTIMATED PRICE AT COMPLETION	
Target	Ceiling	Qty	Contractor	Program Manager
1,500.2	N/A	52	1,500.2	1,500.2

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(5.5)	(21.9)
CUMULATIVE VARIANCES TO DATE (10/30/88)	(35.9)	(36.1)
NET CHANGE	(30.4)	(14.2)

15. CONTRACT INFORMATION (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

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. No program impact is expected.

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

a. Program Status --

(1) Percent Program Completed: 45.8% (11 yrs/24 yrs)

(2) Percent Program Cost Appropriated: 43.6% ($15475.7/$35486.6)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years	Budget Year	Budget Year	Balance to Complete	Total
	(FY 1978-89)	(FY 1990)	(FY 1991)	(FY 1992-02)	
RDT&E,N	9,205.9	195.7	0.0	0.0	9,401.6
WPN	5,927.3	1,816.2	1,536.8	16,165.1	25,445.4
MILCON	342.5	7.6	115.6	173.9	639.6
Total	15,475.7	2,019.5	1,652.4	16,339.0	35,486.6

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	197.6	193.6	7.6
1983				343.9	351.0	346.6	341.2	4.9
1984				1,370.1	1,449.0	1,448.2	1,333.7	3.8
1985				1,820.0	1,983.0	1,982.7	1,970.2	3.4
1986				1,731.8	1,943.1	1,941.6	1,922.5	2.8
1987				1,355.0	1,565.4	1,563.5	1,453.4	2.7
1988				861.4	1,029.7	1,019.1	798.1	3.1
1989				446.5	554.0	164.2	7.7	4.0
1990				152.6	195.7			3.6
Subtotal	28	0.0	0.0	8,412.0	9,401.6	8,795.4	8,149.0	
Appropriation: WPN								
1985			9.6	137.3	160.8	160.3	157.2	3.4
1986			42.3	420.7	508.4	508.2	469.4	2.8
1987	21		789.0	1,077.1	1,346.7	1,343.0	794.1	2.7
1988	66		1,320.2	1,577.2	2,042.8	1,826.0	326.5	3.1
1989	66		1,185.4	1,396.0	1,868.6	409.9	8.4	4.0
1990	63		1,070.3	1,318.4	1,816.2			3.6
1991	52		896.7	1,088.6	1,536.8			3.3
1992	50		849.0	1,058.6	1,525.4			2.8
1993	44		784.3	975.6	1,431.7			2.3

1994	68		976.0	1,165.5	1,741.2			1.8
1995	64		997.9	1,176.6	1,789.3			1.8
1996	64		998.8	1,158.0	1,792.8			1.8
1997	64		999.6	1,131.0	1,782.6			1.8
1998	64		1,001.3	1,127.0	1,808.2			1.8
1999	64		983.9	1,098.7	1,794.4			1.8
2000	64		671.9	841.2	1,398.7			1.8
2001	57		511.9	526.0	890.3			1.8
2002				122.2	210.5			1.8
Subtotal	871	0.0	14,088.1	17,395.7	25,445.4	4,247.4	1,755.6	

Appropriation: MILCON

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	17.7	13.6	3.1
1989				12.0	15.4			4.0
1990				5.8	7.6			3.6
1991				85.5	115.6			3.3
1992				35.9	49.6			2.8
1993				27.0	37.9			2.3
1994				36.3	51.9			1.8
1995				5.8	8.4			1.8
1996				8.1	12.0			1.8
1997				9.3	14.1			1.8
Subtotal	0	0.0	0.0	513.4	639.6	285.4	278.9	
Total	899	0.0	14,088.1	26,321.1	35,486.6	13,328.2	10,183.5	

17.

a. Annual Production Rates -- (NOTE: 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 five month period. The 21 missiles in the Production Estimate and Current Estimate are planned for delivery over a four 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	63	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		72	64	72
2000		72	64	72
2001		72	64	72
2002		60	64	50
2003			57	

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$)	26,556.3	-235.2	26,321.1	+0.0	26,321.1
(TY$)	35,518.5	-32.0	35,486.6	+235.2	35,251.4
PAUC (FY 1983$)	31.428	-2.149	29.278	+0.000	29.278
(TY$)	42.034	-2.560	39.473	+0.262	39.212

c. Schedule Variance --

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum
Start Date (Mo/Yr)	Apr 1987		Apr 1987		Apr 1987
Duration (in Months)	154	+32	186	+12	174
End Date (Mo/Yr)	Jan 2001		Aug 2003		Sep 2002

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	17/17
Procurement	0/0

e. Approved Design to Cost Goal -- None.

18. Operating and Support Cost:

a. Not applicable since TRIDENT II (D-5) Missile is not a new SAR.

b. Not applicable since TRIDENT II (D-5) Missile is not a new SAR.

c. Contractor Support Cost - -

(Then-Year Dollars in Millions)

	FY1989 & Prior	FY1990 Year	FY1991 Year	Balance to Complete 1/	Total
O&MN	234.5	115.6	122.6	8,356.0	8,828.7
Industrial Fund	0.0	0.0	0.0	0.0	0.0
Total	234.5	115.6	122.6	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.

UNCLASSIFIED

N-13 DDG-51-2 ~~CONFIDENTIAL~~ SAR-88-001

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

PROGRAM: DDG 51 Guided Missile Destroyer

AS OF DATE: December 31, 1988

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1. Designation and Nomenclature (Popular Name): DDG 51 Gui[illegible]
Destroyer Class; Guided Missile Destroyer: ARLEIGH BURKE CLASS

2. DoD Component: Department of the Navy

3. Responsible Office and Telephone Number:

AEGIS Shipbuilding Program Manager, PMS 400
Naval Sea Systems Command

PM: RADM J.B. [illegible], Jr., USN
ASSIGNED: June 11, 1987
AUTOVON: 222-7395
COMMERCIAL: (202) 692-7395

4. Program Elements/Procurements Line Items:

RDT&E: PE 0604307N Project 01337
PE 0604307N Project 01937
PE 0604567N Project 00857-565; Project 01803-065 (shared funding)

PROCUREMENT (SCN): PE 24222N/APPN 1611N

MILCON: P-214

5. 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.

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f Mission and Description: The Navy has a priority requirement for a battle force ...able surface combatant as a replacement for retiring battle force guided missile ...stroyers. 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 less than 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. Program Highlights:

a. 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, Maine, in April 1985. Approval for Limited Production (ALP) 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. Bath Iron Works submitted a revised DDG 51 construction schedule which delayed the delivery of DDG 51 by nine months. The initial schedule delay was attributable to a number of factors, including: a 99-day strike at the BIW shipyard in 1985; requirement for additional AEGIS Combat System testing; drawing design problems with Computer Aided Design (CAD); and changes to Government Furnished Information. BIW proposed an additional seven month postponement of the DDG 51 delivery. The Navy has negotiated contract provisions to incorporate these delays. The Navy established Ingalls Shipbuilding Incorporated as the second source for DDG 51 Class construction by awarding the DDG 52 construction contract in May 1987.

b. Significant Developments Since Last Report - Approval for Limited Production ...s amended 28 September 1988 to include the DDG 51 class ships and systems for which funds are appropriated in FY87, FY88, and FY89 and long lead material for FY90 ships and systems. This decision was made to accommodate Congressional decisions that have changed the acquisition profile since the initial ALP was granted.

The DDG 51 keel was laid on 08 December 1988.

The Navy awarded contracts to BIW (DDG 54, 56, 58) and Ingalls (DDG 55, 57) for follow-on production of DDG 51 class ships on 13 December 1988.

A competitive multiyear procurement is planned for FY 1990/1991 DDG 51 Class acquisition using fixed price incentive contracts between the two current shipbuilders. A second multiyear procurement will follow and is planned for FY 1992 - FY 1994.

The lead shipbuilder is progressing as scheduled according to revised plans approved by the Navy in the last fiscal year.

The DDG 51 Class program is expected to satisfy the mission requirement.

c. Changes since "As of Date" -- a helicopter rearming capability and facilities upgrades were added to the DDG 52. This has caused a schedule adjustment of 8 months to the DDG 52 ship delivery with no impact to follow ship schedules. These upgrades will significantly enhance the ship's Anti-Submarine Warfare System (ASW) warfighting capability. This modification is being accomplished within existing program resources ...er the FY87 Defense Authorization Act Conference Report which encouraged the Navy to ...ncorporate a helicopter support capability for the DDG 51 Class. All future ships of ...his class will receive these upgraded capabilities.

8. Threshold Breaches: DAE baseline and DCP (#1337 Rev 1, Change 1, of 22 August 1986), schedule breaches are: as previously reported in the 31 December 1987 SAR, the lead ship has been rescheduled a total of 16 months to a new delivery date of February 1991, a 6 month or greater breach of the DAE baseline; and, the DDG 52 delivery has been rescheduled 8 months, from September 1991 to May 1992, due to incorporation of Helo Rearm and facilities upgrades, a DAE baseline breach.

9. Schedule:

a.

	Milestones --	Production Estimate	Approved Program	Current Estimate	
(1)	DNSARC I	Jun 81	Jun 81	Jun 81	
(2)	DSARC II	Dec 83	Dec 83	Dec 83	
(3)	DDG 51 Contract Award	Apr 85	Apr 85	Apr 85	
(4)	DSARC III	Oct 86	Oct 86	Oct 86	
(5)	DDG 52 Contract Award	Jan 87	May 87	May 87	
(6)	DDG 51 Delivery 1/	N/A	Oct 89	Feb 91	
(7)	DDG 52 Delivery	N/A	Sep 91	May 92	(CH-1)
(8)	DDG 51 IOC	Oct 90	Oct 90	Feb 92	
(9)	DDG 53 Delivery	N/A	Jul 92	Jul 92	

b. Previous Change Explanations --

- Delay to DDG 51 IOC date due to schedule delays proposed by BIW and negotiated and accepted by the Navy.
- DDG 52 award delayed due to RFP changes to strengthen solicitation provisions.

c. Current Change Explanations --

(CH-1) - A helicopter rearming capability and facilities upgrades were added to the DDG 52. This has caused a schedule adjustment of 8 months to the DDG 52 ship delivery with no impact to follow ship schedules. All future ships of this class will receive these upgraded capabilities.

d. References --

Production Estimate: DCP #1337 Rev 1, Change 1 of 22 August 1986.

Approved Program: DAE Baseline approved 17 February 1988.

1/ Add DDG 51 delivery IAW DAE baseline.

10. Technical/Operational Characteristics:

a. Technical --	Prod Est	Approved Program Goal/ Threshold	Demon-strated Perf	Current Estimate
(1)(U) Ship:				
(a)(U) Length (overall, in ft)	466	466	N/A	466
(b)(U) Beam (ft)	59	59	N/A	59
(c)(U) Navigational Draft (ft)	30.6	30.6	N/A	30.6
(d)(U) Displacement (LT)	8,300	8,300	N/A	8,300
(e)(U) Propulsion	LM 2500 Gas Turbine	LM 2500 Gas Turbine	N/A	LM 2500 Gas Turbine
(f)(U) Accommodations	341	341	N/A	341
(b)(1)				
(c)(U) Armament				
(U)1. Anti-Submarine Warfare				
(U)a. ASW System	AN/SQQ-89	AN/SQQ-89	N/A	AN/SQQ-89
(U)b. ASROC	VLA	VLA	N/A	VLA
(U)c. Helo	SEAHAWK Land & Refuel; LAMPS Elec	SEAHAWK Land & Refuel; LAMPS Elec	N/A	SEAHAWK Land, Refuel,& Rearm; LAMPS Elec (CH-1)
(U)2. Anti-Air Warfare				
(U)a. Launchers	MK 41 VLS	MK 41 VLS	N/A	MK 41 VLS
(U)b. Missiles	SM-2 MR	SM-2 MR	N/A	SM-2 MR
(U)c. Missile Fire Control System	3 MK 99	3 MK 99	N/A	3 MK 99
(U)d. Guns	2 PHALANX	2 PHALANX	N/A	2 PHALANX
(U)3. Anti-Surface/Strike Warfare				
(U)a. Guns	1 5"/54	1 5"/54	N/A	1 5"/54
(U)b. Gunfire Control System	MK 160	MK 160	N/A	MK 160
(U)c. Anti-Ship Cruise Missile	HARPOON	HARPOON	N/A	HARPOON
(U)d. Cruise Missile	TOMAHAWK	TOMAHAWK	N/A	TOMAHAWK

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

	Prod Est	Approved Program Goal/ Threshold	Demon-strated Perf	Current Estimate
b. Operational --				
(U)4. Electronic Warfare	SLQ-32, SRBOC	SLQ-32, SRBOC	N/A	SLQ-32, SRBOC
(U)5. Radars				
(U) Surface	SPS-67	SPS-67	N/A	SPS-67
(U) 3D	SPY-1D	SPY-1D	N/A	SPY-1D

c. Previous Change Explanations -- None

d. Current Change Explanations -- (CH-1) - A helicopter rearming capability and facilities upgrades were added to the DDG 52. All future ships of this class will receive these upgraded capabilities.

e. References --

Production Estimate: DCP #1337 Rev 1, Change 1, of 22 August 1986.

Approved Program: DAE Baseline approved 17 February 1988.

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

a. Cost --	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	979.8	1,226.4	1,226.4
Procurement (SCN)	15,948.3	20,916.3	20,916.3
Basic Ship Costs	(5,383.6)	(7,271.6)	(7,271.6)
HM&E and Combat System Elements	(9,427.9)	(12,467.1)	(12,467.1)
Other Costs	(621.9)	(470.1)	(470.1)
OF/PD	(514.9)	(707.5)	(707.5)
Construction (MILCON)	25.6	25.4	25.4
Total FY 87 Base-Year $	16,953.7	22,168.1	22,168.1
Escalation	3,163.8	4,889.3	4,889.3
Development (RDT&E)	(-63.2)	(-12.3)	(-12.3)
Procurement (SCN)	(3,224.8)	(4899.2)	(4899.2)
Construction (MILCON)	(2.2)	(2.4)	(2.4)
Total Then-Year $	20,117.5	27,057.4	27,057.4 1/

1/ Excludes FY 1994 Advance Procurement for the FY 1995 ships

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

	Production Estimate	Approved Program	Current Estimate
b. Quantities --			
Development (RDT&E)	-	-	-
Procurement	23	33	33
Total	23	33	33

c. Foreign Military Sales -- None.

d. Nuclear Costs -- None.

e. References --

Production Estimate: DCP #1337 Rev 1, Change 1 of 22 August 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 (FY1989)		Budget Year (FY1990)
	SAR Current (Dec 88 SAR)	UCR Baseline (Dec 87 SAR)	UCR Baseline (Dec 88 SAR)
a. Program Acquisition --			
(1) Cost	27,057.4	20,312.5	27,057.4
(2) Quantity	33	23	33
(3) Unit Cost	820.0	883.2	820.0
b. Current Procurement --	(FY 1989)	(FY 1989)	(FY 1990)
(1) Cost	2,826.1	2,211.6	3,617.8
Less CY Adv Proc	-11.3	-78.4	+0.0
Plus PY Adv Proc	+78.2	+77.3	+17.2
Less OF/PD	-0.0	-4.3	-17.1
Net Total	2,893.0	2206.2	3,617.9
(2) Quantity	4	3	5
(3) Unit Cost	723.3	735.4	723.6

13. Cost Variance Analysis:

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

	RDT&E	SCN	MILCON	TOTAL
Production Estimate	916.6	19,173.1	27.8	20,117.5
Previous Changes:				
Economic	+2.2	+219.3	+0.2	+221.7
Quantity	-	-	-	-
Schedule	-	+144.1	-	+144.1
Engineering	-	-	-	-
Estimating	-27.9	-121.7	-	-149.6
Other	-	-	-	-
Support	-	-21.0	-0.2	-21.2
Subtotal	-25.7	+220.7	-	+195.0
Current Changes:				
Economic	-0.4	-187.6	-	-188.0
Quantity	-	+7,996.5	-	+7,996.5
Schedule	-	-128.3	-	-128.3
Engineering	-	-	-	-
Estimating	+323.6	-1543.2	-	-1,219.6
Other	-	-	-	-
Support	-	+284.3	-	+284.3
Subtotal	+323.2	+6,421.7	-	+6,744.9
Total Changes	+297.5	+6,642.4	-	+6,939.9
Current Estimate	1,214.1	25,815.5	27.8	27,057.4

(FY 1987 (Base-Year) Dollars in Millions)

	RDT&E	SCN	MILCON	TOTAL
Production Estimate	979.8	15,948.3	25.6	16,953.7
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-26.7	-184.5	-	-211.2
Other	-	-	-	-
Support	-	-18.5	-0.2	-18.7
Subtotal	-26.7	-203.0	-0.2	-229.9
Current Changes:				
Quantity	-	+6,284.4	-	+6,284.4
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+273.3	-1,324.6	-	-1,051.3
Other	-	-	-	-
Support	-	+211.2	-	+211.2
Subtotal	+273.3	+5,171.0	-	+5,444.3
Total Changes	+246.3	+4,968.0	-0.2	+5,214.4
Current Estimate	1,226.4	20,916.3	25.4	22,168.1

13. Cost Variance Analysis (Cont'd)

b. Previous Change Explanations --

RDT&E
Economic: revised escalation indices
Estimating: revised program funding requirements

PROCUREMENT
Economic: revised escalation indices
Schedule: change in acquisition profile (FY88-FY91)
Estimating: revised procurement estimates for ship construction and ship systems
Support: revised outfitting and post delivery requirements due to schedule and quantity changes

MILCON
Economic: Revised indices
Support: Revised program funding requirements

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Jan 1989 economic escalation rates. (Economic)	N/A	-0.4
Revised program funding requirements. (Estimating)	+273.3	+323.6
(2) Procurement		
Revised Jan 1989 economic escalation rates. (Economic)	N/A	-187.6
Change in Profile from 2, 0, 3, 5, 6, 6, to 3, 0, 4, 5, 5, 5 (FY87-FY92) (Schedule)	N/A	-128.3
Addition of 10 ships in FY93-FY94. (Quantity)	+6,284.4	+7,996.5
Revisions to procurement estimates reflecting ship construction contract multiyear procurement savings, revised ship systems estimates, and the impact to End Cost (BY 87 $) due to adjustments of projected ship construction escalation requirements. (Estimating)	-1,324.6	-1,543.2
Impact to outfitting and post delivery requirements for the revised procurement schedule and change in procurement quantity. (Support)	+211.2	+284.3
(3) MILCON		
Revised Jan 89 economic escalation rates. (Economic)	N/A	0.0

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

a. Initial SAR Estimate to Development Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1217.1	-120.3	-218.2	+5.2	-25.1	+155.6	--	+12.3	-190.5	1026.6

b. Development Baseline Estimate to Production Estimate --

PAUC (Dev Est)	Changes								PAUC (PdE Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1026.6	-112.9	-45.0	+9.9	--	-9.8	--	+5.9	-151.9	874.7

c. Production Estimate to Current Estimate --

PAUC (PdE Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
874.7	+1.0	-22.7	+0.5	--	-41.5	--	+8.0	-54.7	820.0

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

a. RDT&E -- Not Applicable

b. SCN --

Ship Construction (DDG 51):	Initial Contract Price Target	Ceiling	Qty
Bath Iron Works Bath, Maine N00024-85-C-2144, FPI Awarded/Definitized: April 1985	$322.0	$399.1	1

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion 1/ Contractor	Program Manager
$349.3	$438.0	1	$520.7	$532.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -58.2	$ -33.8
Cumulative Variances To Date (9/88)	$ -13.1 ✓	$ - 6.0 ✓
Net Change	$ +45.1	$ +27.8

Explanation of Change: BIW's reporting reflects a reprogramming of Detail Design and Construction. Current variances are mainly attributable to labor manhours in System Engineering Design.

Ship Construction (DDG 52)	Initial Contract Price Target	Ceiling	Qty
Ingalls Shipbuilding Pascagoula, Mississippi N00024-87-C-2256, FPI Awarded/Definitized: May 1987	$162.2	$191.4	1

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion 1/ Contractor	Program Manager
$164.3	$193.9	1	$223.3	$242.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (12/88)	$ +1.4 ✓	$ -13.7 ✓
Net Change	$+1.4	$ -13.7

Explanation of Change: -- Schedule variance is due to delayed material procurement. Equipment is scheduled to be delivered in the next reporting period.

Note: DDG 51 Combat System Development (N00024-84-C-5105) contract has been deleted since the contract value does not fall within the top six major contracts. Similiarly, the DDG 51 portion of the AEGIS Weapon System production contract (N00024-85-C-5100) no longer falls within the top six major contracts on the DDG 51 program.

1/ Estimated Price at Completion for Ship construction contracts incorporates incentive arrangements, projected change orders, and escalation commitments which are not included in the contract ceiling price.

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

Ship Construction (DDG 53):
Bath Iron Works
Bath, Maine
N00024-87-C-2257, FPI
Awarded/Definitized: September 1987

Initial Contract Price		
Target	Ceiling	Qty
$189.8	$225.7 1/	1

Current Contract Price		
Target	Ceiling	Qty
$189.9	$225.8	1

Estimated Price At Completion 2/	
Contractor	Program Manager
$268.6	$278.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (12/88)	$ -0.7	$ -8.0
Net Change	$ -0.7	$ -8.0

Explanation of Change: Current variances are not significant.

Ship Construction (DDG 54, 56, 58):
Bath Iron Works
Bath, Maine
N00024-89-C-2033, FPI
Awarded/Definitized: December 1988

Initial Contract Price		
Target	Ceiling	Qty
$670.4	$771.6	3

Current Contract Price		
Target	Ceiling	Qty
$670.4	$771.6	3

Estimated Price At Completion 2/	
Contractor	Program Manager
$809.3	$809.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (12/88)	$ 0	$ 0
Net Change	N/A	N/A

Explanation of Change: This is a new contract. Contractor Cost Performance Reporting will commence in June 1989.

Ship Construction (DDG 55, 57):

Ingalls Shipbuilding
Pascagoula, Mississippi
N00024-89-C-2034, FPI
Awarded/Definitized: December 1988

Initial Contract Price		
Target	Ceiling	Qty
$503.4	$575.1	2

Current Contract Price		
Target	Ceiling	Qty
$503.4	$575.1	2

Estimated Price At Completion 2/	
Contractor	Program Manager
$604.6	$604.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (12/88)	$ 0	$ 0
Net Change	N/A	N/A

Explanation of Change: This is a new contract. Contractor Cost Performance Reporting will commence in June 1989.

1/ Fixed price work in the original contract was not included in the previously reported ceiling price.

Estimated Price at Completion for Ship construction contracts incorporates incentive arrangements, projected change orders, and escalation commitments which are not included in the contract ceiling price.

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

AEGIS Weapon System (DDG 52,53, and CGs 66-73): 1/	Initial Contract Price Target	Ceiling	Qty
GE Government Systems Division Moorestown, N.J. N00024-87-C-5140, FPI	365.2	393.3	5
(MOD)	$697.0	$749.5	10

Awarded/Definitized: January 14, 1988 for CG 66, 67, 68 and DDG 52, 53 and modified January 19, 1988 for CG 69-73.

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$697.9	$750.5	10	$728.8 2/	$728.8 2/

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (10/88)	$ + 5.3	$ - 4.6
Net Change	$ +5.3	$ -4.6

Explanation of Change: Current variances are not significant at this early stage of the contract.

1/ This is a combined procurement contract for the DDG 52, 53 and CG 66-73. It is reported in the SARs of each program.
2/ Includes $25.6 for Amortization of Special Tooling and Special Test Equipment not reported in the contract price.

c. MILCON: Not Applicable

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: 27.3 % ($ 7,381.1/$ 27,057.4)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-00)	Total
RDT&E	895.6	43.8	79.1	195.6	1,214.1
SCN	6,457.4	3,617.8	3,649.1	12,091.2	25,815.5
MILCON	27.8	0.0	0.0	0.0	27.8
TOTAL	7,380.8	3,661.6	3,728.2	12,286.8	27,057.4

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

Fiscal Year	Qty	Sailaway FY 87 Dollars		Total Base Year $	Total Then-Year Dollars			Escl Rate (%) 1/
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1980				14.9	10.5	10.5	10.5	10.59
1981				45.1	35.3	35.3	35.3	10.61
1982				121.2	102.0	102.0	102.0	7.60
1983				170.8	150.7	150.7	150.7	4.90
1984				132.2	121.1	121.1	121.1	3.80
1985				146.1	138.4	138.4	138.4	3.40
1986				101.8	99.1	99.1	92.1	2.80
1987				89.5	91.3	88.0	81.7	2.70
1988				88.7	93.6	88.1	38.1	3.10
1989				49.0	53.6			4.00
1990				38.7	43.8			3.60
1991				67.8	79.1			3.30
1992				56.0	66.9			2.80
1993				54.6	66.6			2.30
1994				50.0	62.1			1.80
Subtotal				1226.4	1214.1	833.2	769.9	
Appropriation: SCN								
1984					78.6	78.6	67.5	3.60
1985	1	267.6	829.1	1096.7	1047.8	863.8	602.7	2.10
1986				0.0	98.1	96.2	52.4	1.00
1987	3	92.5	2033.3	2125.8	2396.4	1397.7	253.7	1.50
1988				4.8	10.4	5.5	0.3	2.60
1989	4		2402.0	2402.0	2826.1	1303.7	0.0	4.00
1990	5		2963.3	2978.8	3617.8			3.60
1991	5		2872.0	2910.9	3649.1			3.30
1992	5		2936.2	2978.6	3773.1			2.80
1993	5		2898.1	2996.9	3861.7			2.30
1994	5		2914.7	2999.5	3916.4			1.80
1995				122.0	151.8			1.80
1996				104.3	132.2	8310		1.80
1997				102.3	132.0			1.80
1998				58.6	77.0			1.80
1999				34.4	46.0			1.80
2000				0.7	1.0			1.80
Subtotal	33	360.1	19848.7	20916.3	25815.5	3745.5	976.6	

1/ Since spend-out rates are not shown, the escalation rates cannot be used to verify the composite index.

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

Fiscal Year	Qty	Sailaway FY 87 Dollars		Total Base Year $	Total Then-Year Dollars			Escl Rate (%) 1/
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: MILCON								
1986				4.5	4.6	3.7	3.7	2.80
1987				-	-	-	-	2.70
1988				13.4	14.7	9.1	1.5	3.10
1989				7.5	8.5	-	-	4.00
Subtotal				25.4	27.8	12.8	5.2	
Total	33	360.1	19848.7	22168.1	27057.4	4591.5	1751.7	

1/ Since spend-out rates are not shown, the escalation rates cannot be used to verify the composite index.

17. Production Rate Data:

a. Annualized Production Rates -- Not Applicable (Exempt: Less than six ships per year).

b. Cost Variance -- Not Applicable

c. Schedule Variance -- Not Applicable

d. Deliveries (Plan/Actual)--

	To Date
RDT&E	0/0
Procurement	0/0

e. Approved Design-to-Cost Goal-- There is no design to cost goal established for DDG 51.

18. Operating and Support Costs:

a. Assumptions and Ground Rules -- Not Applicable.

b. Costs -- Not Applicable.

c. Contractor Support Costs -- The Contractor Support Costs are combined costs for both the CG 47 AEGIS Class Cruiser and DDG 51 Class Destroyer programs.

AF-19 · KC135R

SAR-88-057

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: KC-135R

AS OF DATE: December 31, 1988

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Designation and Nomenclature (Popular Name): KC-135R Modernization Program

DoD Component: U. S. Air Force

3. Responsible Office and Telephone Number:
C/KC-135 Reengine System Program Management Office
Tanker/Cargo Division
OC-ALC/MMSGE, 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

[redacted]

SAF/PAS
89-0036-T
#10
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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 Jun 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 Operational Test and Evaluation (OT&E) program. A total of 55 flights, .4 hours were flown. The KC-135R demonstrated satisfactory compliance with formance, 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 thirty-four KC-135R aircraft have been delivered to date. Seven Main Operating Bases, four Tanker Task Force activities, a Forward Operation Location and three Regional Engine Maintenance Organizations have been activated. A total of 245 kits and 179 installations have been procured. The KC-135R program has been selected for multi-year procurement in the current President's Budget.

The KC-135R satisfies the mission requirement.

c. Changes Since "As of" Date - None

Threshold Breaches: There are currently no DAE baseline (dated Februay) or DCP (dated 1 April 1981) 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/Jan 80	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

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 February 1988.

10. Technical/Operational Characteristics:

a. Technical --	* Production Estimate/ Approved Program	Demonstrated Performance	Current Estimate
Max Gross Weight (lbs)	322,500/322,500	322,500	322,500
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	10,400
Takeoff Distance (ft)	9,000/9,000	8,100	8,100
Fuel Offload (2000 NM Radius) (lbs)	114,000/114,000	114,000	114,000

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.

d. Current Change Explanations -- None

e. References --

Production Estimate: Decision Coordination Paper (DCP), 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 February 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)

	Production Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	$ 91.6	$ 89.7	$ 89.7
Procurement	4941.5	7310.9	7310.9
Airframe	(2033.0)	(2455.8)	(2455.8)
Engine	(2348.0)	(4262.9)	(4262.9)
Total Flyaway	(4381.0)	(6718.7)	(6718.7)
Other Weapon System Costs	(208.0)	(272.4)	(272.4)
Initial Spares	(352.5)	(319.8)	(319.8)
O&M (Installation)	196.0	248.4	248.4
Total FY81 Base-Year $	5229.1	7649.0	7649.0
Escalation	2600.1	4920.5	4920.5
Development (RDT&E)	(5.6)	(5.0)	(5.0)
Procurement	(2515.2)	(4783.9)	(4783.9)
O&M (Installation)	(79.3)	(131.6)	(131.6)
Total Then-Year $	7829.2	12569.5	12569.5
b. Quantities --			
Development (RDT&E)	-	-	-
Procurement	334	637	637
Total	334	637	637

c. Foreign Military Sales -- Sales to date total eleven for an estimated cost of $220,012,101 which includes two years of initial spares, support equipment, French peculiar design changes and eleven installations.

d. Nuclear Costs -- None

e. References --

Production Estimate: Program Management Directive (PMD) Number 7021 (14)/11142F, 31 August 1981.

Approved Program: FY1990-91 President's Budget, 9 Jan 1989.

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

		Current Year		Budget Year
		Current Estimate (Dec 88 SAR)	UCR Baseline (Dec 87 SAR)	UCR Baseline (Dec 88 SAR)
a.	Program Acquisition --			
(1)	Cost	12569.5	12446.7	12569.5
(2)	Quantity	637	638	637
(3)	Unit Cost	19.732	19.509	19.732
b.	Current Procurement --	(FY 1989)	(FY 1989) *	(FY 1990)
(1)	Cost	745.1	593.8	385.1
	Less CY Adv Proc	-	-	-
	Plus PY Adv Proc	-	-	-
	Net Total	745.1	593.8	385.1
(2)	Quantity	47	36	24
(3)	Unit Cost	15.853	16.494	16.046

* Adjusted to reflect FY89 Appropriations Act.

101. 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	- 500.8	- 10.4	- 511.4
Quantity	-	+5988.0	+187.0	+6175.0
Schedule	-	+ 289.1	+ 7.9	+ 297.0
Engineering	-	-	-	-
Estimating	-2.3	-1732.2	-133.1	-1867.6
Other	-	-	-	-
Support	-	+ 524.5	-	+ 524.5
Subtotal	-2.5	+4568.6	+ 51.4	+4617.5
Current Changes				
Economic	-	- 164.7	- 2.8	- 167.5
Quantity	-	- 117.9	- .4	- 118.3
Schedule	-	+ 104.2	+ 2.2	+ 106.4
Engineering	-	-	-	-
Estimating	-	+ 603.3	+ 54.3	+ 657.6
Other	-	-	-	-
Support	-	- 355.4	-	- 355.4
Subtotal	0.0	+ 69.5	+ 53.3	+ 122.8
TAL CHANGES	-2.5	+4638.1	+104.7	+4740.3
RRENT ESTIMATE	94.7	12094.8	380.0	12569.5

(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	-	+3187.8	+108.0	+3295.8
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	- 1.9	-1106.5	- 96.5	-1204.9
Other	-	-	-	-
Support	-	+ 247.7	-	+ 247.7
Subtotal	- 1.9	+2329.0	+ 11.5	+2338.6
Current Changes:				
Quantity	-	- 71.6	- .2	- 71.8
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	+ 328.0	+ 41.1	+ 369.1
Other	-	-	-	-
Support	-	- 216.0	-	- 216.0
Subtotal	0.0	+ 40.4	+ 40.9	+ 81.3
Total Changes	- 1.9	+2369.4	+ 52.4	+2419.9
Current Estimate	89.7	7310.9	248.4	7649.0

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

Schedule: procurement program stretchout; decrease due to early procurement of 14 kits

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

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

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

Schedule: installation schedule stretchout associated with kit procurement stretchout; decrease due to early procurement of 14 kits

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

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)	---	-164.7
Quantity decreased from 638 to 637, 1 aircraft planned for reengining lost to attrition (Quantity)	- 9.9	- 19.3
Total engines for modification decreased from 2,548 to 2,511, 34 excess engines to be used as installs, 3 "free" engines obtained through FY88 contract negotiations (Quantity)	-61.7	- 98.6
Schedule change associated with an increase in procurement in FY88 (47 to 50) and FY89 (36 to 47) (Schedule)	---	- 50.4
Schedule change associated with program stretchout, 56 kits moved from FY90-FY94 to outyears (Schedule)	---	+154.6
Revised hardware estimate based on latest prices for smaller annual buys (Estimating)	+321.4	+593.2
Adjustment for prior year inflation indices (Estimating)	+ 6.6	+ 10.1
Definitization of prior year spares amounts (Support)	- 37.5	- 86.1
Decrease in spare engines caused by configuration change and better performance than anticipated (Support)	-194.4	-301.1
Increase to data and product support for program stretchout (Support)	+ 15.5	+ 31.1
Adjustment for prior year inflation indices (Support)	+ .4	+ .7

Cost Variance Analysis (Cont'd):

	(Dollars in Millions) Base-Year $	Then-Year $
(2) O&M (Installation)		
Revised economic escalation indices (Economic)	---	- 2.8
Decreased installation costs associated with deletion of one aircraft from planned program (Quantity)	- .2	- .4
Installation schedule rephased to accomodate the kit procurement schedule change Schedule)	---	+ 2.2
Installation cost corrected to include aircraft preparation costs (Estimating)	+41.1	+54.3

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 (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
23.441	-1.066	-1.642	+0.633	0.000	-1.899	+0.265	0.000	-3.709	19.732

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

a. RDT&E - no active contracts

b. Procurement - -

(1) Airframe Modification Kits
Boeing Military Airplane Co
F34601-86-C-2171, FFP
Award Date: July 11, 1986
Definitized: July 11, 1986

Initial Contract Price

Target	Ceiling	Qty
151.8	N/A	43

Current Contract Price

Target	Ceiling	Qty
143.6	N/A	43

Estimated Price at Completion

Contractor	Program Manager
143.6	143.6

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

(2) Airframe Modification Kits
Boeing Military Airplane Company
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 Prtice

Target	Ceiling	Qty
162.6	N/A	50

Estimated Price at Completion

Contractor	Program Manager
162.6	162.6

(3) Airframe Modification Kits
Boeing Military Airplane Co
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

First time contract reported in SAR.

Estimated Price at Completion

Contractor	Program Manager
180.0	180.0

(4) Engine
CFM International
F33657-84-C-2128, Opt II, FFP
Award Date: March 1, 1986
Definitized: March 1, 1986

Initial Contract Price

Target	Ceiling	Qty
425.0	N/A	181

Current Contract Price

Target	Ceiling	Qty
376.9	N/A	181

Estimated Price at Completion

Contractor	Program Manager
376.9	376.9

(5) 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

(6) 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

First time contract reported in SAR.

Estimated Price at Completion

Contractor	Program Manager
467.4	467.4

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

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
CFM International	F33657-84-C-2128, Basic, Opt I

These contracts are more than 95% complete and have been deleted and replaced with later contracts.

Note: Cost/Schedule Variances - - All contracts are Firm Fixed Price (FFP). Cost Performance is not a contractual requirement and CPR data is not available.

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

a. Program Status --

(1) Percent Program Completed: 48.1% (13 yrs/27 yrs)

(2) Percent Program Cost Appropriated: 40.0% ($5030.7/12569.5)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY77-89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance to Complete Beyond FYDP (FY92-03)	Total
RDT&E	94.7	-	-	-	94.7
Procurement	4813.9	385.1	386.0	6509.8	12094.8
O&M	122.1	22.2	25.4	210.3	380.0
Total	5030.7	407.3	411.4	6720.1	12569.5

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

c. Annual Summary --*

Fiscal Year	Qty	Flyaway FY81 Dollars Nonrec	Flyaway FY81 Dollars Rec	Total Base Year$	Total Then Year $ Program	Total Then Year $ Obligated	Total Then Year $ Expended	Escl Rate
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	399.2	541.7	541.7	541.7	7.9
1985	43	2.0	398.7	468.4	656.7	632.5	610.2	3.4
1986	46	1.1	402.0	441.6	636.4	636.4	560.3	2.8
1987	50	.5	460.0	509.0	760.0	727.1	353.1	2.7
1988	50	.3	459.0	461.3	713.2	688.7	8.9	3.1
1989	47		464.7	466.3	745.1	0.0	0.0	4.0
1990	24		226.2	234.1	385.1			3.6
1991	20		212.8	228.8	385.9			3.3
1992	20		213.5	252.6	434.8			2.8
1993	30		321.4	347.0	608.4			2.3
1994	30		323.1	354.5	632.5			1.8
1995	36		389.7	415.5	754.6			1.8
1996	36		391.5	417.5	772.0			1.8
1997	36		393.6	419.6	789.7			1.8
1998	36		395.5	421.7	807.9			1.8
1999	36		397.4	423.8	826.6			1.8
2000	36		399.5	413.9	821.7			1.8
2001	2		22.3	30.5	61.7			1.8
Subtotal	637	104.3	6614.4	7310.9	12094.8	3987.2	2835.0	

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	Obligated	Expended	
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	2.8
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	5.5	4.0
1990	46			15.2	22.2			3.6
1991	51			16.9	25.4			3.3
1992	35			11.5	17.8			2.8
993	22			7.3	11.5			2.3
994	20			6.7	10.7			1.8
1995	26			8.7	14.3			1.8
1996	30			10.1	16.8			1.8
1997	34			11.5	19.5			1.8
1998	36			12.2	21.1			1.8
1999	36			12.3	21.6			1.8
2000	36			12.4	22.1			1.8
2001	36			12.4	22.6			1.8
2002	36			12.5	23.1			1.8
2003	14			4.9	9.2			1.8
Subtotal	637			248.4	380.0	105.5	105.5	
Total	637	104.3	6614.4	7649.0	12569.5	4092.7	2940.5	

17. Production Rate Data (Cont'd):

a. Annualized 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	72
1990			24	72
1991			20	72
1992			20	72
1993			30	72
1994			30	29
1995			36	
1996			36	
1997			36	
1998			36	
1999			36	
2000			36	
2001			2	

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$)	5229.1	+2419.9	7649.0	+829.1	6819.9
(TY$)	7829.2	+4740.3	12569.5	+1945.8	10623.7
PAUC (BY$)	15.656	-3.648	12.008	+1.302	10.706
(TY$)	23.441	-3.709	19.732	+3.054	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	+ 165 mos	264	+ 81 mos	182
End Date (Mo/Yr)	9/89	+ 165 mos	6/03	+ 81 mos	9/96

d. Deliveries (Plan/Actual)

	To Date
RDT&E	N/A
Procurement	134/134

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)	11.9	9.2	9.4	TBD	30.5
Industrial Fund	130.0	71.5	84.7	TBD	286.2
Total	141.9	80.7	94.1	TBD	316.7

(2)

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SAR-88-064

AF-1 AMRAAM

SELECTED ACQUISITION REPORT [RCS: DD-COMP (Q&AR) 823]

PROGRAM: AMRAAM (AIM-120A)

AS OF DATE: December 31, 1988

(U) INDEX

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1. (U) Designation and Nomenclature (Popular Name): AIM-120A Advanced Medium Range Air-to-Air Missile (AMRAAM)

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

3. (U) Responsible Office and Telephone Number:

AMRAAM Joint System Program Office PD: Brigadier General Charles E. Franklin
Armament Division — Assigned: July 25, 1988
Eglin AFB, FL 32542 — AV 872-2307; COMM (904) 882-2307

Naval Air Systems Command (PMA-268) — Captain Todd W. Givens, USN
AMRAAM Joint System Program Office — Assigned: May 6, 1988
Armament Division (Navy) — AV 872-2412; COMM (904) 882-2412
Eglin AFB, FL 32542

4. (U) 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

OASD(PA) DFOISR 89-0044 SAF/PAS

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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 June 1985, the Joint System Program Office (JSPO) negotiated a revised FSD schedule complying with the direction to retain all elements of the original program. The Blue Ribbon Committee independently established that the AMRAAM program should be continued, and identified producibility enhancement projects and management initiatives which would significantly reduce acquisition costs. 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.

* A-6F Deleted per Navy Direction.

7. (U) Program Highlights (continued):

a. Significant Historical Developments (continued) -- Through December 1987, 51 FSD guided AMRAAM Air Vehicle Instrumented (AAVI) launches were completed. Successful missions have demonstrated multiple missiles against multiple active Electronic Countermeasure (ECM) targets, ripple fire of dual missiles against a single target, engagement of a high altitude supersonic target, single missile engagement of clustered targets, and look-down, shoot-down of a very low altitude target. Operation of the third simultaneous test site began in January 1987. 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. The Congressional language directed that the reduced funding level be allocated to ensure competitive incentives remain maximized and total acquisition costs be minimized. This Congressional action, increased the cost cap from $7.172B to $7.585B in FY84 dollars.

b. Significant Developments Since Last Report -- Through December 1988, 37 additional FSD Guided Test Vehicles (GTVs) and two Separation/Control Test Vehicles (S/CTVs) were launched. The missiles were launched from F-15, F-16 and F/A-18 aircraft at Eglin Gulf Test Range, FL; Naval Weapons Center, CA; Pacific Missile Test Center, CA; and White Sands Missile Range, NM. The success rate for AMRAAM launches through December 1988 is over 76 percent overall. Twelve of the vehicles launched in 1988 were for separation purposes, and four were Raytheon Qualification Lot launches. Successful missions have demonstrated single missile engagements of clustered targets in an ECM environment, multiple missiles against multiple targets in an ECM environment, warhead performance in an ECM environment, single missiles against single targets in an ECM environment, warhead performance against a maneuvering target, launches against low altitude targets, and launches against maneuvering targets.

The option for Full Go-Ahead for the Lot II LRIP Contracts were exercised on July 15, 1988. Hughes will produce 212 missiles (200 AF production, 12 USN RDT&E) for a total price of $319 million; while, Raytheon will produce 200 missiles (200 AF production) for a total price of $291 million. Also, included in the contract price were special tooling and test equipment, flight test support, interim contractor support, associated spare and repair parts, data and other associated hardware and engineering services.

Hughes Aircraft Company delivered the first production AMRAAM in September 1988. The missile was symbolically rolled-out and up-loaded onto a Tactical Air Command F-15 during a ceremony at Tucson. The missile was loaded by an Air Force Operational Test and Evaluation Center (AFOTEC) load crew symbolizing AFOTEC's role in the acquisition of weapons systems.

The Conventional Systems Committee (CSC) met on September 15, 1988 to review the AMRAAM program. The review resulted in a continuation of low rate production through FY89 (Lot III). The CSC also required AMRAAM to submit an

7. (U) Program Highlights (continued):

b. Significant Developments Since Last Report (continued) -- updated Acquisition Plan before any FY89 Production funds could be obligated. Upon submission of the Acquisition Plan, AMRAAM would then be authorized to proceed with Long Lead funding for Lot III.

On December 9, 1988, the updated AMRAAM Acquisition Plan was signed by USD(A) and delivered to Congress. The Plan formalized a slip for the DAB IIIB (Rate Production Decision) review from May 1989 to September 1989. The reason for the slip was to accommodate flight testing that will occur through 2nd Quarter FY89. Although the Acquisition Plan identified approximately a four percent increase to the production cost cap, our current estimate reflected in this budget submission is approximately two percent over the cap. This current estimate includes a Multiyear Procurement Strategy beginning in FY94.

On December 13, 1988, not to exceed (NTE) long lead contracts were awarded for the production of 900 AMRAAM missiles, 531 missiles to Hughes and 369 missiles to Raytheon. The split of missiles was determined as a result of a formal source selection process. The long lead USAF/USN NTE price for the Hughes contract was $172,148,440 and for the Raytheon contract was $105,687,891. Also included in the contracts were special tooling and test equipment, flight test support, interim contractor support, associated spare and repair parts, data and other associated hardware and engineering services. The exercise of the options for Lot III full go-ahead (FGA) is anticipated to occur not later than July 15, 1989.

AMRAAM is expected to meet all mission requirements.

c. Changes since "As Of" Date: NONE

8. (U) Threshold Breaches: There are currently no ADM (dated November 22, 1988) Threshold Breaches nor DAE Baseline (dated December 1988) breaches.

9. (U) 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
DAB IIIB (Lot III Full Go-Ahead Rate Production)	NA /May 89	Sep 89 (CH-1)
IOC (Air Force)	Sep 86/Oct 89	Oct 89
DT&E/IOT&E Complete	NA /Apr 89	Apr 89
Full Operational Capability (FOC)	NA /Mar 91	Jul 91

9. (U) Schedule (continued):

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 May 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.

c. Current Change Explanations:

(CH-1) The Defense Acquisition Board (DAB) Full Rate Production Decision (DAB IIIB) scheduled for May 1989 has slipped to September 1989 to accommodate flight testing that will occur through the second quarter of FY89.

d. References:

Development Estimate: SDDM dated November 3, 1982, #X22681

Approved Program: DAE baseline dated December 1988.

[redacted]

(b)(1)

a. (U) Technical	Dev Est	Approved Program (Goals/Thresholds)	Demonstrated Performance	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 (MTBM-Type 1) (Hrs) 3/	600	600/450	114	450 1000

(b)(1)

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.

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: None

e. (U) Reference:

Development Estimate: SDDM, November 3, 1982, #X22681.

Approved Program: DAE baseline dated December 1988.

11. (U) 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	824.1
Procurement	4031.6	4488.4	4488.4 *
Air Vehicle Flyaway	3508.2	4258.8	4258.8
Other Weapon Sys Cost	264.0	176.4	176.4
Initial Spares	84.9	53.2	53.2
Other Procurements	174.5	0.0	0.0
Construction	--	--	--
Total FY 78 Base-Year $	4761.8	5312.5	5312.5
Escalation	6829.8	6279.9	6279.9
Development (RDT&E)	447.9	508.2	508.2
Procurement	6381.9	5771.7	5771.7
Construction (MILCON)	--	--	--
Total Then-Year $	11591.6	11592.4	11592.4
b. Quantities --			
Development (RDT&E)	169	111	111
Procurement	24335	24320	24320
Total	24504	24431	24431

* This equates to $7,728.9M (FY84$)

c. Foreign Military Sales -- Commitments to date are 11 AMRAAMs (Lot II) for the United Kingdom at $24.4 million and, committments for Lot III Long Lead (six (6) AMRAAMs for Germany at $ 3.6 million).

d. Nuclear Costs -- None

e. References --

Development Estimate: SDDM dated November 3, 1982, #X22681

Approved Program: FY90-91 President's Budget

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

(Current (Then-Year) Dollars in Millions)

		Current Year		Budget Year
		Current Est Dec 88 SAR	UCR Baseline Dec 87 SAR	UCR Baseline Dec 88 SAR
a.	Program Acquisition			
	(1) Cost	11592.4	11199.2	11592.4
	(2) Quantity	24431	24431	24431
	(3) Unit Cost	0.474	0.458	0.474
b.	Current Procurement	FY 1989	FY 1989 1/	FY 1990
	(1) Cost	835.9	839.4	1050.1
	Less CY Adv Proc	0.0	0.0	0.0
	Plus PY Adv Proc	0.0	0.0	0.0
	Net Total	835.9	839.4	1050.1
	(2) Quantity	900	900	1600
	(3) Unit Cost	0.929	0.933	0.656

Differs from the December 1987 SAR to reflect the FY89 Appropriations Act in accordance with the Congressional change to SAR law.

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13. (U) Cost Variance Analysis:

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

	RDTE	PROC	MILCON	TOTAL
Development Estimate	1178.1	10413.5		11591.6
Previous Changes:				
Economic	-45.0	-2001.2		-2046.2
Quantity	-39.2	0.0		-39.2
Schedule	-19.1	393.9		374.8
Engineering	5.1	170.3		175.4
Estimating	70.7	1631.0		1701.7
Other	0.0	0.0		0.0
Support	0.0	-558.9		-558.9
Subtotal	-27.5	-364.9		-392.4
Current Changes				
Economic	0.2	-61.1		-60.9
Quantity	0.0	0.0		0.0
Schedule	0.0	22.5		22.5
Engineering	203.3	0.0		203.3
Estimating	-21.8	320.1		298.3
Other	0.0	0.0		0.0
Support	0.0	-70.0		-70.0
Subtotal	181.7	211.5		393.2
Total Changes	154.2	-153.4		0.8
Current Estimate	1332.3	10260.1		11592.4

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

(FY78 Constant (Base Year) Dollars in Millions)

	RDTE	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	2.3	64.3		66.6
Estimating	36.5	675.5		712.0
Other	0.0	0.0		0.0
Support	0.0	-261.2		-261.2
Subtotal	8.1	332.4		340.5
Current Changes				
Quantity	0.0	0.0		0.0
Schedule	0.0	0.0		0.0
Engineering	96.2	0.0		96.2
Estimating	-10.4	157.1		146.7
Other	0.0	0.0		0.0
Support	0.0	-32.7		-32.7
Subtotal	85.8	124.4		210.2
Total Changes	93.9	456.8		550.7
Current Estimate	824.1	4488.4		5312.5

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

b. Previous Change Explanations:

RDT&E

Economic: Revised economic escalation indices.

Schedule: Revised estimate due to the reduction of evaluation missiles.

Engineering: Addition and deletion of Pre-Planned Product Improvement (P3I) effort.

Estimating: Funds transferred from P3I procurement budget to FY87 development budget to extend the FSD program into FY88. Reduction in government support to live within approved funding. Additional unique analysis for tradeoffs, shipboard use, aircraft integration, and variations. Addition of FY92 to Navy R&D. Adjustment for current and prior year escalation. Addition of FYs 93 & 94 to the Navy RDT&E Program for missile/Navy aircraft platforms development and testing. Adjustment due to FY88 Congressional Actions reducing flight test content. Adjustments to fund Small Business and Unfunded Requirements at additional risk to completion of flight test program. Rephasing of Navy F-14 Flight Test Program Analysis.

PROCUREMENT

Economic: Revised economic escalation indices.

Schedule: Rephased production quantities in FY90 through FY93. Production program delayed by one year. Adjustment due to Congressional quantity realignment from FY87 and FY88 to the outyears. Schedule impact due to Congressional realignment of quantities from FY88 to the outyears, extending ramp-up rate.

Engineering: Extension of production funds and deletion of HAVE SPEAR, a limited access program.

Estimating: Increased missile hardware costs and the addition of warranty provisions. Adjustment for Congressional transfer of the Advance Procurement TY$ funding from FY84 to FY86. Re-estimate based on impact of revised escalation indices. Adjustment to flyaway caused by schedule change due to Congressional realignment of quantities. Adjustment for current and prior year escalation. 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. Revised estimate for Special Tooling/Special Test Equipment (ST/STE), Production Test requirements, Production Support Activities (including technical analysis), and incorporation of Tech Mod at the AMRAAM Contract Facilities. Adjustment of the AMRAAM Producibility Enhancement Program (APREP) investment costs of the projects and additional flight test requirements for the projects.

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

b. Previous Change Explanations: (continued)

PROCUREMENT	(continued)
Support:	Revised support cost requirements resulting from revised schedule. Incorporated contractor maintenance support and deferred organic depot until completion of production. Re-estimate of initial spares support. Reevaluation and rephasing of initial spares. Recategorization of adjustment for current and prior year escalation properly attributable to support category. Adjustment made to reflect recategorization of Navy Other Line Item Costs to Nonrecurring Costs. Rephase of the Joint Depot to incorporate Joint Depot Maintenance Group decision for a five year Interim Contractor Support (ICS) period, with Organic Depot capability at Alameda, CA (USN facility) at the end of the ICS period. Revision and rephasing of the Data, Training Equipment, Containers and Peculiar Support Equipment requirements due to Congressional and DAB realignment of quantities.
MILCON	N/A

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13. (U) 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	0.2
Offset for Current and Prior Year escalation (Estimating)	-0.3	-0.4
Incorporation of AMRAAM Pre-Planned Product Improvement (P3I) Program utilizing evolving technology to meet the future threat environment (Engineering)	96.2	203.3
Reprogrammings to restore USAF flight test funding removed from prior years at risk to completion of the flight test program content (Estimating)	0.6	1.0
Adjustments to fund Small Business Research and Unfunded Requirements at risk to completion of flight test effort (Estimating)	-0.5	-0.9
Reduction of Navy Flight Test Program Analysis accomplished at additional risk to completion of Navy unique aircraft/platforms development program (Estimating)	-10.2	-21.5
(2) PROCUREMENT		
Revised Economic Escalation Indices (Economic)	N/A	-61.1

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

c. Current Variance Analysis:

	(Dollars in Millions) Base Year	Then Year
(2) PROCUREMENT (continued)		
Schedule adjustment to incorporate one additional year of Low Rate AMRAAM Production (FY89) as reported in the AMRAAM Acquisition Plan submitted to Congress on December 9, 1988	107.7	266.4
Schedule impact due to incorporation of one additional year of Low Rate AMRAAM Production (FY89) as reported in the AMRAAM Acquisition Plan submitted to Congress on December 9, 1988 (Schedule)	(0.0)	(22.5)
Adjustment to estimating methodology to incorporate one additional year of Low Rate AMRAAM Production (FY89) (Estimating)	(107.7)	(243.9)
Offset for Current and Prior Year escalation (Estimating)	-6.7	-14.0
Revision of Estimating methodology to incorporate Multiyear Procurement beginning in FY94 (USAF/USN) and extending through FY97 (Estimating)	-71.0	-195.3
Congressional Appropriations Action withdrawing a portion of FY87 AMRAAM USAF Procurement Funding causing a rephase of the APREP Program investment costs; transferred to the USN for the procurement of an additional USN Destroyer (Estimating)	-12.4	-25.0

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

c. Current Variance Analysis:

	(Dollars in Millions) Base Year	Then Year
(2) PROCUREMENT (continued)		
Revision of the Program Office Estimate to incorporate actual costs accrued to date, & the results of negotiations	139.5	310.5
Revised estimating methodology for Special Tooling/Special Test Equipment (ST/STE) (Estimating)	(+76.1)	(+167.4)
Revised estimate for Production Test requirements based on actuals (Estimating)	(+11.6)	(+24.6)
Revised estimating methodology for Production Activities including technical analysis (Estimating)	(+36.9)	(+86.4)
Revised estimate of the APREP investment costs of the projects and additional flight test requirements for the APREP projects (Estimating)	(+16.2)	(+34.8)
Revised estimate for incorporation of Tech Mod at the AMRAAM Contract Facilities (Estimating)	(-1.3)	(-2.7)
Offset for Current and Prior Year escalation (Support)	-0.3	-0.5
Revision of the estimate for Navy Logistics Support requirements (Support)	4.2	10.4

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 Joint Depot Facility at Alameda, CA (USN facility) (Support)	0.2	-0.1
Revision of the Program Office Peculiar Support Equipment (PSE) estimate incorporating a rephase due to one additional year of Low Rate AMRAAM Production (FY89)	-36.8	-79.8
Revision & rephasing of the Data Requirements to incorporate one additional Low Rate AMRAAM Production Lot (FY89) (Support)	(-10.9)	(-25.5)
Revision & rephase of Training Equipment Requirements incorporating one additional Low Rate AMRAAM Production Lot (FY89) (Support)	(+0.9)	(+2.2)
Revision & rephase of the Containers and Peculiar Support Equipment estimate to incorporate one additional Low Rate AMRAAM Production Lot (FY89) Support)	(-21.0)	(-42.8)
Revision of the Initial Spares estimate incorporating one additional Low Rate AMRAAM Production Lot and rephase of the AMRAAM program (Support)	(-5.8)	(-13.7)

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	
0.473	-0.086	-0.001	0.016	0.016	0.082	0.000	-0.026	0.001	0.474

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

a. RDT&E: NONE.

b. PRODUCTION

AMRAAM (AIM-120A):

	Initial Contract Price		
AMRAAM Low Rate Initial Production (LRIP) Lot II Procurement	Target 312.4	Ceiling N/A	Qty 223*

Hughes Aircraft Company
Missile Systems Division
Canoga Park, CA
F08635-88-C-0093, FFP**
Award: July 15, 1988
Definitization: July 15, 1988

* 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: This is the first SAR submission for this Contract. Target Price includes identified funding of $13.6 million for 12 USN RDT&E missiles, $1.0 million for Interim Contractor Support, and $20.5 million (FMS UK Case) for 11 missiles and associated support.

	Initial Contract Price		
	Target	Ceiling	Qty
Lot I Low Rate Initial Production	279.4	N/A	105

Hughes Aircraft Company
Missile Systems Division
Canoga Park, CA
F08635-87-C-0070, FFP**
Award: October 31, 1987 (Full Go-Ahead)
Definitization: October 31, 1987

** CPR data is not required on Firm Fixed Price (FFP) Contracts

Change Explanation: Target Price increased due to incorporation of the following change proposals and option exercises: Fin Evaluation and Improvement to accommodate the F-15 fuselage environment; exercise for Flight Test support at the three AMRAAM test sites (Pt. Mugu, CA; Eglin Gulf Ranges, FL; White Sands, NM); upgrade of control surface and control section support structures; software upgrades; and miscellaneous small engineering changes.

15. (U) Contract Information (continued):

b. PRODUCTION (continued)

AMRAAM (AIM-120A):

	Initial Contract Price		
AMRAAM Low Rate Initial Production (LRIP) Lot II Procurement	Target 258.9	Ceiling 292.1	Qty 200

Raytheon Company
Bedford, MA
F08635-88-C-0116, FPIF
Award: July 15, 1988 (Full Go-Ahead)
Definitization: July 15, 1988

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
258.9	292.1	200	258.4	258.9

Change Explanation: This is the first SAR submission for this contract. Cost and schedule data will be reported upon completion of the Subsequent Application Review, scheduled for February 1989.

	Initial Contract Price		
AMRAAM Low Rate Initial Production (LRIP) Lot I Procurement	Target 152.8	Ceiling 175.8	Qty 75

Raytheon Company
Bedford, MA
F08635-87-C-0065, FPIF/FFP
Award: October 30, 1987 (Full Go-Ahead)
Definitization: October 30, 1987

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
161.9	186.3	75	156.6	162.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	--	--
Cumulative Variances to Date (Nov 87)	+7.1	-16.9
Net Change	+7.1	-16.9

Change Explanation: This is the first SAR submission for this contract. Cost variance - The cost variance is caused by late labor turn-ons in Level of Effort (LOE) accounts due to the problems discussed in the schedule variance explanation. We expect this false positive trend to reverse as the contract matures and some of the unstarted work is completed. Schedule variance - A Missile Design Reconfiguration (Technical Change Proposal (TCP) 067) caused

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 (continued):
material changes, thus delaying material receipts. These problems, in combination with the Qualification Lot Program slip of ten months has caused Lot I labor turn-ons to be late. The areas most affected to date include Special Test Equipment (STE) reconfiguration and hybrid development and manufacture. Impact to the Contract: We expect that initial deliveries may slip. We are assessing whether there will be a slip in the end delivery date and the contract is expected to exceed the target price at completion.

	Initial Contract Price		
	Target	Ceiling	Qty
Qualification Lot	76.2	89.9	15

Raytheon Company
Bedford, MA
F08635-86-C-0002, FPIF
Award: November 4, 1985
Definitization: June 10, 1986

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
76.4	90.0	15	81.8	82.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-0.6	-3.5
Cumulative Variances to Date (Nov 87)	-9.3	-2.4
Net Change	-8.7	+1.1

Change Explanation: Cost variance - Problems with incomplete/inaccurate documentation from Hughes Aircraft Company (lead contractor) required documentation re-work and re-engineering, thus causing much of the cost variance during the early phases of the contract. As the contract has matured, additional cost variance has accrued due to scrap and re-work of missile hardware. Cost variance is growing worse by $1 million per month. Expect this trend to continue through contract completion which is now forecast for January 1989.

15. (U) Contract Information (continued):

b. PRODUCTION (continued)

Qualification Lot
Raytheon Company
Bedford, MA
F08635-86-C-0002, FPIF (continued)

Change Explanation (continued):
Schedule variance is recovering now that twelve of fifteen missiles have been delivered through December 1988. Expect the remaining three missiles to be delivered in January 1989. Impact to the Contract: The JSPO currently projects a ten (10) month delay of final missile delivery based on the original contract schedule and an unfavorable cost variance at completion of $6.0 million (-8.5%).

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

a. Program Status

(1) Percent Program Completed: 61.9% (13 yrs/21 yrs)

(2) Percent Program Cost Appropriated: 29.9% ($3467.3/$11592.3)

b. Appropriation Summary

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY77-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-97)	Total
RDT&E	1112.2	22.6	28.5	169.0	1332.3
Procurement	2355.1	1050.1	1306.3	5548.6	10260.1
MILCON					0.0
Total	3467.3	1072.7	1334.8	5717.6	11592.4

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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)								
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				55.1	93.8	93.8	78.1	2.8
1987				24.2	42.7	42.7	29.7	2.7
1988				25.3	46.2	40.6	13.4	3.1
1989				7.0	13.3	11.9	0.1	4.0
1990				11.5	22.6	--	--	3.6
1991				14.2	28.5	--	--	3.3
1992				16.2	33.4	--	--	2.8
1993				15.0	31.5	--	--	2.3

* Of the 111 AF/USN total RDT&E Quantity, only Guided Test Vehicles are reported. This includes AMRAAM Air Vehicles Instrumented (AAVIs), AMRAAM Air Vehicles (AAVs), Inspect and Repair as Necessary (IRANs), and Follower GTVs.
** Not Available

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16. (U) 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/Navy)								
1994				13.8	29.5	--	--	1.8
1995				18.8	41.1	--	--	1.8
1996				14.4	32.0	--	--	1.8
1997				0.7	1.5	--	--	1.8
Subtotal	111	**	**	824.1	1332.3	1105.2	1037.5	

* Of the 111 AF/USN total RDT&E Quantity, only Guided Test Vehicles are reported. This includes AMRAAM Air Vehicles Instrumented (AAVIs), AMRAAM Air Vehicles (AAVs), Inspect and Repair as Necessary (IRANs), and Follower GTVs.
** Not Available

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6. (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	--	15.3	--	15.3	27.8	27.8	27.8	8.0
1985	--	37.4	--	37.4	69.8	69.8	60.0	3.4
1986	--	69.3	--	98.1	191.1	191.1	150.1	2.8
1987	180	93.0	185.0	275.8	557.4	524.4	200.2	2.7
1988	400	93.0	233.0	321.6	673.1	516.9	14.7	3.1
1989	900	72.1	307.8	387.2	835.9	276.1	0.0	4.0
1990	1600	102.0	345.3	473.5	1050.1	--	--	3.6
1991	3000	56.3	458.1	575.7	1306.3	--	--	3.3
1992	3000	22.1	424.7	468.9	1084.7	--	--	2.8
1993	3000	13.3	384.8	418.8	986.7	--	--	2.3
1994	3000	11.8	329.6	419.8	1006.6	--	--	1.8
1995	3000	11.8	311.1	401.3	979.5	--	--	1.8
1996	3000	11.7	318.8	315.8	784.8	--	--	1.8
1997	3240	11.7	339.8	279.2	706.3	--	--	1.8
Subtotal	24320	620.8	3638.0	4488.4	10260.1	1606.1	452.8	
Total	24431			5312.5	11592.4	2711.3	1490.3	

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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)								
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				52.6	89.6	89.6	75.4	2.8
1987				21.4	37.7	37.7	27.0	2.7
1988				12.9	23.5	19.0	7.5	3.1
1989				0.0	0.0	0.0	0.0	4.0
1990				7.6	14.9	--	--	3.6
1991				12.4	24.9	--	--	3.3
1992				14.4	29.7	--	--	2.8

* Of the 111 AF/USN total RDT&E Quantity, only Guided Test Vehicles are reported. This includes AMRAAM Air Vehicles Instrumented (AAVIs), AMRAAM Air Vehicles (AAVs), Inspect and Repair as Necessary (IRANs), and Follower GTVs.
* Not Available

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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	29.7	--	--	2.3
1994				13.8	29.5	--	--	1.8
1995				13.7	30.0	--	--	1.8
1996				13.5	30.0	--	--	1.8
1997				0.0	0.0	--	--	1.8
Subtotal	94	**	**	708.6	1157.2	964.0	927.6	

* Of the 111 AF/USN total RDT&E Quantity, only Guided Test Vehicles are reported. This includes AMRAAM Air Vehicles Instrumented (AAVIs), AMRAAM Air Vehicles (AAVs), Inspect and Repair as Necessary (IRANs), and Follower GTVs.
** Not Available

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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)								
1984	--	15.3	--	15.3	27.8	27.8	27.8	8.0
1985	--	37.4	--	37.4	69.8	69.8	60.0	3.4
1986	--	69.3	--	98.1	191.1	191.1	150.1	2.8
1987	180	93.0	185.0	275.8	557.4	524.4	200.2	2.7
1988	400	93.0	233.0	321.6	673.1	516.9	14.7	3.1
1989	874	67.8	297.3	371.1	801.1	268.6	0.0	4.0
1990	1450	94.9	301.0	414.1	918.4	--	--	3.6
1991	2200	41.4	331.0	406.7	922.8	--	--	3.3
1992	1800	12.6	251.3	274.8	635.7	--	--	2.8
1993	1800	6.8	235.8	247.0	581.8	--	--	2.3
1994	1800	5.3	200.1	227.1	544.6	--	--	1.8
1995	1800	5.3	186.0	252.2	615.5	--	--	1.8
1996	1800	5.2	190.6	195.9	486.9	--	--	1.8
1997	3004	5.2	309.2	245.3	620.5	--	--	1.8
Subtotal	17108	552.5	2720.3	3382.4	7646.6	1598.6	452.8	
Total	17202	--	--	4091.0	8803.8	2562.6	1380.4	

UNCLASSIFIED

6. (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)								
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	2.7	2.8
1987				2.8	5.0	5.0	2.7	2.7
1988				12.4	22.7	21.6	5.9	3.1
1989				7.0	13.3	11.9	0.1	4.0
1990				3.9	7.7	--	--	3.6
1991				1.8	3.6	--	--	3.3
1992				1.8	3.7	--	--	2.8
1993				0.9	1.8	--	--	2.3
1994				0.0	0.0	--	--	1.8

* Of the 111 AF/USN total RDT&E Quantity, only Guided Test Vehicles are reported. This includes AMRAAM Air Vehicles Instrumented (AAVIs), AMRAAM Air Vehicles (AAVs), Inspect and Repair as Necessary (IRANs), and Follower GTVs.

* Not Available

UNCLASSIFIED

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				5.1	11.1	--	--	1.8
1996				0.9	2.0	--	--	1.8
1997				0.7	1.5	--	--	1.8
Subtotal	17	**	**	115.5	175.1	141.2	109.9	

* Of the 111 AF/USN total RDT&E Quantity, only Guided Test Vehicles are reported. This includes AMRAAM Air Vehicles Instrumented (AAVIs), AMRAAM Air Vehicles (AAVs), Inspect and Repair as Necessary (IRANs), and Follower GTVs.
** Not Available

UNCLASSIFIED

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	4.3	10.5	16.1	34.8	7.5	0.0	4.0
1990	150	7.1	44.3	59.4	131.7	--	--	3.6
1991	800	14.9	127.1	169.0	383.5	--	--	3.3
1992	1200	9.5	173.4	194.1	449.0	--	--	2.8
1993	1200	6.5	149.0	171.8	404.8	--	--	2.3
1994	1200	6.5	129.5	192.7	462.0	--	--	1.8
1995	1200	6.5	125.1	149.1	364.0	--	--	1.8
1996	1200	6.5	128.2	119.9	297.9	--	--	1.8
1997	236	6.5	30.6	33.9	85.8	--	--	1.8
Subtotal	7212	68.3	917.7	1106.0	2613.5	7.5	0.0	
Total	7229			1221.5	2788.6	148.7	109.9	

17. (U) 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/	196.4 1/	196.4 1/
1988	3000	400	400	400
1989	3000	1270	900	900
1990	3000	2550	1600	1600
1991	3000	2255	3000	3000
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	3240	3240 *

1/ Funded Delivery Period is eleven (11) months

* Current Estimate equals Maximum Economic rate because we are buying up to maximum production.

17. (U) 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$)	5102.3	210.2	5312.5	0.0	5312.5
Prog Acq Cost (TY$)	11199.2	393.2	11592.4	0.0	11592.4
PAUC (BY$)	0.209	0.008	0.217	0.000	0.217
PAUC (TY$)	0.458	0.016	0.474	0.000	0.474

c. Schedule Variance:

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less max)	Maximum Economic
Start Date (Mo/Yr)	12/86 2/	N/A	12/86 2/	N/A	12/86 2/
Duration (in Mos)	164	0	164	0	164
End Date (Mo/Yr)	07/99 3/	N/A	07/99 3/	N/A	07/99 3/

2/ Date of Contract Award: 12/86
3/ Projected Date of Last Delivery: 07/99

d. Deliveries (Plan/Actual):

	To Date
RDTE	99/99
Procurement	11/8

17. (U) Production Rate Data (continued)

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	0.191	0.191
Then-Year $	0.397	0.433	0.433
Navy			
Qty: 7,212			
Peak Rate: 250/mo			
FY78 Base-Year $	0.122	0.137	0.137
Then-Year $	0.315	0.324	0.324

18. Operating and Support Costs

a. N/A
b. N/A

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)	1.0	1.9	3.7	TBD	6.6
Industrial Fund	0	0	0	TBD	0.0
Total	1.0	1.9	3.7	TBD	6.6

SAR-88-054

AF-16 IUS

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

AS OF DATE: DECEMBER 31, 1988

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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)

[redacted]

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)

SAF/PAS

89-0036-T

#13

OASD(PA) DFOISR 88T-0222

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 let 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, therefore,to two separate contract restructures. Four 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. The most recent FSD vehicle launch is described in subparagraph b. below.

In 1983, the program entered into a follow-on production contract. 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, two of those production vehicles have flown DOD payloads successfully to nominal mission altitudes from the Space Shuttle park orbit. On 6 February 1984, the SECAF 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 to produce three IUS vehicles to be delivered in 1988 and 1989. 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.

b. Significant Developments Since Last Report — Since the last SAR report was submitted, there has been one IUS mission. This was the 29 Sep 88 deployment of a NASA TDRS satellite from the Space Shuttle "Discovery", marking an end to the two-and-a-half year standdown period.

The IUS program procured a user-funded IUS in a stand-alone buy of one vehicle. The contract was awarded to Boeing Aerospace in FY88. 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.

The Inertial Upper Stage system is expected to satisfy mission requirements.

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

8. Threshold Breaches: There are currently no DCP (dated 29 March 1978) 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.)	N/A	Mar 78
Development Contract Award	N/A	Mar 78
Engine Qualification Test		
(1) Titan Configured	N/A	Oct 82
(2) STS Configured	N/A	Jan 83
First Flight Vehicles		
(1) Titan Configured	N/A	Oct 82
(2) STS Configured	N/A	Mar 83
First Production Contract Award	N/A	Jan 83
Initial Launch Capability (ILC)*		
(1) Titan Configured	N/A	Oct 82
(2) STS Configured	N/A	Apr 83
Delivery of First Production Contract Vehicle	N/A	Jun 84
Awarded Follow-On Production Contract	N/A	Jul 85
Change Proposal to Contract (Add 1 Vehicle)	N/A	Aug 88
Award Follow-on Launch Contract	N/A	Jul 90
Delivered Last Production Vehicle	N/A	Feb 91

*ILC is defined as the first IUS launch of each configuration.

9. Schedule (Cont'd)

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 approved DAE 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	99.3
(2) Space Shuttle	96	N/A	75 (Ch-1)	98.5
(3) Titan IV	96	N/A	N/A	99.3
Accuracies				
(1) GSO Position (NM)	+/-92	N/A	+/-9.9(Ch-1)	+/-91
(2) GSO Velocity (ft/s)	+/-78	N/A	+/-7.8	+/-38
(3) GSO Inclination (Degrees)	+/-0.12	N/A	+/-.097(Ch-1)	+/-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)(Ch-2)	5,300	N/A	N/A	5,282 (Ch-2)

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 67%

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

c. Previous Change Explanations (Cont'd) —

demonstrated performance for the STS reflected two-thirds of the mission 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. Demonstrated performance figures are not included because the Titan IV has yet to fly. 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 to 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 —

(Ch-1): Reflects demonstrated performance.

(Ch-2): This is the current calculated payload to GSO. The park orbit was changed to optimize performance at this new weight.

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	$426.9	$426.9
Procurement	533.6	395.0	395.0
Flyaway	(437.0)	(305.5)	(305.5)
Other	(96.6)	(89.5)	(89.5)
Initial Spares	(-)	(-)	(-)
Construction (MILCON)	5.2	4.6	4.6
Total FY 75 Base-Year $	$963.0	$826.5	$826.5
Escalation	1049.3	806.4	806.4
Development (RDT&E)	(269.0)	(268.2)	(268.2)
Procurement	(777.2)	(535.5)	(535.5)
Construction (MILCON)	(3.1)	(2.7)	(2.7)
Total Then-Year $	$2012.3	$1632.9	$1632.9
b. Quantities —			
Development (RDT&E)	1	1	1
Procurement	17	10	10
Total	18	11	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: FY1990-91 President's Budget.

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	1632.9	1355.6	1632.9
(2) Quantity	11	8	11
(3) Unit Cost	148.445	169.450	148.445
b. Current Procurement —	(FY 1989)	(FY 1989 APPN)*	(FY 1990)
(1) Cost	0.0	0.0	26.7
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	0.0	0.0	26.7
(2) Quantity	0	0	0
(3) Unit Cost	N/A	N/A	N/A

*Differs from the 1987 SAR to reflect the FY1989 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	693.2	1310.8	8.3	2012.3
Previous Changes:				
Economic	-2.9	-14.7	-	-17.6
Quantity	-	-675.5	-	-675.5
Schedule	-	-	-	-
Engineering	+42.7	+3.6	-	+46.3
Estimating	-24.0	+17.7	-1.0	- 7.3
Other	-	-	-	-
Support	+8.1	-10.7	-	-2.6
Subtotal	+23.9	-679.6	-1.0	-656.7
Current Changes:				
Economic	-0.3	+1.4	-	+1.1
Quantity	-	+186.2	-	+186.2
Schedule	-	-	-	-
Engineering	-	+63.2	-	+63.2
Estimating	-21.7	+60.0	-	+38.3
Other	-	-	-	-
Support	-	-11.5	-	-11.5
Subtotal	-22.0	+299.3	-	+277.3
Total Changes	+1.9	-380.3	-1.0	-379.4
Current Estimate	695.1	930.5	7.3	1632.9

(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	-	-241.4	-	-241.4
Schedule	-	-	-	-
Engineering	+18.6	+1.5	-	+20.1
Estimating	-8.9	+1.6	-0.6	-7.9
Other	-	-	-	-
Support	+3.2	-2.7	-	+0.5
Subtotal	+12.9	-241.0	-0.6	-228.7
Current Changes:				
Quantity	-	+63.6	-	+63.6
Schedule	-	-	-	-
Engineering	-	+21.5	-	+21.5
Estimating	-10.2	+21.7	-	+11.5
Other	-	-	-	-
Support	-	-4.4	-	-4.4
Subtotal	-10.2	+102.4	-	+92.2
Total Changes	+2.7	-138.6	-0.6	-136.5
Current Estimate	426.9	395.0	4.6	826.5

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.

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.

Engineering: Engineering changes associated with ten deleted vehicles.

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.

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.

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	-0.3
Adjustment for current and prior year escalation. (Estimating)	+0.0	+0.2
Re-estimated IUS development costs due to standdown. (Estimating)	-0.8	-1.9

13. Cost Variance Analysis (Cont'd)

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

	(Dollars in Millions) Base-Year $	Then-Year $
Budget Authority Withdrawn	-12.5	-28.5
Unable to accomplish development for upgraded IUS. (Estimating)	(-8.0)	(-17.8)
Unable to develop new batteries and computers in the near future. (Estimating)	(-4.5)	(-10.7)
Re-estimated development costs for software and hardware associated with three new vehicles. (Estimating)	+3.1	+8.5
(2) Procurement		
Revised economic escalation indices. (Economic)	N/A	+1.4
Addition of three vehicles.	+76.1	+221.9
Three additional vehicles. (Quantity)	(+63.6)	(+186.2)
Requalification of vendors. (Estimating)	(+12.5)	(+35.7)
IUS Useful Life Extension Program (Engineering)	+6.9	+20.3
Solid Rocket Motor Unit Upgrade (Engineering)	+14.6	+42.9
Adjustment for current and prior year escalation. (Estimating)	-0.4	-1.2
Re-estimated costs of upgrading and replacing aging vehicle hardware. (Estimating)	+8.8	+24.5
Re-estimated Space Launch Recovery costs. (Estimating)	-1.1	-2.8
Miscategorized FY86 funds associated with IUS. (Estimating)	+5.0	+12.1
Congressional Appropriation decreased budget request (Estimating)	-7.5	-19.8
Unable to replace aging hardware in the near future. (Estimating)	(-3.1)	(-8.3)
Unable to upgrade the Systems Integration Laboratory (SIL). (Support)	(-4.4)	(-11.5)

(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	Total	
111.794	-1.500	+26.660	-	+9.955	+2.818	-	-1.282	+36.651	148.445

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

Current Contract Price			
Target	Ceiling	Qty	
347.2	366.2	6	1/

Estimated Price At Completion	
Contractor	Program Manager
329.8	330.2

1/ Of the six vehicles on contract, five are program office funded and one is user funded.

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-2.6	-1.1
Cumulative Variances To Date (10/27/88)	-3.0	-0.6
Net Change	-0.4	+0.5

Explanation of Change:

Cost Variance - Indirect contractor costs are responsible. Various resource pools have higher rates and are using more hours than expected. The G&A pool is also contributing with higher rates than originally planned.

Schedule Variance - Delay in aft Airborne Support Equipment spreader beam cover assembly.

No impact to program or contract.

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

b. Procurement (Cont'd) —

IUS Vehicle:
Boeing Aerospace Company, 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
842.4	909.5	11 1/	844.6	859.2

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. Furthermore, only six of the vehicles are program office funded.

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-4.7	-27.9
Cumulative Variances To Date (11/24/88)	-19.7	-64.9
Net Change	-15.0	-37.0

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 McDonnell Douglas, a greater use of production material than planned, and manufacturing problems at Boeing Electronic Co. (BECo).

Schedule Variance - Several sub-contractors are late delivering various procured parts. Chemical Systems Division (CSD) is behind their shipping schedule for motors, Thrust Vector Control (TVC) actuators, potentiometers and controllers, and is behind schedule with their Aft Frame Tilt Actuators (AFTA) refurbishment and acceptance tests. Technical difficulties at Delco have delayed shipment of computers to Boeing.

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: 73.7% (14 yrs/ 19 yrs)

(2) Percent Program Cost Appropriated: 77.5%($1265.5/$ 1632.9)

b. Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY76-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-94)	Total
RDT&E	669.7	9.4	3.8	12.2	695.1
Procurement	588.5	26.7	20.1	295.2	930.5
MILCON	7.3	-	-	-	7.3
Total	1265.5	36.1	23.9	307.4	1632.9

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	30.1	3.4
1986				5.3	11.1	11.1	8.7	2.8
1987				3.6	7.7	7.7	3.8	2.7
1988				1.7	3.9	3.8	2.2	3.1
1989				4.1	9.5	0.0	0.0	4.0
1990				3.9	9.4			3.6
1991				1.5	3.8			3.3
1992				1.5	3.9			2.8
1993				1.5	4.0			2.3
1994				1.6	4.3			1.8
Subtotal	1			426.9	695.1	660.1	650.9	

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	57.7	8.0
1985			--	38.8	90.0	90.0	32.8	3.4
1986	3		81.2	43.1	104.3	98.5	55.7	2.8
1987			--	2.8	7.0	7.0	2.3	2.7
1988			--	16.0	41.6	13.9	10.5	3.1
1989			--	0.0	0.0	0.0	0.0	4.0
1990			--	9.7	26.7			3.6
1991			--	7.1	20.1			3.3
1992			--	29.3	84.4			2.8
1993	3		131.0	60.1	175.9			2.3
1994			--	11.7	34.9			1.8
Subtotal	10		305.5	395.0	930.5	544.0	431.2	
Appropriation: MILCON								
1979	--	--	--	4.6	7.3	7.3	7.3	9.6
Subtotal				4.6	7.3	7.3	7.3	
Total	11			826.5	1632.9	1211.4	1089.4	

17. Production Rate Data:

No report. Production less than six per year.

18. Operating and Support Costs:

a. N/A

b. N/A

c. Contractor Support Costs - N/A

AF-20 LANTIRN

SAR-88-068

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

PROGRAM: LANTIRN

AS OF DATE: December 31, 1988

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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

89-0036-T

OASD(PA) DFOISR 89-T-0286 #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 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

7. Program Highlights (Cont'd):

schedule. The LANTIRN system (navigation and target Pods) undervent Follow-on Test and 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.

b. Significant Developments Since Last Report: On time deliveries of eight production navigation pods and two production targeting pods. First operational demonstration sorties on the F-15E aircraft. Authorization to enter targeting pod full-rate production. FY89 Option for 240 navigation pods, 231 targeting pods and seven 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.

The LANTIRN system is expected to satisfy the mission requirement.

c. Changes since "As Of" Date: None.

8. Threshold Breaches: The Navigation Pod IOC changed from FY89 to FY90 and the Targeting Pod IOC changed from FY90 to FY91. The FSC Maximum Total Weight changed from 990 to 980 lbs.

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/Sep 81	Sep 81
5. HUD F-16 Flight Test Complete	Dec 82/Dec 82	Dec 82
6. HUD A-10 Flight Test Complete	Dec 82/NA	Dec 82
7. HUD F-16 Production Decision	Jan 83/Dec 84	Dec 84
8. HUD A-10 Production Decision	May 83/NA	
9. First FSD Navigation Pod Delivery	Feb 83/Feb 83	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
15. Navigation Pod		Sep 85
16. Targeting Pod		Mar 86
17. Production Decision	Feb 85/	
18. Navigation Pod	Mar 85	Mar 85
19. Targeting Pod	May 86	May 86
20. FCS F-15E Flight Test Complete	May 88/NA	Mar 89
21. FCS A-10 Flight Test Complete	Sep 87/NA	
22. First FCS Production Delivery	Aug 87/NA	
23. Navigation Pod	Mar 87	Mar 87
24. Targeting Pod	Jul 88	Jun 88 (CH-1)

9. Schedule (Cont'd):

25.	IOC	TBD/	
26.	Navigation Pod	/FY89	Sep 90
27.	Targeting Pod	/FY90	Sep 91

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 testing 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.

c. Current Change Explanations --

(CH-1) Updated to reflect actual delivery one month early.

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 approved 9 February 1988. by SAF/AQ.

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 (CH-1)
Display Contrast (Ratio)	1.20	NA	1.38	NA (CH-1)
MTBF (Hours)				
Mature Requirement		NA	NA	NA (CH-1)
A-10	250	NA	NA	NA (CH-1)
F-16	250	NA	NA	NA (CH-1)
Field Projections				
Interim Goal (End of DT&E/IOT&E)	31	NA	40	NA (CH-1)
Mature Requirement (10,000 Hrs)	125	NA	NA	NA (CH-1)
Weight (Lbs)				
A-10	95	NA	95	NA (CH-1)
F-16	82	NA	80	NA (CH-1)
FCS				
Maximum Total Weight (lbs)	985	900/900	1018	980 (Lot 3) (CH-2)
Maximum Total AC Power (kilovolt amperes)	10.8	14.8/14.8	14.8	14.8
MTBF				
FCS:				
Mature Requirement	50	NA	NA	NA(CH-1)
Field Projection				
Interim Threshold (end DT&E/IOT&E)	9	NA	NA	NA(CH-1)
Mature Requirement (10,000 hrs)	34	NA	NA	NA(CH-1)
Navigation Pod:				
Lab Lower Test Limit-Mature Reqmt	73	NA	NA	NA(CH-1)
Field Projection Interim Threshold (end DT&E/IOT&E)	13.2	NA	11.2	NA(CH-1)
Mature Requirement (10,000 hrs)	50	NA	NA	NA(CH-1)
Targeting Pod:				
Lab Lower Test Limit-Mature Rqmt	159	NA	NA	NA(CH-1)
Field Projection Interim Threshold (end DT&E/IOT&E)	28.5	NA	40.1	NA(CH-1)
Mature Threshold (10,000 hrs)	108	NA	NA	NA(CH-1)
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 (CH-1)
Vertical	20	NA	20	NA (CH-1)
Instantaneous Field of View				
Horizontal	25	NA	30	NA (CH-1)
Head Down Display (HDD)				
Targeting sensor FLIR field of view (FOV) (Degrees)				
Wide FOV (WFOV)				
Horizontal	8	NA	6	6 (CH-1)
Vertical	8	NA	6	6 (CH-1)
Narrow FOV (NFOV)				
Horizontal	1.7	NA	1.7	1.7 (CH-1)
Vertical	1.7	NA	1.7	1.7 (CH-1)
Navigation sensor video visual display of terrain on aircraft HUD				
WFOV Forward Looking Infrared				
Horizontal	28	NA	28	28 (CH-1)
Vertical	21	NA	21	21 (CH-1)
FCS				
Terrain Following				
Altitude (Ft Manual)	200	NA	200	200
Maneuvering flight				
Maximum aircraft Speed (MACH)	NA	NA	.85	.85 (CH-1)
Degree of Bank	NA	NA	60	60 (CH-1)
Navigation Capability Under the weather				
Day	NA	NA	Yes	Yes (CH-1)
Night	NA	NA	Yes	Yes (CH-1)
Terrain Avoidance (vertical plane only)				
In Clouds	NA	NA	Yes	Yes (CH-1)
Hourly rainfall (mm/Hr)	NA	NA	10	10 (CH-1)

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 interdiction type target and an atmospheric transmissivity of 0.45 per 4KM (Nautical Miles)	NA	NA	4	4	(CH-1)
LANTIRN Laser Guided Bomb (LGB) Successful LANTIRN system performance (IP to impact not counting bomb performance) (Percent)	NA	NA	50	50	(CH-1)
Automatic IR Maverick Handoffs per pass	NA	.1/1	2	2	
Automatic Handoff single Maverick launch on 1st pass (Percent)	NA	NA	75	75	(CH-1)
LANTIRN unguided toss Conventional toss accuracy with targeting pod cuing. Improved over Aircraft baseline without LANTIRN	NA		Yes	Yes	(CH-1)
Multi-aircraft compatibility					
System operability with:					
F-15E (with CFTs)	NA	NA	Yes	Yes	(CH-1)
F-16C/D Block 40/42	NA	NA	Yes	Yes	(CH-1)
Reliability/Maintainability (standard terminology for AFR 80-5)					
MTBM - Type 1 (mature system - 10.000 operational flight hours)	NA	NA	21.4*	34	(CH-1)
Fully Mission Capable (FMC) (Percent)	NA	NA	63	80	(CH-1)
Weapon system reliability (Percent)	NA	NA	88	95	(CH-1)
Mean corrective time (O-Level) - Minutes	NA	NA		20	(CH-1)

* 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 (CH-1)
by SRU replacement in targeting pod, nose section, or R&R of wiring harness	NA	NA.		3.5 (CH-1)
all other	NA	NA.		4.0 (CH-1)
LRU maintenance	NA	NA		2.0 (CH-1)
Built-in-test of mission-critical fault identification on flight line (Percent)	NA	NA		95 (CH-1)

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.

d. Current Change explanations --

(CH-1) Not previously reported.

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-Q0023(1)/63249F, 21 Dec 79.

APPROVED PROGRAM: DAE baseline approved 9 February 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	402.7
Procurement	1681.7	2026.6	2026.6
Pod Sets	(1297.9)	(1578.0)	(1578.0)
Total Flyaway	(1297.9)	(1578.0)	(1578.0)
Other Weapon System Cost	(311.7)	(355.1)	(355.1)
Initial Spares & Repair Parts	(72.1)	(93.5)	(93.5)
Construction (MILCON)	--	--	--
Total FY80 Base-Year $	$2102.1	$2429.3	$2429.3
Escalation	1721.1	1601.1	1601.1
Development (RDT&E)	(128.5)	(124.1)	(124.1)
Procurement	(1592.6)	(1477.0)	(1477.0)
Construction (MILCON)	--	--	--
Total Then-Year $	$3823.2	$4030.4	$4030.4
b. Quantities * --			
Development (RDT&E)	12	12	12
Procurement	1316	1256	1256
Total	1328	1268	1268

c. Foreign Military Sales -- Commitments to date are for 20 targeting pods for Israel for a total of $62.5 million.

d. Nuclear Costs -- None.

e. References --

* Note: Quantities include navigation and targeting pods; the term "pod set" used elsewhere in the report is composed of one navigation and one targeting pod.

11. Program Acquisition Cost (Cont'd):

DEVELOPMENT ESTIMATE: Secretary of the Air Force Review, 18 Nov 82. Original PMD R-00023(1)/63249F, 21 Dec 79.

APPROVED PROGRAM: ACQUISITION PROGRAM BASELINE (APB) approved 2 Aug 88 by SAF/AQ.

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
	(1) Cost	$4030.4	$4122.7	$4030.4
	(2) Quantity	1268	1412	1268
	(3) Unit Cost	3.179	2.920	3.179
b.	Current Procurement —	(FY 1989)	(FY 1989)*	(FY 1990)
	(1) Cost	721.5	721.5	362.2
	Less CY Adv Proc	0.0	0.0	0.0
	Plus PY Adv Proc	0.0	0.0	0.0
	Net Total	721.5	721.5	362.2
	(2) Quantity	471	471	224
	(3) Unit Cost	1.532	1.532	1.617

* Adjusted to reflect FY89 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	-346.7	—	-359.6
Quantity	—	+71.4	—	+71.4
Schedule	+28.5	+4.3	—	+32.8
Engineering	-67.7	+40.7	—	-27.0
Estimating	+14.0	+420.4	—	+434.4
Other	—	—	—	—
Support	+18.0	+129.5	—	+147.5
Subtotal	-20.1	+319.6	—	+299.5
Current Changes:				
Economic	—	-15.9	—	-15.9
Quantity	—	-97.2	—	-97.2
Schedule	—	—	—	—
Engineering	—	-0.7	—	-0.7
Estimating	-2.0	+39.2	—	+37.2
Other	—	—	—	—
Support	—	-15.7	—	-15.7
Subtotal	-2.0	-90.3	—	-92.3
Total Changes	-22.1	+229.3	—	+207.2
Current Estimate	526.8	3503.6	—	4030.4

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	--	+35.4	--	+35.4
Schedule	+19.8	--	--	+19.8
Engineering	-49.0	+20.1	--	-28.9
Estimating	+3.4	+256.3	--	+259.7
Other	--	--	--	--
Support	+9.3	+73.0	--	+82.3
Subtotal	-16.5	+384.8	--	+368.3
Current Changes:				--
Quantity	--	-53.2	--	-53.2
Schedule	--	--	--	--
Engineering	--	-0.4	--	-0.4
Estimating	-1.2	+21.9	--	+20.7
Other	--	--	--	--
Support	--	-8.2	--	-8.2
Subtotal	-1.2	-39.9	--	-41.1
Total Changes	-17.7	+344.9	--	+327.2
Current Estimate	402.7	2026.6	--	2429.3

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 658 to 700 (1316 pods to 1400 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
Reduction in FY88 funding caused reduction of flight testing (Estimating)	-0.3	-0.5
Elimination of FY91 funding caused cancellation of all RDT&E efforts (Estimating)	-0.9	-1.5

13. Cost Variance Analysis (Cont'd):

(2) Procurement	(Dollars in Millions) Base-Year	Then-Year
Revised economic escalation indices (Economic)	N/A	-15.9
Quantity decrease of 72 pod sets	-59.7	-109.0
Decrease of 72 Pod Sets (Quantity)	(-53.2)	(-97.2)
Engineering changes applicable to decrease of 72 pod sets (Engineering)	(-0.4)	(-0.7)
Estimating changes applicable to decrease of 72 pod sets (Estimating)	(-6.1)	(-11.1)
Adjustment for current and prior year escalation (Estimating)	+5.3	+9.1
Reestimate of ECO requirements (Estimating)	+4.6	+9.0
Correction of Flyaway - Pod Data Costs were previously in PSE costs (Estimating)	+18.1	+32.2
Reestimate of Other Government Costs due to increases for software, quality, manufacturing and flight test support (Support)	+15.3	+28.2
Quantity decrease of 3 sets of Support Equipment (Support)	-15.2	-27.2
Correction of PSE requirements to delete Pod Data that should have been in Flyaway (Support)	-18.1	-32.2
Reestimate of PSE requirements for decrease in tooling costs (Support)	-11.0	-17.2
Reestimate of Depot Requirements due to increases for repair equipment, AISF software and quality/efficiency initiatives (Support)	+9.3	+13.4
Reestimate of Initial Spares requirements (Support)	+9.5	+16.0
Adjustment for current and prior year escalation for Support Equipment (Support)	+2.0	+3.3

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	
2.879	-.296	+.115	+.026	-.021	+.372	--	+.104	+.300	3.179

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

a. RDT&E -- Pods:

Initial Contract Price		
Target	Ceiling	Qty
$94.0	N/A	12 Pods

Martin-Marietta Corporation
P.O. Box 5837
Orlando, FL 32855
Contract F33657-80-C-0441
Award: FFP, September 1980
(Pire Control System)

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
$ 87.3	N/A	2 Pods

Martin-Marietta Corporation
P.O. Box 5837
Orlando, FL 32855
Contract F33657-84-C-0004
Award: FFP, April 1985
(Pod Prod & Support Equipment)

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Quantity	Contractor	Program Manager
$2620.7	N/A	882 Pods 29 Support Equipment	$3331.7	$3331.7

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

a. Program Status --

(1) Percent Program Completed: 84.6% (11 years/13 years)

(2) Percent Program Cost Appropriated: 84.0% ($3386.8/$4030.4)

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

Appn	Current & Prior Yrs (FY79-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (N/A)	Total
RDT&E	523.3	3.5	0.0	--	526.8
Procurement	2863.5	362.2	277.9	--	3503.6
MILCON	0.0	0.0	0.0	--	0.0
Total	3386.8	365.7	277.9	--	4030.4

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: 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				25.5	37.9	37.9	24.3	2.7
1988				12.5	19.3	18.4	8.3	3.1
1989				3.0	4.7	0.2	0.2	4.0
1990				2.2	3.5	--	--	3.6
SUBTOTAL	6/6			402.7	526.8	517.9	494.2	

* Reflects Program Office records as of 5 Jan 89.

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	31.3	25.3	57.4	90.0	90.0	89.4	3.4
1986	7/2	105.9	100.6	263.0	423.8	423.9	349.3	2.8
1987	143/7	114.4	228.7	480.3	802.1	802.1	364.8	2.7
1988	169/81	41.3	273.0	474.0	820.0	778.8	67.2	3.1
1989	240/231	16.0	313.0	403.5	721.5	661.3	0.0	4.0
1990	67/157	13.0	169.5	196.7	362.2	--	--	3.6
1991	0/150	2.7	138.7	147.3	277.9	--	--	3.3
Sub-Total	628/628	329.0	1248.8	2026.6	3503.6	2762.1	876.7	
TOTAL	634/634	329.0	1248.8	2429.3	4030.4	3280.0	1370.9	

* Reflects Program Office records as of 5 Jan 89.

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	161/209	161/209
1991	N/A	N/A/238	N/A/180	N/A /180

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	+327.2	2429.3	0	2429.3
(TY $)	4108.6	+207.2	4030.4	0	4030.4
PAUC(BY $)	1.741	+.333	1.916	0	1.916
(TY $)	2.916	+.300	3.179	0	3.179

* 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	5	9
91	0	10

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)	90/89	0	90/89	0	90/89
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	8/8	2/2

e. Approved Design to Cost Goal -- N/A.

18. Operating 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)	3.5	5.6	7.0	TBD	16.1
Industrial Fund	0	0	0	TBD	0.0
Total	3.5	5.6	7.0	TBD	16.1

① N-1 A6E/A-6

SAR-88-084

UNCLASSIFIED

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823) (U)
PROGRAM: A-6E/A-6 UPGRADE

AS OF DATE: 31 DECEMBER 1988

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[redacted]

DESIGNATION/NOMENCLATURE (POPULAR NAME):
A-6E LONG RANGE ALL-WEATHER (DAY/NIGHT) CARRIER ATTACK AIRCRAFT (INTRUDER)

2. DOD COMPONENT: U. S. NAVY

3. RESPONSIBLE OFFICE AND TELEPHONE NUMBER:
NAVAL AIR SYSTEMS COMMAND
WASHINGTON, DC 20361-1234

PROGRAM MANAGER: CAPT M. KEARNEY
ASSIGNED: 04 AUG 1987
TELEPHONE: (202) 692-8083

4. PROGRAM ELEMENTS:
RDT&E: 0603257N, 0204134N
PROCUREMENT: 0204134N, 0206112M APPN: 1506 ICN 011000
051001

MILCON: 0204696N

5. RELATED PROGRAMS: EA-6, F-14, AV-8B, F/A-18 and E-2



UNCLASSIFIED

OASD(PA) DFOISR 89-T-0592

SSION AND DESCRIPTION:

Mission: The A-6 mission is the destruction, in all weather conditions and during darkness, of both moving and fixed sea and land targets, especially at low-level and in direct support of ground operations.

Description: The A-6E is the Navy's only all weather attack aircraft. Its avionics include a micro-miniaturized digital computer, a solid state weapon release system, a single integrated track and search radar, a Carrier Airborne Inertial Navigation System (CAINS) and a Communication, Navigation and Identification System (CNI). The A-6E is powered by two (2) J52-P-8B engines. An added capability, Target Recognition Attack Multisensor (TRAM), has been procured since FY 1976. This major subsystem of the A-6E is procured under a multiyear production contract and includes an infrared sensor, laser ranger/designator and laser receiver. It provides for delivery of laser guided weapons and increased night and passive surveillance and identification capability. The aircraft is a long range, twin-jet, carrier-based, attack aircraft capable of very accurate navigation and delivery of nuclear and non-nuclear weapons from its five external store stations.

7. PROGRAM HIGHLIGHTS

a. Significant Historical Developments - In 1984 an upgraded version of the A-6E, identified as the A-6F was approved. In 1988 the A-6F was restructured into the A-6G due to fiscal constraints. The A-6G incorporated improvements in reliability, performance, and survivability through improved avionics, propulsion, and airframe safety features. It retained or enhanced all the operational capabilities of the A-6E, but incorporated the following improvements: a high resolution radar for improved stand-off targeting, higher thrust engines, modern integrated digital avionics, a new Night Attack Navigation System (NANS), and minor airframe changes. In December 1988, the A-6G was excluded from the FY-90/91 President's Budget and is now in the process of termination.

Boeing Military Airplane Company was awarded a competitive contract to develop a new composite material wing for installation into existing A-6E aircraft and subsequent production A-6E aircraft produced by Grumman Aerospace Corporation, beginning with the Navy's FY 1987 buy. The contract is firm fixed price throughout and is structured in a series of options, designed to be exercised at certain times. The program is structured into these basic categories of work: (1) Design, Fabrication and Qualification (DFQ) to develop and prove, through hardware testing, adequacy of the design; (2) production to fabricate and assemble wing kits, and (3) installation of some composite wing kits into existing A-6E aircraft. The contract was initiated by Government invitation for bids. Two submissions were received. The award will result in a more reliable and maintainable A-6 replacement wing with a service life of 8,800 reliable hours, an improvement of 4800 hours over the FY 1986 wing warranty.

Initial funding for this replacement wing was a $240 million FY 1985 Supplemental Appropriations Bill which was composed of FY 1985 and prior fiscal years aircraft procurement funding. Production wings are scheduled for delivery November 1988 through the July 1991 timeframe.

b. Significant Developments Since Last Report

(1) A-6E SWIP - The A-6E System Weapons Integration Program (SWIP) completed OPEVAL in March 1988. This block upgrade to the A-6 includes HARM, HARPOON IC, LASER and INFRARED MAVERICK and provisions for future stand off weapons. Initial Operational Capability (IOC) was third quarter FY 1988.

(2) A-6G program was excluded from the FY 90/91 President's Budget and is now in the process of termination.

(3) Due to termination of A-6G, this submission is a FINAL SAR since the A-6E has met 90% delivered requirement.

c. Changes since "As Of" Date: None

8. THRESHOLD BREACHES: There are currently no DAE baseline breaches.

9. SCHEDULE

a. Milestones

	PROD EST	APPROVED PROGRAM	CURRENT ESTIMATE
A-6E			
Contract Executed (Prototype)	Aug 69	N/A	Aug 69
First Flight (Prototype A/C)	Mar 70	N/A	Mar 70
NPE (begin/end)	Apr-May 71	N/A	Apr-May 71
First Production Contract Executed	Dec 70	N/A	Dec 70
First Flight (Production A/C)	Jul 71	N/A	Jul 71
Acceptance Flight Production A/C	Sep 71	N/A	Sep 71
BIS (begin/end)	Sep 71	N/A	Sep 71/Jan 72
Fleet Introduction - LANT, CRAW	Dec 71	N/A	Dec 71
Navy Support Date	Sep 71	N/A	Sep 71
First Deployment	Sep 72	N/A	Sep 72
A-6E TRAM			
Development Contract	Jun 72	N/A	Jun 72
Design Completion	May 73	N/A	May 73
Pilot Production Deliveries (begin/end)	Apr 76	N/A	Apr 76
IOT&E Completion	Jun 76	N/A	Jun 76
Production Go-Ahead (Limited)	Jul 76	N/A	Jul 76
Production Go-Ahead (Full)	Nov 79	N/A	Nov 79
First Aircraft Delivery - FULL TRAM	Sep 79	N/A	Sep 79
IOC	Dec 79	N/A	Dec 79

9. Milestones (Con't)

	PROD EST	APPROVED PROGRAM	CURRENT ESTIMATE
A-6F			
Development Contract	Jul 84	N/A	Jul 84
Limited Production	Jul 88	N/A	N/A
Full Production	Jul 90	N/A	N/A
Initial Operational Capability (IOC)	1991	N/A	N/A
A-6G			
Development Contract	N/A	N/A	N/A CH-1
Limited Production	N/A	N/A	N/A
Full Production	N/A	N/A	N/A
IOC	N/A	N/A	N/A

b. Previous Change Explanation: None.

c. Current Change Explanation: CH-1 - The A-6G was excluded from the FY-90/91 President's Budget and is in the process of termination.

d. References: Production Estimate: OSD PBD of 1 Dec 1970
SECNAV memo of 6 Jul 1983

Approved Program: No DAE baseline has been approved for this program.

10. TECHNICAL/OPERATIONAL CHARACTERISTICS:

a. Technical/Operational

	PROD EST	APPROVED PROGRAM GOAL/THRESHOLD	DEMON-STRATED PERF	CURRENT ESTIMATE
A-6E				
Long Range Strike Store Delivery 4-300 Gal Tanks +1 MK 43				

a. TECHNICAL/OPERATIONAL CHARACTERISTICS (CON'T):

	PROD EST	APPROVED PROGRAM GOAL/THRESHOLD	DEMON-STRATED PERF	CURRENT ESTIMATE
Takeoff Weight lb.	53,863	N/A / N/A	53,863	53,863
Length/Span	54'7"/53'0"	N/A / N/A	54'7"/53'0"	54'7"/53'0"
Height/Height Folded	16'3"/21'11"/	N/A / N/A	16'3"/21'11"	16'3"/21'11"
Engine No./Type	2/J-52-P-8A/B	N/A / N/A	2/J-52-P-8A/B	2/J-52-P-8A/B
Crew	2	N/A / N/A	2	2
Combat Speed/Alt	563 kts/SL	N/A / N/A	563 kts/SL	563 kts/SL
Combat Ceiling	41,000'	N/A / N/A	41,000'	41,000'
Rad/Mission Time	864nm/4.82hrs	N/A / N/A	864nm/4.82hrs	864nm/4.82hrs
Spd Max @ SL Stores Retained	563 kts	N/A / N/A	563 kts	563 kts
Mine Warfare				
4 MK 56 Mines				
+1-300 Gal Tank				
Takeoff Weight lb	54,759	N/A / N/A	54,759	54,759
[illegible]h/Span	54'7"/53'0"	N/A / N/A	54'7"/53'0"	54'7"/53'0"
[illegible]t/Height Folded	16'3"/21'11"/	N/A / N/A	16'3"/21'11"	16'3"/21'11"
Engine No./Type	2/J-52-P-8A/B	N/A / N/A	2/J-52-P-8A/B	2/J-52-P-8A/B
Crew	2	N/A / N/A	2	2
Combat Speed/Alt	429kts/15,000'	N/A / N/A	429kts/15,000'	429kts/15,000'
Combat Ceiling	26,000'	N/A / N/A	26,000'	26,000'
Rad/Mission Time	461nm/3.1hrs	N/A / N/A	461nm/3.1hrs	461nm/3.1hrs
Spd Max @ SL Stores Retained	407 kts	N/A / N/A	407 kts	407 kts
Close Support				
28 MK-81 SNAKEYE BOMBS				
Takeoff Weight lb	52,520	N/A / N/A	52,520	52,520
Length/Span	54'7"/53'0"	N/A / N/A	54'7"/53'0"	54'7"/53'0"
Height/Height Folded	16'3"/21'11"	N/A / N/A	16'3"/21'11"	16'3"/21'11"
Engine No./Type	2/J-52-P-8A/B	N/A / N/A	2/J-52-P-8A/B	2/J-52-P-8A/B
Crew	2	N/A / N/A	2	2
Combat Speed/Alt	502kts/5,000'	N/A / N/A	502kts/5,000'	502kts/5,000'
Combat Ceiling	37,500'	N/A / N/A	37,500'	37,500'
Rad/Mission Time	383nm/2.09hrs	N/A / N/A	383nm/2.09hrs	383nm/2.09hrs
[illegible]d Max @ SL Stores [illegible]ained	504 kts	N/A / N/A	504 kts	504 kts

	PROD EST	APPROVED PROGRAM GOAL/THRESHOLD	DEMON-STRATED PERF	CURRENT ESTIMATE
A-6F				
Long Range Strike 3-300 Gal Tank 2 MK 84 LGDB 2 Sidewinders				
Takeoff Weight lb	58,260	N/A / N/A	N/A	N/A
Length/Span	54'7"/53'0"	N/A / N/A	54'7"/53'0"	N/A
Height/Height Folded	16'3"/21'11"	N/A / N/A	16'3"/21'11"	N/A
Engine No./Type	2/GE 404-400D	N/A / N/A	2/GE 404-400D	N/A
Crew	2	N/A / N/A	2	N/A
Combat Speed/Alt	563/SL	N/A / N/A	N/A	N/A
Combat Ceiling	38,740'	N/A / N/A	N/A	N/A
Mission Radius	610 nm	N/A / N/A	N/A	N/A
Spd Max @ SL Stores Retained	563 kts	N/A / N/A	N/A	N/A
Anti Ship Strike 1[redacted] Gal Tank 2[redacted] 2 [redacted]OON 2 Sidewinders				
Takeoff Weight lb	53,899	N/A / N/A	N/A	N/A
Length/Span	54'7"/53'0"	N/A / N/A	N/A	N/A
Height/Height Folded	16'3"/21'11"	N/A / N/A	N/A	N/A
Engine No./Type	2/GE 404-400	N/A / N/A	2/GE 404-400	N/A
Crew	2	N/A / N/A	2	N/A
Combat Speed/Alt	563/SL	N/A / N/A	N/A	N/A
Combat Ceiling	36,750'	N/A / N/A	N/A	N/A
Mission Radius	655nm	N/A / N/A	N/A	N/A
Spd Max @ SL Stores Retained	407 kts	N/A / N/A	N/A	N/A
Close Air Support (CAS) 22 MK 82 LGDB 2 Sidewinders				
Takeoff Weight lb	60,754	N/A / N/A	N/A	N/A
Length/Span	54'7"/53'0"	N/A / N/A	N/A	N/A
Height/Height Folded	16'3"/21'11"	N/A / N/A	N/A	N/A
Engine No./Type	2/GE 404-400D	N/A / N/A	2/GE 404-400D	N/A
Crew	2	N/A / N/A	2	N/A
Combat Speed/Alt	563/SL	N/A / N/A	N/A	N/A
C[redacted] Ceiling	31,000'	N/A / N/A	N/A	N/A
M[redacted]n Radius	215 nm	N/A / N/A	N/A	N/A
Spd Max @ SL Stores Retained	504 kts	N/A / N/A	N/A	N/A

	PROD EST	APPROVED PROGRAM GOAL/THRESHOLD	DEMON-STRATED PERF	CURRENT ESTIMATE
A-6G Long Range Strike 3-300 Gal Tanks 2 MK 84 LGB 2 Sidewinders				
Takeoff Weight lb	N/A	N/A	N/A	N/A CH-1
Length/Span	N/A	N/A	N/A	N/A
Height/Height Folded	N/A	N/A	N/A	N/A
Engine No./Type	N/A	N/A	N/A	N/A
Crew	N/A	N/A	N/A	N/A
Combat Speed/Alt	N/A	N/A	N/A	N/A
Combat Ceiling	N/A	N/A	N/A	N/A
Mission Radius	N/A	N/A	N/A	N/A
Spd Max @ SL Stores Retained	N/A	N/A	N/A	N/A
Ar[redacted]ip Strike 1-[redacted]al Tank 2 [redacted] 2 HARPOON 2 Sidewinders				
Takeoff Weight lb	N/A	N/A	N/A	N/A
Length/Span	N/A	N/A	N/A	N/A
Height/Height Folded	N/A	N/A	N/A	N/A
Engine No./Type	N/A	N/A	N/A	N/A
Crew	N/A	N/A	N/A	N/A
Combat Speed/Alt	N/A	N/A	N/A	N/A
Combat Ceiling	N/A	N/A	N/A	N/A
Mission Radius	N/A	N/A	N/A	N/A
Spd Max @ SL Stores Retained	N/A	N/A	N/A	N/A

C[redacted]ir Support (CAS)
2[redacted]32 LGDB
2[redacted]vinders

Takeoff Weight lb	N/A	N/A	N/A	N/A
Length/Span	N/A	N/A	N/A	N/A
Height/Height Folded	N/A	N/A	N/A	N/A
Engine No./Type	N/A	N/A	N/A	N/A
Crew	N/A	N/A	N/A	N/A
Combat Speed/Alt	N/A	N/A	N/A	N/A
Combat Ceiling	N/A	N/A	N/A	N/A
Mission Radius	N/A	N/A	N/A	N/A
Spd Max @ SL Stores Retained	N/A	N/A	N/A	N/A

b. Previous Changes Explanations - None.

c. Current Changes - CH-1 - A-6G was excluded from FY 90/91 President's Budget and is in the process of termination.

References: Production Estimate:
OSD PBD of 1 December 1970
SECNAV Memo of 6 July 1983

Approved Program: No DAE baseline has been approved for this program.

11. PROGRAM ACQUISITION COST (Current Estimate in Millions of Dollars)

	PRODUCTION ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
a. Cost --			
Development (RDT&E)	142.4	719.9	719.9
Procurement	2,957.3	5,151.1	5,151.1
Airframe	(1,205.0)	(2,279.8)	(2,279.8)
Engine	(208.0)	(360.8)	(360.8)
Avionics	(446.3)	(930.8)	(930.8)
Total Flyaway	(1,859.3)	(3,571.4)	(3,571.4)
Other Weapon System Cost	(838.7)	(1,292.0)	(1,292.0)
Initial Spares	(259.3)	(287.7)	(287.7)
Construction (MILCON)	2.5	11.3	11.3
Total FY 1984 Base-Year $	3,102.2	5,882.3	5,882.3
Escalation	122.2	-1,282.8	-1,282.8
Development (RDT&E)	(6.6)	(18.5)	(18.5)
Procurement	(116.7)	(-1,302.8)	(-1,302.8)
Construction	(-1.1)	(1.5)	(1.5)
Total Then-Year $	3,224.4	4,599.5	4,599.5
b. Quantities --			
Development (RDT&E)	0	(2)*	(2)*
Procurement	173	205	205
Total	173	205	205

* Non Add: The Congressional Data Sheet does not include these two (2) R&D aircraft. These are test bed modified aircraft and not representative of fleet assets.

c. Foreign Military Sales - N/A

d. Nuclear Costs - N/A

e. Reference: Production Estimate: OSD PBD of 1 Dec 70; SECNAV Memo of 6 Jul 83. Approved Program: FY 1990/91 President's Budget.

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
	(1) Cost	4,599.5	8,464.6	4,599.5
	(2) Quantity	205	359	205
	(3) Unit Cost	22.437	23.578	22.437
b.	Current Procurement	(FY 1989)	(FY 1989 APPN)	(FY 1990)
	(1) Cost	7.2	7.2	.9
	Less CY Adv Proc	0	0	0
	Plus PY Adv Proc	0	0	0
	Net Total	7.2	7.2	.9
	(2) Quantity	0	0	0
	(3) Unit Cost	0	0	0

13. COST VARIANCE ANALYSIS:

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

	RDT&E	PROC	MILCON	TOTAL
[redacted]ction Estimate	149.0	3,074.0	1.4	3,224.4
Previous Changes:				
Economic	- 14.9	+ 158.8	+ 1.8	+ 145.7
Quantity		+3,426.8		+3,426.8
Schedule				
Engineering	+ 834.9			+ 834.9
Estimating		- 601.3	+12.4	- 588.9
Other				
Support		+1,421.7		+1,421.7
Subtotal	+ 820.0	+4,406.0	+14.2	5,240.2
Current Changes				
Economic		- 141.8		- 141.8
Quantity		-3,237.6		-3,237.6
Schedule				
Engineering	- 249.3			- 249.3
Estimating	+ 18.7	+ 705.7	- 2.8	+ 721.6
Other				
Support		- 958.0		- 958.0
Subtotal	-230.6	-3,631.7	- 2.8	-3,865.1
Total Changes	589.4	774.3	11.4	1,375.1
Current Estimate	738.4	3,848.3	12.8	4,599.5

(FY 1984 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
[redacted]ction Estimate	142.4	2,957.3	2.5	3,102.2
Previous Changes:				
Economic				
Quantity		+3,118.7		+3,118.7
Schedule				
Engineering	+763.1			+ 763.1
Estimating		+ 343.7	+10.9	+ 354.6
Other				
Support		+1,390.5		+1,390.5
Subtotal	763.1	4,852.9	+10.9	5,626.9
Current Changes:				
Economic				
Quantity		-2,338.8		-2,338.8
Schedule				
Engineering	-204.2			- 204.2
Estimating	+ 18.6	+ 427.8	- 2.1	+ 444.3
Other				
Support		- 748.1		- 748.1
Subtotal	-185.6	-2,659.1	- 2.1	-2,846.8
Total Changes	577.5	+2,193.8	8.8	2,780.1
Current Estimate	719.9	5,151.1	11.3	5,882.3

13, COST VARIANCE ANALYSIS (Con't)

Previous Change Explanations -

RDT&E
- Economic: Revised escalation indices.
- Engineering: Congress approved development of an upgraded A-6E aircraft (A-6F) and increased funds to complete full scale development.
  Addition of ECP-1 to enhance A-6F capabilities.
  Restructure of A-6F program to A-6G.
- Estimating: Refinement of estimates based upon approval of A-6F aircraft.

Procurement
- Economic: Revised escalation indices. Reflects correction of previous economic computation.
  Deletes A-6F from FY-88/FY93.
  Correction of prior SARs.
- Quantity: Addition of 22 A-6E aircraft and 150 A-6F aircraft.
  Deletion of 150 A-6F aircraft in FY-88/FY-93.
  Addition of 164 A-6G aircraft in FY-88/FY-96.
- Engineering: Addition of ECP-1. Deletion of A-6F aircraft.
- Estimating: Refinement of estimates based upon approval of A-6F.
  Deletion of A-6F.
  Corrections of prior SARs.
- Support: Additional support added for new production aircraft.
  Deletion of A-6F. Addition of A-6G.
  Refinement of A-6E support requirements.
  Reassessment of spares requirements.
  Correction of prior SARs.

Milcon:
- Estimating: Refinement of estimates.
  Addition of trainer facilities at NAS Whidbey Island, NAS Oceana and for the Marine Corps.
  Deletion of a trainer facility at NAS Whidbey Island and funding for Marine Corps training facility.

c. Current Change Explanations -

	Base Year	Then Year
RDT&E	-185.6	-230.6
Engineering: Deletion of A-6G FY-88/FY-92.	(-204.2)	(-249.3)
Estimating:	(+18.6)	(+18.7)
Correction of prior SAR.	(+35.5)	(+37.3)
Exclusion of trainer.	(-15.9)	(-17.0)
Refinement of estimates.	(- 1.0)	(- 1.6)
Procurement:	-2,659.1	-3,631.7
Economic: Revised escalation indices.	N/A	(-141.8)
Quantity: Deletion of 164 A-6G aircraft in FY-88/FY-96.	(-2,338.8)	(-3,237.6)
Estimating: Deletion of A-6G FY-88/FY-92.	(+427.8)	(+705.7)
Support: Deletion of A-6G FY-88/FY-96.	(-748.1)	(-958.0)
Milcon:		
Estimating: Deletion of additional buildings at NAS Oceana for A-6G training.	-2.1	-2.8

d. References - Production Estimate: FY 1990/91 President's Budget.

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 (PdE Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
18.638	+.019	-1.986	-	+2.857	+.647	-	+2.262	3.799	22.437

15. CONTRACT INFORMATION: (Then-Year Dollars in Millions)

a. RDT&E

A-6F Full Scale Development
Grumman Aerospace, Bethpage, NY
N0019-84-C-0098 (NTE/FFP)
Award: July 1984
Definitization: July 1984

Initial Contract Price

Target	Ceiling	Qty
397.8	N/A	5

Current Contract Price

Target	Ceiling	Qty
$452.5	N/A	5

Estimated Price at Completion

Contractor	Program Manager
$452.5	$452.5

Explanation of Change: Program scope expanded for ECP-1. A-6F/G program subsequently cancelled.

Previous Cumulative Variance - N/A
Cumulative Variance to Date - N/A

b. Procurement

Airframe (FY 1987)
Grumman Aerospace, Bethpage, NY
N00019-85-C-0475 (FFP)
Award: June 1986
Definitization: Sept 1987

Initial Contract Price

Target	Ceiling	Qty
$143.7	N/A	11

Current Contract Price

Target	Ceiling	Qty
$143.7	N/A	11

Estimated Price at Completion

Contractor	Program Manager
Undetermined	$183.7

Explanation of Change: Late GFE wing claim will increase price at completion.

Previous Cumulative Variance - N/A
Cumulative Variance to Date - N/A

Airframe (FY 1988)
Grumman Aerospace, Bethpage, NY
N00019-88-C-0172 (FFP)
Award: June 1988
Definitization: May 1989

Initial Contract Price		
Target	Ceiling	Qty
$195.2	N/A	10

Current Contract Price		
Target	Ceiling	Qty
$195.2	N/A	10

Estimate Price at Completion	
Contractor	Program Manager
$214.7	$214.7

Explanation of Change: Late GFE wing impact uncertain.

Previous Cumulative Variance - N/A
Cumulative Variance to Date - N/A

Common Wing
Boeing Military Airplane Company
Wichita, KS
N00019-85-C-0311 (FFP)
Award: Jul 1985
Definitization: Jul 1985

Initial Contract Price		
Target	Ceiling	Qty
$1,221.6	N/A	Var

Current Contract Price		
Target	Ceiling	Qty
$810.3	N/A	Var

Estimated Price at Completion	
Contractor	Program Manager
$810.3	$810.3

Explanation of Change: Options four and five will not be exercised.

Previous Cumulative Variance - N/A
Cumulative Variance to Date - N/A

16. PROGRAM FUNDING SUMMARY: (Current Estimate in Millions of Dollars)

a. Program Status
(1) Percent Program Completed: 90.9% (20 yrs/22 yrs)
(2) Percent Program Cost Appropriated: 99.9% ($4,595.8/$4,599.5)

b. Appropriation Summary -

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY69-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete	Total
RDT&E	738.4	0	0	0	738.4
Procurement	3,847.4	.9	0	0	3,848.3
MILCON	10.0	2.8	0	0	12.8
Total	4,595.8	3.7	0	0	4,599.5

16. PROGRAM FUNDING SUMMARY (con't):

c. Annual Summary -

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1972				5.5	2.4	2.4	2.4	4.6
1973				12.0	5.6	5.6	5.6	4.4
1974				22.7	11.5	11.5	11.5	8.0
1975				21.8	12.0	12.0	12.0	10.9
1976				10.5	6.1	6.1	6.1	6.6
1977				3.0	1.9	1.9	1.9	2.6
1978				4.3	2.9	2.9	2.9	6.8
1979				9.9	7.3	7.3	7.3	8.4
1980				3.8	3.1	3.1	3.1	10.6
1981				0	0	0	0	10.6
1982				0	0	0	0	7.6
1983				8.3	8.2	8.3	7.9	4.9
1984				22.3	22.7	22.8	22.0	3.8
1985				85.5	89.7	89.7	83.2	3.4
1986				235.5	254.5	254.5	246.6	2.8
1987				154.5	171.9	171.8	149.8	2.7
1988				120.3	138.6	113.1	39.1	3.1
TOTAL				719.9	738.4	713.0	601.4	

16. PROGRAM FUNDING SUMMARY (con't):

c. Annual Summary -

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: Procurement								
1969	0	0.0	0.0	14.6	5.3	5.3	5.3	3.2
1970	12	0.0	163.4	227.3	82.8	82.8	82.6	3.9
1971	12	0.0	185.0	333.5	126.6	126.6	126.2	4.6
1972	12	0.0	167.8	262.9	104.7	104.8	104.7	3.8
1973	21	0.0	232.1	360.1	157.8	157.9	157.5	4.2
1974	13	0.0	183.9	293.3	134.9	134.9	134.5	5.8
1975	12	0.0	165.2	278.0	135.0	135.0	134.3	8.8
1976	11	14.7	193.5	324.4	168.9	168.9	165.0	6.6
1977	6	0.0	115.1	*111.0	64.5	64.3	64.4	3.8
1978	12	0.0	191.7	286.1	182.0	179.8	181.9	6.8
1979	12	1.2	207.7	235.9	165.9	162.4	165.3	8.7
1980	6	0.0	127.5	195.9	153.7	153.6	152.3	11.8
1981	12	0.0	214.1	298.7	261.8	261.7	257.4	11.6
1982	12	2.5	221.9	288.3	273.9	273.9	266.1	14.3
1983	8	0.0	144.1	214.1	216.3	216.2	212.7	9.0
1984	6	25.0	118.3	226.8	238.4	238.4	231.6	8.0
1985	6	20.4	107.3	270.9	295.2	295.2	259.0	3.4
1986	11	14.8	163.5	256.2	286.0	285.9	254.3	2.8
1987	11	48.3	207.3	260.8	302.6	330.2	206.4	2.7
1988	10	92.8	155.7	405.8	483.9	263.3	29.0	3.1
1989	0	0.0	0.0	5.8	7.2	0	0	4.0
1990	0	0	0	.7	.9	0	0	3.6
TOTAL	205	219.7	3,265.1	5,151.1	3,848.3	3,641.1	3,190.5	

*$20.4 A-6E not associated with procurement is excluded.

16. PROGRAM FUNDING SUMMARY (con't):

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: MILCON								
1975				.8	.5	.5	.5	16.1
1978				.5	.4	.4	.4	7.7
1979				.7	.5	.5	.5	9.3
1988				3.7	4.4	0	0	3.1
1989				3.4	4.2	0	0	4.0
1990				2.2	2.8	0	0	3.6
TOTAL				11.3	12.8	1.4	1.4	

- PRODUCTION RATE DATA:

a. Annualized Production Rates -

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1984	-	6	6	72
1985	-	6	6	72
1986	-	0	11	72
1987	-	0	11	72
1988	-	0	10	72
1989	-	0	0	0
1990	-	0	0	0
1991	-	0	0	0
1992	-	0	0	0

b. Cost Variance - Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic *
:og Acq Cost					
(BY $)	3,102.2	2,909.9	5,882.3	-	5,882.3
(TY $)	3,224.4	1,375.1	4,599.5	-	4,599.5
\UC (BY $)	17.931	11.396	28.694	-	28.694
(TY $)	18.638	3.799	22.437	-	22.437

FY 1988 is the last buy year. All costs are sunk.

c. Schedule Variance -

	Production Estimate	Variance (CE less PdE	Current Estimate	Variance (CE less Max)	Maximum Economic *
tart Date	Aug 72	N/A	Aug 72	N/A	Aug 72
uration (in mos)	230	0	230	N/A	N/A
nd Date	Oct 91	N/A	Oct 91	N/A	N/A

FY 1988 is the last buy year. End date for maximum economic rate not computed.

d. Deliveries (Plan/Actual) -

	To Date
RDT&E	2/2
Procurement	184/184

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 -

(Then-Year Dollars in Millions)

	FY89 & prior	FY90	FY91	Total
O&M,N	148.2	112.7	108.1	369.0
Industrial Funds	1.9	1.1	1.0	4.0
Total	150.1	113.8	109.1	373.0

A-2: ADDS

88-114

UNCLASSIFIED

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)
PROGRAM: Army Data Distribution System (ADDS)

AS OF DATE: December 31, 1988

INDEX

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1. Designation/Nomenclature (Popular Name): Not Assigned/Army Data Distribution System (ADDS) (Enhanced Position Location Reporting System (EPLRS))

2. DOD Component: U.S. Army

3. Responsible Office and Telephone Number:

Project Manager
PLRS/TIDS
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, T03200 (shared), T06200, T06300, T06400, T01600 (shared), BA960A (shared), BA970A (shared), BL5264 (shared)

MILCON: N/A

UNCLASSIFIED

OASD(PA) DFOISR 89-T-0555

5. Related Programs: Position Location Reporting System (PLRS) Joint Tactical Information Distribution System (JTIDS), and Forward Area Air Defense Command, Control and Intelligence ($FAADC^2I$).

6. Mission and Description: Existing and emerging tactical automated battlefield systems (e.g. ASAS, $FAADC^2I$, TACFIRE, etc.) require near real time and jam resistant data communications. Current deployed systems used for this purpose are limited by restricted data handling capacity, electronic warfare vulnerability, voice/data contention, lack of adequate relay capabilities and poor mobility. The Army Data Distribution System (ADDS) is comprised of an enhancement/pre-planned product improvement (P^3I) of the ARMY/USMC developed Position Location Reporting System (PLRS) and the OSD developed Joint Tactical Information Distribution System (JTIDS). By taking advantage of the advanced state of acquisition of these two projects, it will be possible to satisfy the stated data distribution requirements of the Army and overcome existing deficiencies earlier than would otherwise be possible. ADDS will support near real time and high priority data communication requirements in the five functional areas of air defense, fire support, intelligence/electronic warfare, maneuver control and combat service support. $FAADC^2I$ cannot operate without the ADDS EPLRS and the JTIDS Class 2M terminal.

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 March 1985, the Under Secretary of the Army approved continued development of the EPLRS. Concurrent approval was given for development of VHSIC technology in the Enhanced PLRS User Unit (EPUU), and downsizing of the Net Control Station (NCS). In February 1985, the Assistant Secretary of Defense for Command, Control, Communications and Intelligence ($ASD\text{-}C^3I$) approved the development of the downsized version of the JTIDS Terminal, the Class 2M. 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.

b. Significant Developments Since Last Report - Two long lead software tasks were awarded in FY88, Phase A in February and Phase B in June, for the P^{3}I Contract. EPLRS Development Contract (Phases 3/4/5) was capped and fully funded. Technical Test at Ft Huachuca, AZ initiated in May uncovered three EPLRS system problems: (1) Intermittent FSK lockup (No transmit/no receive with input/output failure); (2) Slow intercommunity needline build; (3) Slow rebuild after extended system disruption. The first two problems have been corrected during the regression testing which was successfully completed on 13 Dec 88. A new version of firmware was reprogrammed and all EPUUs contain the new firmware. The third problem will be treated through a change in operational procedures. Formal Technical Testing is scheduled for 13 Feb 89. Reliability demonstration for the Net Control Station - EPLRS (NCS-E) and Enhanced PLRS User Unit (EPUU) was successfully completed on 23 Jan 88 and 4 Mar 88 respectively. All Engineering Development Models (EDM), EPUUs and NCS-Es have been delivered under Phase 3/4/5. The Quantity changed from 140 to 123 due to POS/NAV laydown performed by TRADOC.

The ADDS system is expected to satisfy the mission requirement.

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

8. Threshold Breaches: There are currently no Draft DAE baseline breaches, DCP or SDDM (dated August 8, 1979) threshold breaches.

9. Schedule:

a. Milestones	Planning Estimate	Approved Program	Current Estimate
PLRS (Ch-7)			
PLRS/PJH ASARC	Sep 82	N/A	N/A
PLRS Production Contract Award	Jul 83	N/A	N/A
PLRS First Unit Equipped (FUE)	Sep 87	N/A	N/A
PLRS FOT&E Start - End	Feb-Mar 88	N/A	N/A
EPLRS (Ch-1)			
Phase 1 Contract Completed	Dec 80	N/A	N/A (Ch-1)
Phase 2 Contract Completed	Feb 82	N/A	N/A (Ch-1)
Phase 3/4 Contract Completed	Dec 86	N/A	N/A (Ch-1)
Phase 5 Contract Award	Sep 84	N/A	N/A (Ch-1)
ROC Approval	Jul 84	N/A	Sep 86
O & O Approval	Jul 84	N/A	N/A (Ch-1)
DA Information Brief	Feb 86	N/A	N/A (Ch-1)
P^{3}I Phase A Software Contract Awd	Sep 86	N/A	Feb 88(Ch-2)
P^{3}I Phase B Hardware/Firmware Awd	N/A	N/A	Jun 88(Ch-2)
P^{3}I Phase C EPUU Prod Contract Awd	N/A	N/A	May 89(Ch-2)
Technical Test Start	Aug 87	N/A	May 88
Technical Test End	N/A	N/A	Mar 89 (Ch-2)
Type Class Approval (Std)	Sep 87	N/A	N/A (Ch-1)
Operational Test & Evaluation (IOT&E)	Aug 87	N/A	Apr 90(Ch-2)
Milestone IIIA P^{3}I LRIP	Sep 87	N/A	May 88(Ch-3)
Milestone IIIB	N/A	N/A	Sep 90(Ch-4)
Full Scale Prod Contract Award	Jul 88	N/A	Nov 90(Ch-2)
P^{3}I First Prod Delivery	N/A	N/A	Jun 91(Ch-6)
P^{3}I First Unit Equipped (FUE)	Sep 88	N/A	Apr 92(Ch-5)

9. Schedule: (Cont'd)

	Planning Estimate	Approved Program	Current Estimate
JTIDS (Ch-7)			
JTIDS Class 2M TT Start	N/A	Jun 90	Jun 90
JTIDS Class 2M TT End	N/A	Dec 90	Dec 90
JTIDS Class 2M IOT&E Start	N/A	Mar 91	Mar 91
JTIDS Class 2M IOT&E End	N/A	Jun 91	Jun 91
JTIDS Milestone III	N/A	Oct 91	Oct 91
JTIDS Class 2M Full Scale Production Award	N/A	Oct 91	Oct 91
JTIDS FUE	N/A	Apr 93	Apr 93

b. Previous Change Explanations --

Phase 3/4 date was revised to reflect actual completion of the Phase (Feb 87) versus contract award date (Mar 82). O&O Plan was approved October 86 versus Jun 86. Pre-planned Product Improvement Initial Production Contract Award slipped from August 87 to February 88 due to a slip announced by Hughes Aircraft Company in the execution of the development contract. PLRS Milestones added as requested by OSD Memo, dated 4 August 87. The addition of key milestones start and completion dates are shown IAW DODI 7000.3 guidance. MDR IIIA was changed to a Briefing to ASARC Principals and was held in May 88. Type classification (LP) is no longer required. Only Standard Type Classification is required.

c. Current Change Explanations --

(Ch-1) All EPLRS historical milestones not in the ADDS baseline will be deleted in the next SAR.

(Ch-2) P^3I Contract is shown in Phases A, B, and C. Dates for IOT&E and all subsequent milestones directly related to them are changed because of complications with the completion of Technical Test.

(Ch-3) EPLRS Milestone IIIA occurred May 88 versus Apr 88.

(Ch-4) EPLRS Milestone IIIB is an added milestone to occur Sep 90.

(Ch-5) With the extension of TT, EPLRS FUE is changed from Jun 91 to Apr 92.

(Ch-6) EPLRS P^3I First Production Delivery is an added milestone to occur in Jun 91.

(Ch-7) Those milestones under Approved Program and Current Estimate marked "NA" signify milestones to be deleted from the SAR. PLRS milestones will be deleted in the next SAR. JTIDS milestones have been added.

9. Schedule: (Cont'd)

d. References:
Planning Estimate: SDDM, dated 8 Aug 79
Approved Program: There is no approved DAE Baseline.

10. Technical/Operational Characteristics: 1/

a. Technical	Planning Estimate	Approved Program	Demo Perf	Current Estimate
Size (Length x Width x Height)				
NCS-E (S-280C)	12'x7.3'x7'	N/A		12'x7.3'x7'
Downsized NCS-E (S-250C)	7'x6.5'x6'	N/A		7'x6.5'x6'
EPUU/Manpack	10.1"x10.7"X4"	N/A		14.7"x10.2"x5.1"
		N/A		
JTIDS Class 2M	N/A	N/A		25"x15"x10" (Ch-1)
		N/A		
Weight (lbs) - Upper Limit				
NCS-E (S-280C)	6200	N/A		6300
Downsized NCS-E (S-250C)	2300	N/A		2300
EPUU/Manpack	17	N/A		28 2/
JTIDS Class 2M Terminal	N/A	N/A		88 3/
Power Requirements (NCS-E)				
Voltage (AC)	115-208	N/A		115-208
Frequency (HZ)	50-60	N/A		60 (Ch-2)
Power Requirements (EPUU)				
Voltage (DC)	20-28	N/A		20-28
Power Requirements (JTIDS)				
Voltage (DC)	22-28	N/A		22-28
Frequency Band (MHZ)				
NCS-E	420-450	N/A		420-450
EPUU	420-450	N/A		420-450
JTIDS Class 2M	960-1215	N/A		960-1215

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)

b. Operational	Planning Estimate	Approved Program	Demo Perf	Current Estimate
MTBF (Hrs) (Lower Limit/Confidence Level)				
NCS-E	100	N/A		100 (80%)
EPUU	500	N/A		500 (80%)
Class 2M Terminal	120	N/A		400 (70%) (Ch-3)
MTTR (Min)				
NCS-E	30	N/A		30
EPUU	30	N/A		15 (Ch-4)
Class 2M Terminal	30	N/A		30
Time Slots/Sec				
EPUU	512	N/A		N/A (Ch-7)
Class 2M Terminal	128	N/A		N/A (Ch-7)
Bits/Slot				
EPUU	75	N/A		N/A (Ch-7)
Class 2M Terminal	225	N/A		N/A (Ch-7)
Data Rate (KBS)				
EPUU	1.2	N/A		N/A (Ch-7)
Class 2M Terminal	238	N/A		N/A (Ch-7)
Channels				
EPUU	8	N/A		8
Class 2M Terminal	128	N/A		51 (Ch-5)

Message Length/Speed of Service Criteria: (Ch-6)
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.

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 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 2M Voltage is DC versus AC. Phase applies to the JTIDS Class 2 terminal versus the Class 2M. Frequency requirements are grouped separately to more accurately reflect technical characteristics.

d. Current Change Explanations --

(Ch-1) The system specification dated 27 May 88 for the JTIDS development contract states that the size of the JTIDS Class 2M terminal shall be 25"X15"X10" versus 20.5"X15"X7.8"

(Ch-2) The system specification dated 27 Jan 88 for the EPLRS NCS-E development states that the Power Requirement for NCS-E is 60 HZ versus 50-60 HZ.

(Ch-3) The system specification dated 27 May 88 for the JTIDS Class 2M terminal states that the MTBF for JTIDS Class 2M is 400 hours versus 450 hours.

(Ch-4) The system specification dated 21 Jan 88 for the EPLRS EPUU states that the MTTR is 15 minutes versus 30 minutes.

(Ch-5) 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."

(Ch-6) This Message Length/Speed of Service Criteria is a new addition.

(Ch-7) These EPLRS milestones, which are not in the baseline, will be deleted in the next SAR.

e. References --

Planning Estimate: SDDM, dated 8 August 1979
Approved Program: There is no approved DAE Baseline.

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

	Planning Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E) 1/	$175.3	$ 278.8	$ 278.8
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	2049.8	2049.8
Escalation	1056.7	779.0	779.0
Development (RDT&E)	(13.7)	(42.1)	(42.1)
Procurement	(1043.0)	(736.9)	(736.9)
Construction (MILCON)	-	-	-
Total Program Cost (Then-Year)	3038.2	2828.8	2828.8
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: FY 1990-91 President's Budget.

1/ R&D Planning Estimate was adjusted in Dec 84 SAR to reflect true FY83 base year dollars.

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	2828.8	3402.9	2828.8
(2) Quantity 1/	123	140	123
(3) Unit Cost 2/	23.0	24.3	23.0
b. Current Procurement 3/ --	(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

1/ The Quantity changed from 140 to 123 due to POS/NAV laydown performed by TRADOC.

2/ Unit cost data is 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, dated 15 May 1985.

3/ N/A due to year to year changes in the mix of hardware components being purchased under this program.

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	-5.9	-384.7	-	-390.6
Quantity	-	+716.1	-	+716.1
Schedule	-	-	-	-
Engineering	+81.1	-518.5	-	-437.4
Estimating	-7.6	+484.2	-	+476.6
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+67.6	+297.1	-	+364.7
Current Changes:				
Economic	-0.7	-28.8	-	-29.5
Quantity	-	-530.3	-	-530.3
Schedule	+38.0	-	-	+38.0
Engineering	+27.0	-	-	+27.0
Estimating	-	+127.6	-	+127.6
Other	-	-	-	-
Support	-	-206.9	-	-206.9
Subtotal	+64.3	-638.4	-	-574.1
Total Changes	+131.9	-341.3	-	-209.4
Current Estimate	320.9	2507.9	-	2828.8

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	-	+482.6	-	+482.6
Schedule	-	-	-	-
Engineering	+64.7	-376.7	-	-312.0
Estimating	-8.1	+326.3	-	+318.2
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+56.6	+432.2	-	+488.8
Current Changes:				
Quantity	-	-404.7	-	-404.7
Schedule	+26.0	-	-	+26.0
Engineering	+20.9	-	-	+20.9
Estimating	-	+98.0	-	+98.0
Other	-	-	-	-
Support	-	-160.7	-	-160.7
Subtotal	+46.9	-467.4	-	-420.5
Total Changes	+103.5	-35.2	-	+68.3
Current Estimate	278.8	1771.0	-	2049.8

b. Previous Change Explanations --

RDT&E

Economic: Revised escalation indices.

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. (Source: 8 Sep 86 ADDS ROC)

b. Previous Change Explanations -- (Continued)

Procurement

Economic: Revised escalation indices.

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.

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.

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 JTIDS terminal and PSNAP from NCS.

MILCON: N/A

c. Current Change Explanations --

(1) RDT&E

	(Dollars in Millions) Base-Year	Then-Year
Revised Jan 89 economic escalation indices. (Economic)	N/A	-0.7
Extension in Technical Testing schedule for JTIDS Class 2M Terminal (Schedule)	+5.7	+8.0
Increase in System Project Management due to schedule stretchout. (Schedule)	+14.6	+22.0
Extension of Technical Test for EPLRS. (Schedule)	+5.7	+8.0
ADA software conversion for NCS-E downsizing (Engineering)	+19.5	+25.0
Increase in GFE due to hardware requirements in Common Hardware System (CHS) for JTIDS and Standard Integrated Command Post (SICP) shelter for NCS-J. (Engineering)	+1.4	+2.0

c. Current Change Explanations -- (Continued)

(2) Procurement

	(Dollars in Millions) Base-Year	Then-Year
Revised Jan 89 economic escalation indices. (Economic)	N/A	-28.8
Reduction in NCS-E QTYs from 140 to 123 requirements were adjusted by TRADOC. (Quantity)	-29.9	-39.0
Reduction in EPUU's QTYs from 22,103 to 14,518, based on reduced requirements from TRADOC. (Quantity)	-305.0	-401.4
Reduction in other components QTYs, based on reduced requirements from TRADOC. (Quantity)	-69.8	-89.9
Reduction in Initial Spares cost due to reduction in quantities (Support)	-160.7	-206.9
Change in Acquisition Strategy of JTIDS Class 2M terminal from one competitive single source to 2 sources (Leader/Follower). (Estimating)	+50.8	+66.0
Increase in Post Deployment Software Support (PDSS) due to change in the database used for the estimating model. (Estimating)	+47.2	+61.6
(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	Spt	Other	Total	
34.525	-3.415	-8.314	+.309	-3.337	+4.912	-1.682	-	-11.527	22.998

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

a. RDT&E

EPLRS System:	Initial Contract Price Target	Ceiling	Qty
	$36.6	N/A	3

Hughes Aircraft Co.
Ground Systems Group
Fullerton, CA
DAAB07-82-C-J096, CPFF
Award: March 31, 1982
Definitized: March 31, 1982

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

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Project Manager
$157.6	N/A	3	$157.4	$157.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-10.1	-5.4
Cumulative Variances To Date (10/30/88)	-17.8	-1.3
Net Change	-7.7	+4.1

Explanation of Change: The unfavorable variances were caused by problems in software which delayed the final software test; cost growth in independent software technical tests; and delays in delivery of Phase 5 hardware which impacted start of PQT-C conduct. All firmware design has been completed and released to system test; however, problems encountered during test will require design modification. The remainder of the variance is due to the Secure Data Unit (SDU) Development and Prototype Development tasks. The Project Manager has capped the contract price at $157.6M.

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: 52.9% (9 yrs/17 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 19.2% ($542.0/$2828.8)
(Funds Appropriated To Date in Millions/
Total Program Funding in Millions)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY81-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-97)	Total
RDT&E	234.6	19.4	13.1	53.8	320.9
Procurement	307.4	50.2	230.2	1920.1	2507.9
MILCON	-	-	-	-	-
Total	542.0	69.6	243.3	1973.9	2828.8

16. PROGRAM FUNDING SUMMARY (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- 1/

Fiscal Year	Qty (2/)	Flyaway FY83 Dollars Nonrec	Flyaway FY83 Dollars Rec	Total Base Year$	Total Then Year $ Program	Total Then Year $ Obligated	Total Then Year $ Expended	Escl Rate (%)
APPROPRIATION: RDT&E								
1981				17.8	15.8	15.8	15.8	N/A
1982				18.1	17.3	17.3	17.3	N/A
1983				33.3	34.1	34.1	34.1	N/A
1984				21.6	22.9	22.9	22.9	N/A
1985				21.7	23.9	23.9	23.9	N/A
1986				29.7	33.4	33.4	33.4	2.8
1987				34.0	39.3	39.3	39.3	2.7
1988				23.5	28.1	28.0	18.5	3.1
1989				15.9	19.8	6.9	0.2	4.0
1990				15.1	19.4			3.6
1991				9.9	13.1			3.3
1992				7.7	10.4			2.8
1993				5.9	8.2			2.3
1994				4.4	6.2			1.8
1995				20.2	29.0			1.8
Subtotal	3			278.8	320.9	221.6	205.4	N/A
APPROPRIATION: Procurement (OPA)								
1986				25.3	29.8	21.1	10.5	2.8
1987				71.3	86.5	29.5	12.5	2.7
1988				83.1	104.4			3.1
1989				66.9	86.7			4.0
1990				37.7	50.2			3.6
1991				168.8	230.2			3.3
1992				234.9	326.9			2.8
1993				203.8	288.8			2.3
1994				202.2	291.8			1.8
1995				220.9	324.6			1.8
1996				235.2	351.7			1.8
1997				220.9	336.3			1.8
Subtotal	120			1771.0	2507.9	50.6	23.0	N/A
Total	123			2049.8	2828.8	272.2	228.4	

1/ Program funding and quantities reflect the FY90-91 President's Budget.

2/ Because measurement is based on an equivalent network and the year to year mix of components will vary it is not appropriate to report qtys by individual year.

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: N/A

b. Costs: N/A

c. Contractor Support Cost:

(Then-Year Dollars in Millions)

	FY 1989 1/ & PRIOR	FY 1990 YEAR	FY 1991 YEAR	BALANCE TO COMPLETE	TOTAL
O&M	.2	1.1	2.1		3.4

1/Includes FY88 - 89.

N-30 MK 50 TORPEDO

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)
PROGRAM: MK 50 TORPEDO

AS OF DATE: December 31, 1988

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1. (U) Designation and Nomenclature (Popular Name): Torpedo, MK 50 (MK 50 Torpedo)

2. (U) DoD Component: Department of the Navy

3. (U) Responsible Office and Telephone Number:

MK 50 Torpedo Program Office (PMS406)
Naval Sea Systems Command
Washington, D.C. 20362

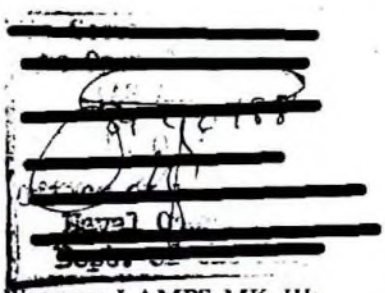
CAPT H. G. Chalkley
Assigned: July 1988
AV 222-0636; COMM (202) 692-0636

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

RDT&E: PE 0603610N Project S0199 (Prior Years Only)
PE 0604610N Project S0199
PE 0603610N Project S1873 (Prior Years Only)

PROCUREMENT: APPN 1507 ICN 3118

MILCON: PE 72096N



5. (U) Related Programs: Vertical Launch ASROC; ASW Standoff Weapon; LAMPS MK III; CV HELO; P-3C; SH-2F; SH-3; ASW Ship In-Service Programs.

(b)(1)

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7. (U) Program Highlights:

a. (U) Significant Historical Developments --

(1) (U) 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 due to cost growth and excessive technical risk in one design. The program was restructured to form a Navy-industry team composed of Honeywell, the Naval Ocean Systems Center, and the Applied Research Laboratory, Pennsylvania State University. The D&V Phase of the program was successfully completed in July 1983, underwent DSARC Milestone II review on January 20, 1984, and was approved to proceed into the Full-Scale Development Phase.

(b)(1)

b. (U) Significant Developments Since Last Report --

As of December 1988, sea run tests involving all launch platforms have demonstrated prototype lot torpedo technical performance and have provided initial tactical evaluation. During September/October 1988, COMOPTEVFOR conducted independent testing (OT-IIA) to estimate potential operational effectiveness and operational suitability. Based on limited analysis of the test data and within the constraints imposed by the limitations to scope of testing, COMOPTEVFOR concluded that the MK 50 has the potential to be operationally suitable and effective and that these findings supported a recommendation for limited production. The second source qualification units were awarded to Westinghouse Electric Corporation. The FY 88 advance procurement for the FY 89 hardware contract was awarded to both Honeywell and Westinghouse.

(U) The MK-50 system is expected to satisfy the mission requirement.

8. (U) Threshold Breaches: (DCP 173 dated December 1983 and SDDM dated 15 March 1984) Previously reported. New thresholds briefed to the OSD Conventional Weapons Systems Committee on 15 Dec 1987 were approved on 16 Feb 1988 and became the DAE Baseline. There are currently no DAE Baseline breaches.

9. (U) Schedule:

a. (U) Milestones --

	Development Estimate	Approved Program	Current Estimate
(U) Milestone I (DSARC I)	Jul 79	Jul 79	Jul 79
(U) D&V Contract Award	N/A	Aug 79	Aug 79
(U) DT/OT-I Completed	N/A	Jul 83	Jul 83
(U) Milestone II (DSARC II)	Dec 83	Jan 84	Jan 84
(U) FSD Contract Award	Aug 83	Sep 83	Sep 83
(U) Critical Design Review	Apr 86	May 88	May 88
(U) Milestone IIIA (DAB)	Oct 86	Feb 89	Mar 89 CH-1
(U) LRIP 2nd Year Approval	N/A	Feb 90	Mar 89 CH-1
(U) OT II Completed	Dec 88	Jul 90	Jul 90
(U) Milestone IIIB (DAB)	Apr 89	Jan 91	Jan 91

(b)(1) [redacted]

b. (U) Previous Change Explanations --

- o DSARC II was delayed one month due to requirements for additional in-water testing to demonstrate terminal homing.
- o Critical Design Review was delayed three months due to late release of Level 3 drawings (Apr - Jun 86).
- o Milestone IIIA was delayed three months due to delay in software development (Oct - Dec 86).
- o A series of FY 86 budget reductions caused a schedule slip and disrupted FY 86 execution. A new transition to production program was established which resulted in a six-month program slip and extended the RDT&E program into the first quarter of FY 89. A new Milestone IIIC was added to the program.
- o 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. MK 50 Torpedo program added two historical milestones, Milestone I (DSARC I) and D&V Contract award, to reflect the DAE Baseline.

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

c. (U) Current Change Explanations -- Ch-1. Milestone IIIA, which will approve LRIP I and II, delayed 1 month due to scheduling conflict.

d. (U) References --

Development Estimate: SDDM, dated March 15, 1984, subject "MK 50 Torpedo (Full-Scale Development Approval)."

Approved Program: DAE Baseline, approved 16 February 1988.

e. (U) Changes since "As of" Date -- None

10. (U) Technical/Operational Characteristics: Thresholds for the Advanced Lightweight Torpedo (Torpedo MK 50) Program were approved during the DSARC Milestone II review in January 1984. Earlier reported demonstrated performance and estimates were based on the engineering development model (100S). The current performance and estimates are based on the performance of the production prototype (200A) model.

a. (U) Technical --

	Dev Est	Approved Program Goal/ Threshold	Demonstrated Perf.	Current Estimate
1. (U) Acoustic Acquisition Range (yds) 50% Probability of Acquisition				

(b)(1)

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

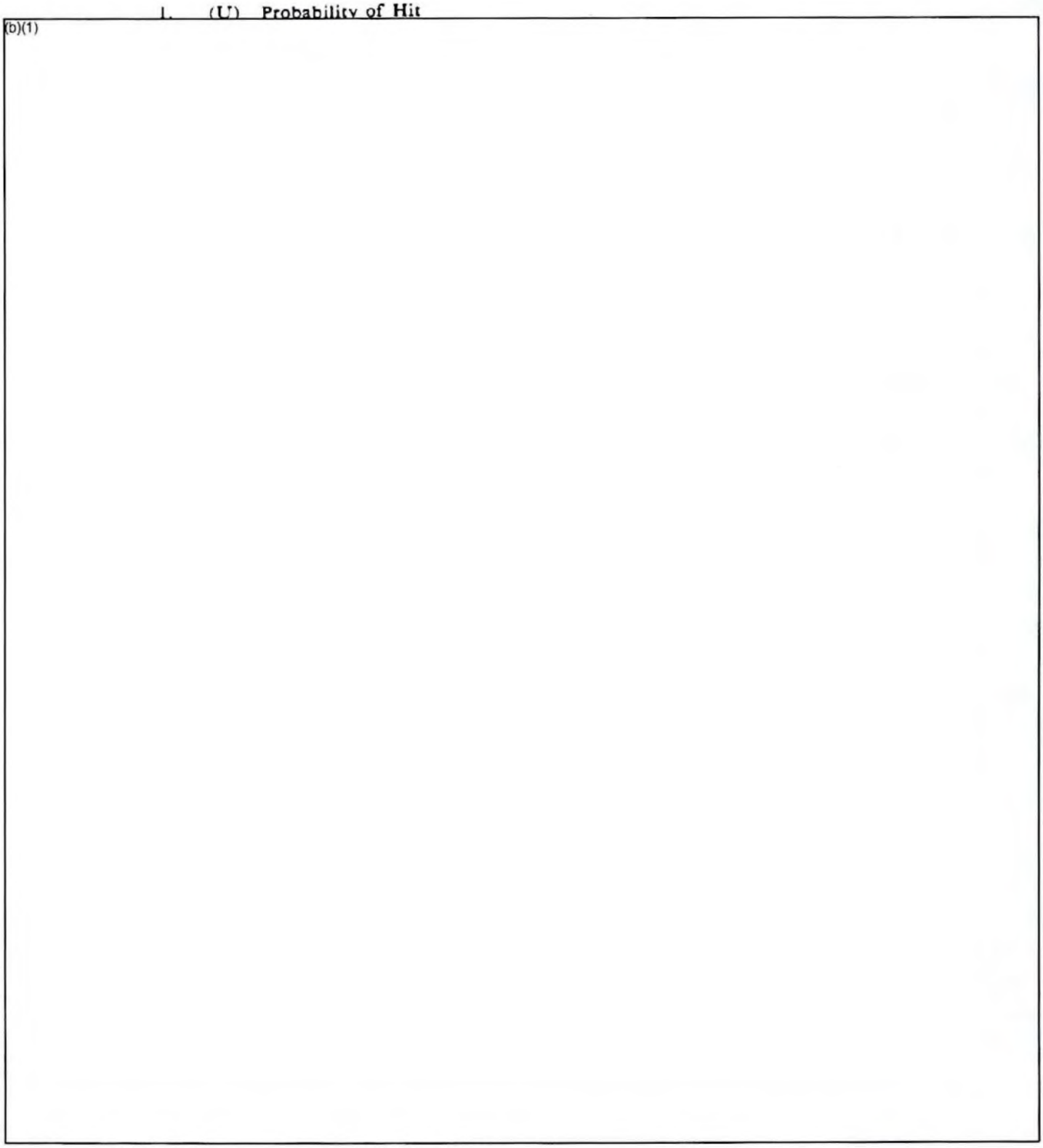
(b)(1)

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

b. (U) Operational --

1. (U) Probability of Hit

(b)(1)



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

c. (U) Previous Change Explanations --

(b)(1)

(U) Demonstrated Peformance based on actual performance by 200A series prototype hardware.

d. (U) Current Change Explanations --

Ch-1 Demonstrated performance reflects 200S in-water tests.
Ch-2 Current estimate based on analysis of recent test data.

e. (U) References --

Development Estimate: SDDM, dated March 15, 1984, subject "MK 50 Torpedo (Full-Scale Development Approval)."

Approved Program: DAE Baseline approved 16 February 1988.

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

a. (U) Cost --

	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	$1,117.7	$1,435.0	$1,435.0
Procurement	3,609.1	3,787.1	3,787.1
Swimaway	(2,976.6)	(2,885.4)	(2,885.4)
Other Weapon System Cost	(386.8)	(778.7)	(778.7)
Initial Spares	(245.7)	(123.0)	(123.0)
Construction (MILCON)	8.9	26.6	26.6
Total FY 84 Base-Year $	$4,735.7	$5,248.7	$5,248.7
Escalation	1,918.0	1,492.4	1,492.4
Development (RDT&E)	(49.2)	(12.7)	(12.7)
Procurement	(1,868.8)	(1,472.8)	(1,472.8)
Construction (MILCON)	-	(6.9)	(6.9)
Total Then-Year $	$6,653.7	$6,741.1	$6,741.1

11. (U) Program Acquisition Cost (Cont'd):

(b)(1)

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References --

Development Estimate: SDDM, dated March 15, 1984, subject "MK 50 Torpedo (Full-Scale Development Approval)."

Approved Program: FY 1990/1991 President's Budget.

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

(b)(1)

		Current Year		Budget Year
b. (U)	Current Procurement --			
(1)	Cost	204.4	204.4	272.3
	Less CY Adv Proc	(36.5)	(36.5)	
	Plus PY Adv Proc	33.7	33.7	-
	Net Total	201.6	201.6	272.3
(2)	Quantity	140	140	200
(3)	Unit Cost	1.440	1.440	1.362

13. (U) Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1,166.9	5,477.9	8.9	6,653.7
Previous Changes:	-	-	-	-
Economic	-7.4	-649.6	-	-657.0
Quantity	+26.5	-	-	+26.5
Schedule	+162.9	+789.3	-	+952.2
Engineering	+28.1	-	-	+28.1
Estimating	-13.7	-263.0	-	-276.7
Other	-	-	-	-
Support	+68.8	-152.5	+3.4	- 80.3
Subtotal	+265.2	-275.8	+3.4	-7.2
Current Changes:				
Economic	-	-110.6	-	-110.6
Quantity	-	-	+21.2	+21.2
Schedule	-	-	-	-
Engineering	+2.9	-	-	+2.9
Estimating	+12.7	+168.4	-	+181.1
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+15.6	+57.8	+21.2	+94.6
Total Changes	+280.8	-218.0	+24.6	+87.4
Current Estimate	1,447.7	5,259.9	33.5	6,741.1

(FY 1984 Constant (Base-Year) Dollars in Millions)

Development Estimate	1,117.7	3,609.1	8.9	4,735.7
Previous Changes:	-	-	-	-
Quantity	+23.1	-	-	+23.1
Schedule	+138.8	+407.1	-	+545.9
Engineering	+25.7	-	-	+25.7
Estimating	+62.2	-234.8	+.2	-172.4
Other	-	-	-	-
Support	+55.1	-108.9	+2.8	-51.0
Subtotal	+304.9	+63.4	+3.0	+371.3
Current Change:				
Quantity	-	-	+14.7	+14.7
Schedule	-	-	-	-
Engineering	+2.4	-	-	+2.4
Estimating	+10.0	+114.6	-	+124.6
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+12.4	+114.6	+14.7	+141.7
Total Changes	+317.3	+178.0	+17.7	+513.0
Current Estimate	1,435.0	3,787.1	26.6	5,248.7

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

b. 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.
Estimating:	Change to "True" FY 84 Constant $ and general reduction by House Appropriations Committee. Addition of P^{3}I Program for Advanced Warhead, subsequently deleted until threat defined.
Estimating:	FY 88 Appropriation Act Reductions.
Support:	Navy Industrial Fund Adjustment/CSS Reduction.
Support:	Navy laboratory support of increase testing program.

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.
Estimating:	Change in First Unit (T1) Cost and Learning Curve assumptions and rate effects based on actual data from Prime Contractor and proposed data from Second Source.
Estimating:	Started competition earlier resulting in more torpedoes produced under full competition with resultant savings.
Support:	Navy Industrial Fund/CSS Reduction and reduction of initial spares requirements based on required initial outfitting requirements for IMA.
Support:	Shift of Spares requirements from FY 88/89 to out years.

MILCON

Estimating:	Change to "True" FY 84 Constant $ (+.2 impact on Constant $, no impact on then-year $)
Support:	Addition of Intermediate Maintenance Activity at Charleston, S.C.

c. Current Change Explanations --

		(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E			
Estimating:	Projected Honeywell Over Target Costs	+4.8	+5.6
Estimating:	Projected Government Cost Increases	+5.2	+7.1
Engineering:	Afterbody Anomalies.	+2.4	+2.9
(2) Procurement			
Economic:	Revised Escalation Rates.	-	-110.6
Estimating:	Changes based on negotiated values of torpedo and support equipment in the Honeywell and Westinghouse LRIP Contracts.	+114.6	+168.4

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

(3) MILCON

Quantity:	Change of 5 IMA facilities for MK 50 from dual use to system specific	+14.7	+21.2

14. (U) 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	
.827	-.059	-	-	+.046	-	-	+.033	+.020	.847

b. Current Baseline Estimate to Current Estimate

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
.847	-.098	-	+.121	+.004	-.005	-	-.010	+.012	.859

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

a. RDT&E --

Torpedo:
Honeywell, USD, Hopkins, MN
N00024-83-C-6254, CPIF
Award: August 1, 1983
Definitized: April 25, 1984

Initial Contract Price		
Target	Ceiling	Quantity
491.1	N/A	90

Current Contract Price		
Target	Ceiling	Quantity
672.0	703.2	90

Estimated Price at Completion	
Contractor	Program Manager
675.1	678.6

	Cost Variance	Schedule Variance
Previous Cumulative Variance	+2.6	-6.2
Cumulative Variances to Date (11/30/88)	-5.7	-12.6
Net Change	-8.3	-6.4

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 modification executed to change the contract to CPIF with a firm ceiling price. The restructure has restored RDT&E torpedo quantities to the original baseline of 90 and the program is no longer dependent on WPN funds to finish OT II Testing. The current cost and schedule variance reflects Honeywell's performance since August 1987.

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

b. (U) Procurement --

Torpedo:
Honeywell, USD, Hopkins, MN
N00024-89-C-6040, FPI
Award: October 6, 1988
Definitized: October 6, 1988

Initial Contract Price		
Target	Ceiling	Quantity
173.2	189.1	76

Current Contract Price		
Target	Ceiling	Quantity
173.2	189.1	76

	Cost Variance	Schedule Variance
Previous Cumulative Variances	0	0
Cumulative Variances to Date	0	0
Net Change	0	0

Torpedo:
Westinghouse, Inc., Baltimore, MD
N00024-87-C-6378, FPI
Award: December 15, 1988
Definitized: December 15, 1988

Initial Contract Price		
Target	Ceiling	Quantity
125.5	142.3	74

Current Contract Price		
Target	Ceiling	Quantity
125.5	142.3	74

	Cost Variance	Schedule Variance
Previous Cumulative Variances	0	0
Cumulative Variances to Date	0	0
Net Change	0	0

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

a. (U) Program Status --

(1) Percent Program Completed: 53.6% (15/28 years)
(2) Percent Program Cost Appropriated: 26.2% ($1,769.2/$6,741.1M).

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY 75-89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance to Complete (FY 92-01)	Total
RDT&E	1,372.7	63.6	11.4	--	1,447.7
Procurement	384.2	272.3	333.7	4,269.7	5,259.9
MILCON	12.3	--	--	21.2	33.5
Total	1,769.2	335.9	345.1	4,290.9	6,741.1

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

(b)(1)

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

Fiscal Year	Qty	Swimaway FY 84 Dollars Non-Rec	Swimaway FY 84 Dollars Rec	Total Base Year$	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate %
Appropriation: MILCON								
1982	-	-	-	9.1	8.9	8.9	8.9	7.6
1989	-	-	-	2.8	3.4	-	-	4.0
1992	-	-	-	1.6	2.1	-	-	2.8
1995	-	-	-	4.5	6.3	-	-	1.8
1997	-	-	-	4.3	6.3	-	-	1.8
1999	-	-	-	4.3	6.5	-	-	1.8
Subtotal	-	-	-	26.6	33.5	-	-	-
TOTAL	-	-	-	5,248.7	6,741.1	-	-	-

17. (U) Production Rate Data:

a. Annual Production Rates -- (NOTE: Funded Delivery Period is 6 months for FY 88 Current Estimate only. All other FDPs are 12 months.)

Fiscal Year Buy	Production Rates (Quantity/Year) Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1987	84	N/A	0	N/A
1988	352	N/A	20	N/A
1989	504	N/A	140	N/A
1990	1,260	N/A	200	N/A
1991	1,260	N/A	270	N/A
1992	1,260	N/A	465	N/A
1993	1,260	N/A	732	N/A
1994	1,260	N/A	940	N/A
1995	503	N/A	980	N/A
1996	N/A	N/A	1000	N/A
1997	N/A	N/A	1000	N/A
1998	N/A	N/A	1000	N/A
1999	N/A	N/A	1006	N/A
2000	N/A	N/A	-	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$)	N/A	N/A	5,248.7	N/A	N/A
	(TY$)	N/A	N/A	6,741.1	N/A	N/A
PAUC	(BY$)	N/A	N/A	.7	N/A	N/A
	(TY$)	N/A	N/A	.9	N/A	N/A

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

c. 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	10/88	N/A	N/A
Duration (in Months)	N/A	N/A	163	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	7/01	N/A	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	46/40
Procurement	0/0

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

(AVERAGE UNIT SWIMAWAY COST)

	DEVELOPMENT ESTIMATE	CURRENT ESTIMATE	LATEST APPROVED THRESHOLD
@ Quantity:	1,000	1,000	1,000
@ Peak Rate:	83/MO	83/MO	83/MO
FY 84 Base-Year $	.378	.372	.378
Then - Year $	.514	.503	.514

18. (U) Operating and Support Costs:

a. N/A

b. 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&MN	.059	.188	0	TBD	TBD
Industrial Fund	0	0	0	0	0
TOTAL	.059	.188	0	TBD	TBD

SAR-88-015

(2) ~~SECRET~~

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ASPJ

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: AIRBORNE SELF-PROTECTION JAMMER (ASPJ)

RDT&E SAR ONLY AS OF DATE: DECEMBER 31,1988

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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

~~AS AMENDED~~

4. Program Elements/Procurement Line Items:
RDT&E PE 0604270N (PU W0619, W0638)
PE 0604270F (PW 2712, 2719)
PROCUREMENT: N/A
MILCON: N/A

5. Related Program: None

~~Classified by: OPNAVINST 5513.1C(92)~~ (THIS PAGE IS UNCLASSIFIED)
~~Declassify on: OADR~~

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OASD(PA) DFOISR 88-T-0564

6. (U) Mission and Description: The Airborne Self-Protection Jammer (ASPJ) program is a joint Navy and Air Force effort to develop defensive electronic countermeasures systems to provide tactical aircraft self protection against radar directed threats from the early 1990's into the twenty-first century.

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 is 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. On 31 August 1987, a PV contract for 6 units with an option for 14 units was signed.

b. Significant Developments Since Last Report -- The ASPJ program has completed Phase II of the Full Scale Development (FSD) DT&E with the completion of DT-IIC on 2 June 1988, F-16A ram air lab tests at Arnold Engineering Development Center on 2 September 1988, and F-16A pre-amp and environmental flight tests in December 1988. This phase of DT&E supports the Milestone (MS) IIIA decision. A limited initial operational assessment (OT-IIA) was completed on 8 July 1988. The results of DT-IIC and OT-IIA supported a mid-August Navy/Air Force Systems Acquisition Review Council (N/AFSARC) approval to proceed with the PV system option, and on 31 August 1988 the PV option contract was signed to purchase 14 additional PV systems. Operational testing to support the MS IIIA decision began at the Naval Weapons Center on 23 July 1988 with the start of OT-IIC by the Navy's Operational Test and Evaluation Force (OPTEVFOR). Air Force Operational Test And Evaluation Center (AFOTEC) began an initial operation lab test (OT-IIB) at the Air Force Electronic Warfare Evaluation Simulator (AFEWES) in mid-September to evaluate ASPJ's

operational capabilities in a high pulse density environment. OT-IIB was completed 28 October 1988, following which AFOTEC began its portion of OT-IIC, F-16A flight testing in mid-November. OPTEVFOR completed the F/A-18A portion of OT-IIC flight testing 16 November 1988. The results of OT-IIA, B and C, and DT-IIC will be used to support the MS IIIA decision. An initial F/A-18C/ASPJ integration effort was completed in December 1988, following lab, ground and flight testing, in preparation for the next series of ASPJ DT&E and OT&E. Also, the AV-8B ASPJ pod version completed its initial phase of integration in preparation for aircraft/ASPJ ground integration tests at the Naval Air Test Center in 1989. F-16C, Block 40 integration is ongoing at the General Dynamics Systems Integration Lab, and the F-14D/ASPJ integration effort is also continuing at the Grumman Aircraft Company.

c. Change Since "As of" Date — None

8. (U) Threshold Breaches: There are currently no DAE baseline breaches, DCP (dated 19 January 1981) breaches, DSDDM (dated 24 February 1982) or USD (C^3I) DM (dated 20 March 1984) breaches.

(b)(1)

b. Previous Change Explanations —

Combined DT-IIC/OT-IIA is a Joint Resources Management Board (JRMB) November 1986 directed requirement to validate system permformance in order to award the production verification contract. DAB IIIA was rescheduled from August 1988 to November 1988 to accommodate improvements in final flight test software.

c. Current 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.

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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: DAE Baseline approved 17 February 1988.

(D)(1)

d. Current Change Explanation —

(Ch-1) Revised estimate based upon demonstrated system performance.

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: DAE Baseline approved 17 February 1988.

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

a. Cost —	Development Est	Approved Prog	Cur Est
Development (RDT&E)	227.7	561.4	561.4
Procurement	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total FY84 Base Year $	227.7	561.4	561.4
Escalation	8.7	+42.5	+42.5
Development (RDT&E)	(8.7)	(+42.5)	(+42.5)
Procurement	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total Then-Year $	236.4	603.9	603.9
b. Quantities —			
Development RDT&E	12	12	12
Procurement*	N/A	N/A	N/A
Total	12	12	12

* Procurement costs are included in the host aircraft procurement budgets. Estimates for procurement is 1,844 systems plus spares.

c. Foreign Military Sales — To be determined

d. Nuclear Costs — None

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:
FY90/91 President's Budget.

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	-1.5	--	--	-1.5
Quantity	--	--	--	--
Schedule	+25.4	--	--	+25.4
Engineering	+52.1	--	--	+52.1
Estimating	+259.3	--	--	+259.3
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+335.3	--	--	+335.3
Current Changes:	--	--	--	--
Economic	+0.1	--	--	+0.1
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+32.1	--	--	+32.1
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+32.2	--	--	+32.2
Total Changes	+367.5	--	--	+367.5
Current Estimate	603.9	--	--	603.9

13. (U) 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	+248.1	--	--	+248.1
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+310.7	--	--	+310.7
Current Changes:	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+23.0	--	--	+23.0
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+23.0	--	--	+23.0
Total Changes	+333.7	--	--	+333.7
Current Estimates	561.4	--	--	561.4

b. Previous Change Explanations --

RDT&E

Economic	Revised Jan 88 Escalation Rates (Economic)
Estimating	Allocation adjustments (FY85 and Prior)
	APB FY88/89 Adjustment
	Nov 86 JRMB Directed Change (FY86)
	Disapproved ATR (FY87)
	JRMB Directed Operational Test (FY89)

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Jan 89		+0.1
Escalation rates (Economic)		
Re-allocation of prior year (FY 88 and Prior) unobligated balances (Estimating)	-0.8	-0.9
Cancellation of AF P^3I (FY88) (Estimating)	-1.0	-1.2
Delay in completion of F-16 Testing (FY88) (Schedule)	-1.7	-2.0
Delay in Completion of F-16 Testing (FY89) (Schedule)	+1.7	+2.0
Operational Testing to support 1992 IIIB Decision (FY90 +0.4, FY91 +1.9) (Estimating)	+1.8	+2.3
Restructure of the Pre-Planned Program Improvement (P^3I) Plan (FY90 -10.4, FY91 -15.4, FY92 +10.1, FY93 +23.0, FY94 +25.0) (Estimating)	+23.0	+32.0
Outyear FYDP adjustment (FY92) (Estimating)		-0.1

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	80.8	N/A	12

N00019-81-C-0369, CPAF
Definitized: August 27, 1981

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: Full Scale Development (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: 81.4% (491.6/603.9)

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	491.6	15.8	18.8	77.7	603.9

c. Annual Summary -- (Navy and Air Force Total)

APPROPRIATION: RDT&E SUMMARY

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 %
1978		2.6		2.6	2.6	2.6	2.6	
1979		20.4		20.4	20.4	20.4	20.4	
1980		22.3		22.3	22.3	22.3	22.3	
1981		40.3		40.3	40.3	40.3	40.0	
1982		78.4		78.4	78.4	78.3	78.2	
1983		82.6		82.6	82.6	82.6	81.5	
1984		81.9		81.9	83.5	83.5	80.5	3.80
1985		55.4		55.4	58.2	58.2	56.5	3.40
1986		28.6		28.6	30.9	30.9	28.5	2.80
1987		19.2		19.2	21.4	19.8	15.7	2.70
1988		28.6		28.6	32.9	24.7	18.5	3.10
1989		15.1		15.1	18.1	8.0	0.4	4.00
1990		12.8		12.8	15.8	0.0	0.0	3.60
1991		14.7		14.7	18.8	0.0	0.0	3.30
1992		22.8		22.8	29.7	0.0	0.0	2.80
1993		17.3		17.3	23.0	0.0	0.0	2.30
1994		18.4		18.4	25.0	0.0	0.0	1.80
TOTAL		561.4		561.4	603.9	471.6	445.1	

c. Annual Summary -- (Navy and Air Force Total Cont'd)

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year $	Total Then-Year			Esc Rate (%)
		Nonrec	Rec		Prog	Oblig	Expended	
APPROPRIATION: RDT&E NAVY								
1978		2.6		2.6	2.6	2.6	2.6	
1979		15.6		15.6	15.6	15.6	15.6	
1980		13.2		13.2	13.2	13.2	13.2	
1981		28.1		28.1	28.1	28.1	27.8	
1982		24.0		24.0	24.0	23.9	23.8	
1983		32.8		32.8	32.8	32.8	31.7	
1984		41.0		41.0	41.8	41.8	38.8	3.80
1985		32.3		32.3	33.9	33.9	32.2	3.40
1986		20.7		20.7	22.4	22.4	20.0	2.80
1987		8.6		8.6	9.6	9.6	7.0	2.70
1988		14.0		14.0	16.1	16.1	13.0	3.10
1989		6.7		6.7	8.1	5.3	0.4	4.00
1990		7.6		7.6	9.4	0.0	0.0	3.60
1991		9.7		9.7	12.4	0.0	0.0	3.30
1992		18.2		18.2	23.7	0.0	0.0	2.80
1993		17.3		17.3	23.0	0.0	0.0	2.30
1994		18.4		18.4	25.0	0.0	0.0	1.80
TOTAL		310.8		310.8	341.7	245.3	226.1	

Fiscal Year	Qty	Flyaway FY84 Dollars		Total Base Year $	Total Then-Year			Esc Rate %
		Nonrec	Rec		Prog	Oblig	Expended	
APPROPRIATION: RDT&E AIR FORCE								
1979		4.8		4.8	4.8	4.8	4.8	
1980		9.1		9.1	9.1	9.1	9.1	
1981		12.2		12.2	12.2	12.2	12.2	
1982		54.4		54.4	54.4	54.4	54.4	
1983		49.8		49.8	49.8	49.8	49.8	
1984		40.9		40.9	41.7	41.7	41.7	3.80
1985		23.1		23.1	24.3	24.3	24.3	3.40
1986		7.9		7.9	8.5	8.5	8.5	2.80
1987		10.6		10.6	11.8	10.2	8.7	2.70
1988		14.6		14.6	16.8	8.6	5.5	3.10
1989		8.4		8.4	10.0	2.7	0.0	4.00
1990		5.2		5.2	6.4	0.0	0.0	3.60
1991		5.0		5.0	6.4	0.0	0.0	3.30
1992		4.6		4.6	6.0	0.0	0.0	2.80
1993		0.0		0.0	0.0	0.0	0.0	2.30
1994		0.0		0.0	0.0	0.0	0.0	1.80
TOTAL		250.6		250.6	262.2	226.3	219.0	

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 ofa 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-35 SEA LANCE

SAR-88-041

~~CONFIDENTIAL~~

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

PROGRAM: SEA LANCE (ASW Standoff Weapon)

AS OF DATE: December 31, 1988

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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: 222-7997
COMMERCIAL: (202) 692-7997

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

RDT&E: PE 0603367N (FY86 & Prior)
PE 0604309N

PROCUREMENT: APPN 1507 ICN 4110

MILCON: PE 24896N

[redacted]

[redacted]

[redacted]

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.

6. (U) **Mission and Description:** To provide a long-range, quick reaction antisubmarine weapon which is compatible with existing and planned submarine and surface ship sensors and combat control systems. Projected improvements in Soviet submarine localization and targeting, coupled with their existing long-range weapons and higher speed submarines, demand a new submarine and surface launched ASW standoff weapon capability. SEA LANCE is being designed for MK-41 Vertical Launching System (VLS) equipped surface ships and for the SSN 637, 688 and 21 attack class submarines conducting ASW missions. Current plans provide for the retirement of SUBROC from attack class submarines beginning in the 1990's. SEA LANCE will be configured to deliver a conventional Torpedo MK 50 payload. Consistent with OR-5A506, SEA LANCE may be configured to carry a tactical Nuclear Depth Bomb (NDB). The SEA LANCE system consists of a common flight vehicle/missile and two launch adaptors.

- The **submarine launch adaptor** consists of a composite capsule (with associated hardware) which provides physical compatibility with the submarine, environmental protection for the missile, and buoyancy to bring the weapon to the surface. Following tube launch from the submarine, the encapsulated missile floats to the surface where, upon sensing broach, the capsule's forward closure is explosively removed and the rocket motor ignites.

- The **surface launch adaptor** consists of the missile adaptor and associated hardware for integration with the VLS canister. The VLS canister and missile adaptor provide 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 January 1980.

- Four Concept Formulation Study (CFS) Phase contracts were awarded 1 February 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 December 1982.

- SEA LANCE received DSARC II approval in April 1986. The SAR submitted for the quarter ending 30 September 1986 reflected program rebaselining from a planning to a development estimate.

- A Full Scale Development contract was awarded in July 1986.

- On 26 August 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.

- During development of the amended FY88/89 biennial budget the program was revised to provide for continued development of SEA LANCE through initial missile tests.

b. Significant Developments Since Last Report -- 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 February 1988, and a Secretary of the Navy Memorandum for the Secretary of Defense (U), 26 April 1988. SEA LANCE is expected to fulfill all current mission requirements.

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

8. (U) Threshold Breaches: There are several DAE baseline schedule breaches.

(b)(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.

c. Current Change Explanations --

(CH-1) DAE baseline additions pending.

(CH-2) Schedule changes due to program restructuring to a combined surface and submarine launched ASWSOW program.

	From	To
Milestone IIIA	Aug 92	Jun 92
Production Contract Award	Apr 92	Oct 91
Milestone IIIB (Full Rate Prod.)	Jul 93	Jan 94
Start TECH EVAL - Submarine (MK 50)	Jun 92	Nov 92
Start OP EVAL - Submarine (MK 50)	Sep 92	Feb 93

d. References --

Development Estimate: SDDM, dated 28 May 1986, subject "SEA LANCE Antisubmarine Warfare Standoff Weapon Milestone II Decision Memorandum."

Approved Program: DAE baseline signed: 17 February 1988.

(b)(1)

(b)(1)

SEA LANCE (ASW Standoff Weapon), December 31, 1988

(b)(1)

Sea Lance (ASW Standoff Weapon), December 31, 1988

(b)(1)

(b)(1)

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

a. Summary -- (FY 1985 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	733.7	1,132.0	17.5	1,883.2
Previous Changes:				
Quantity	-16.5			-16.5
Schedule	134.5	30.8	1.0	166.3
Engineering				
Estimating	-66.9	-10.7	-.2	-77.8
Other				
Subtotal	51.1	20.1	.8	72.0
Current Changes:				
Quantity	4.2	993.0		997.2
Schedule	81.7	88.3		170.0
Engineering	77.3			77.3
Estimating		-628.6		-628.6
Other				
Support			5.8	5.8
Subtotal	163.2	452.7	5.8	621.7
Total Changes	214.3	472.8	6.6	693.7
Current Estimate	948.0	1604.8	24.1	2,576.9

b. Previous Change Explanations --

RDT&E

Economic: revised escalation indicies
Schedule: delays due to program restructuring
Estimating: miscellaneous shared budget reductions

Procurement

Economic: revised escalation indicies
Schedule: delays due to program restructuring
Estimating: offset to revision caused by new escalation indicies

MILCON

Economic: revised escalation indicies
Schedule: delays due to program restructuring
Estimating: offset to revision caused by new escalation indicies

c. Current Change Explanations --

	(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E		
Revised economic escalation indices. (Economic)	N/A	-2.8
FSD missile quantity increased. (Quantity)	4.2	5.2
Reflects schedule delays due to program restructuring. (Schedule)	81.7	92.3
Reflects increased engineering costs associated with the surface variant. (Engineering)	77.3	108.2

13. (U) Cost Variance Analysis (Cont'd):	(Dollars in Millions) Base Year $	Then Year $
(2) Procurement		
Revised economic escalation indices (Economic)	N/A	-38.6
Reflects procurement of the surface variant (2171 units). (Quantity)	993.0	1,409.9
Reflects procurement of delay of 2 years due to program restructuring. (Schedule)	88.3	103.4
Reflects cost economies associated with an increased procurement quantity and a lower average cost for the surface variant. (Estimating)	-628.6	-814.4
(3) MILCON		
Revised economic escalation indices (Economic)	N/A	.0
Reflects increased facilities requirement for the increased inventory objective (Support)	5.8	8.1

(b)(1)

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

a. RDT&E --

Missile:

Boeing Aerospace Co., Kent, WA
N00024-86-C-6053, CPAF,
Work start date: 30 June 1986
Definitized: 31 July 1986

Initial Contract Price		
Target	Ceiling	Qty
$380.0	N/A	N/A

Current Contract Price		
Target	Ceiling	Qty
$378.0	N/A	N/A

Estimated Price at Completion	
Contractor	Program Manager
$378.0	$378.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-3.1	-8.8
Cumulative Variances To Date (10/31/1988)	-9.0	-4.0
Net Change	-5.9	+4.8

Explanation of Change:

The target contract price decreased from $380.0 to $378.0 to reflect deferral of the NDB variant.

Cost and schedule variances are unfavorable. Unfavorable cost variances, driven by the prime contractor and a major subcontractor, are attributable to indirect (overhead) rates and labor and material overruns in the manufacturing, engineering, fabrication, software development complexities, and certification of test hardware items. Schedule variances, although improving, continue to be driven by prime contractor and major sub-contractor design changes, late release of drawings, unavailability of purchased parts, and increased hardware delivery lead times.

Sea Lance (ASW Standoff Weapon), December 31, 1988

(b)(1)

(b)(1)

(b)(1)

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

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
Procurement	0/0

e. Approved Design-to-Cost Goal --
(Average Unit Procurement Cost)

	Develop Est/ DAE Baseline	Current Estimate	Latest Approved Threshold
	@ Peak Rate 18/mo	@ Peak Rate 36/mo	@ Peak Rate 18/mo
FY85 Base-Year $	0.843/0.866	0.457	0.866
Then-Year $	1.123/1.169	0.635	1.169

18. (U) Operating and Support Costs:

a. Assumptions and Ground Rules -- The O & S costs are for the government and contractor efforts required for the IMA operations, ISEA functions, and fleet technical support. This includes projected maintenance turnarounds and repairs based on a 5 year maintenance cycle.

b. Costs -- (FY1985 Constant (Base-Year) Dollars in millions)

Cost Element	Costs
Total O & S Costs	602.7

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	51.0	51.0

(3)

(UNCLASSIFIED)

SAR-88-060

AF-6 C-17A

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

PROGRAM: C-17A

AS OF DATE: December 31, 1988

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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 Program
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

(UNCLASSIFIED)

SAF/PAS
89-0036-T
OASD(PA) DTOISR 89 #25
0249

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 Feburary 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

7. Program Highlights (Cont'd)

a. Significant Historical Developments (Cont'd) -

Sep 87. 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.

b. Significant Developments Since Last Report -

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 in Oct 90.

This SAR and the funding herein reflect a Multiyear Procurement Strategy for FY 93-96.

The C-17 is expected to satisfy mission requirements.

c. Changes since "As of" Date -

Milestone IIIA approval was received on 18 January 1989.

8. Thresholds Breaches: There are currently no DAE baseline (dated February 1988) breaches, DCP (dated June 1988) breaches, or ADM (dated February 15, 1985) threshold breaches.

9. Schedule:

a. Milestones -	Planning Estimate/ Approved Program*	Current Estimate
(1) Source Selection Decision	Aug 81/NA	Aug 81
(2) Contract Award	Jul 82/NA	Jul 82
(3) Start FSED	Oct 84/Feb 85	Feb 85
(4) Milestone II	Nov 87/Feb 85	Feb 85
(5) First Full Funded Production Lot	Dec 87/NA	Jan 88
(6) Milestone III	Feb 91/NA	N/A
(7) Milestone III A	Nov 87/Jan 89	Jan 89(CH-1)
(8) Milestone III B	Feb 91/Mar 93	Mar 93(CH-2)
(9) IOC (Delivery of 12th acft)	Jan 92/Sep 92	Sep 92
(10) First Flight	N/A/Aug 90	Aug 90
(11) FOC	N/A/Jan 00 (CH-4)	Jan 00 (CH-4)
(12) Complete DT&E/IOT&E**(CH-3)	N/A/FEB 92	FEB 92

* The approved program reflects dates contained within the DAE Acquisition Program Baseline.

**This does not include 2 months of contingency testing.

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.

9. Schedule (Cont'd)

b. Previous Change Explanations (Cont'd) -

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 was incorrectly shown in the current estimate as Jul 92 in the Dec 1986 SAR, should have been Oct 92.

c. Current Change Explanations -

(Ch-1) Reflects date of accomplishment. Changed from Oct 88 to Jan 89.

(Ch-2) Rescheduled from Oct 92 to Mar 93 to include ORE results.

(Ch-3) Added to reflect DAE Acquisition Program Baseline.

(Ch-4) Reflects initial forecast of Full Operational Capability from TBD to Jan 2000.

9. Schedule (Cont'd)

d. References -

Planning Estimate: PMD 0020(14) dated 25 Jul 83.

Approved Program: DAE baseline dated February 1988.

10. Technical/Operational Characteristics:

a. Technical -	Planning Estimate	Approved Program Goal/Threshold*	Demonstrated Performance	Current Estimate
(1) Mission Completion Success Probability 1/	.93	.97/.93	N/A	.94 (CH-1)
(2) Maintenance Manhours Per Flying Hour (Air Vehicle) 1/	18.6	17.0/18.6	N/A	14.7 (CH-1)
(3) Maximum TOGW (LBS) 2/	N/A	N/A/580,000	N/A	580,000
(4) Mean time between maintenance inherent (HRS) (MTBMI) 1/	N/A	1.78/1.61	N/A	1.90 (CH-1)
(5) Mean Time between Maintenance corrective (HRS) (MTBMC) 1/	N/A	.86/.78	N/A	.93 (CH-1)
(6) Mean Time between removal (HRS) (MTBR) 1/	N/A	3.10/2.80	N/A	5.20 (CH-1)
(7) Mean Man hours to repair (HRS) 1/	N/A	6.71/7.35	N/A	5.09 (CH-1)

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

b. Operational -	Planning Estimate	Approved Program Goal/Threshold*	Demonstrated Performance	Current Estimate
(1) Payload/Range (LBS/NM) 3/	172,200/2400	N/A/172,200/2400	N/A	167,006/2411 (CH-1)
(2) Landing Distance (Ft) 4/	1550	N/A/2650	N/A	2540 (CH-1)
(3) Takeoff Distance (Ft) 5/	6510	N/A/7600	N/A	7300 (CH-1)
(4) Cruise Speed 6/ KTAS	450	N/A/450	N/A	450
(5) Backup Capability (Percent Grade) 7/	2	N/A/2	N/A	2

*The C-17 program has requirements and goals, not thresholds. Requirements and goals are established in the specifications. Requirements are shown in the "Threshold" column. All goals are added per DAE Baseline.

(CH-1) Current estimates reflect the latest projected capabilities of the aircraft. Previously, estimates reflected the approved program requirements.

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.

d. Current Change Explanations -

(CH-1) The operational payloads have been increased by 41 lbs to account for government directed changes to the design of the C-17 aircraft.

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: DAE baseline dated February 1988.

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

a. Cost -	Planning Estimate	Approved Program	Current Estimate
Development (RDT&E)	2704.1	3797.8	3797.8
Procurement	16793.2	17969.6	17969.6
Airframe	(11229.3)	(11221.7)	(11221.7)
Engine	(2371.6)	(2937.3)	(2937.3)
Avionics	(687.1)	(571.4)	(571.4)
Total Flyaway	(14288.0)	(14730.4)	(14730.4)
Peculiar Support	(314.2)	(1417.8)	(1417.8)
Other Weapon System Cost	(1139.4)	(64.8)	(64.8)
Initial Spares	(1051.6)	(1756.6)	(1756.6)
Construction (MILCON)	47.3	187.7	187.7
Total FY81 Base-Year $	19544.6	21955.1	21955.1
Escalation	20209.2	15499.5	15499.5
Development (RDT&E)	(1242.9)	(1563.5)	(1563.5)
Procurement	(18939.6)	(13817.8)	(13817.8)
Construction (MILCON)	(26.7)	(118.2)	(118.2)
Total Then-Year $	39753.8	37454.6	37454.6

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: FY 90/91 President's Budget

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

a. Program Acquisition --

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
	(Dec 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	37454.6	35695.1	37454.6
(2) Quantity	211	211	211
(3) Unit Cost	177.510	169.172	177.510

b. Current Procurement --	(FY1989)	(FY1989)*	(FY1990)
(1) Cost	1099.3	1099.3	1979.3
Less CY Adv Proc	99.9	99.9	167.6
Plus PY Adv Proc	66.3	66.3	99.9
Net Total	1065.7	1065.7	1911.6
(2) Quantity	4	4	6
(3) Unit Cost**	266.425	266.425	318.600

*Adjusted to reflect FY89 Appropriation Act in accordance with Congressional change to SAR law.

**The increase in unit cost from FY89 to FY90 is due to the phase in of the support elements in the program.

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	-193.4	-5643.2	-4.2	-5840.8
Quantity	0.0	0.0	0.0	0.0
Schedule	+334.9	+212.0	0.0	+546.9
Engineering	+ 32.2	+214.5	0.0	+246.7
Estimating	+432.4	-1144.0	+85.5	-626.1
Other	0.0	0.0	0.0	0.0
Support	+394.6	+1220.0	0.0	+1614.6
Subtotal	+1000.7	-5140.7	+81.3	-4058.7
Current Changes:				
Economic	+1.6	-523.1	-2.9	-524.4
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	+71.0	+64.1	0.0	+135.1
Estimating	+498.2	+1601.6	+153.5	+2253.3
Other	0.0	0.0	0.0	0.0
Support	-157.2	+52.7	0.0	-104.5
Subtotal	+413.6	+1195.3	+150.6	+1759.5
Total Changes	+1414.3	-3945.4	+231.9	-2299.2
Current Estimate	5361.3	31787.4	305.9	37454.6

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	+22.5	+115.0	0.0	+137.5
Estimating	+338.9	-579.0	+44.9	-195.2
Other	0.0	0.0	0.0	0.0
Support	+277.7	+682.0	0.0	+959.7
Subtotal	+814.9	+228.8	+44.9	+1088.6
Current Changes:				
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	+48.2	+36.3	0.0	+84.5
Estimating	+342.6	+859.3	+95.5	+1297.4
Other	0.0	0.0	0.0	0.0
Support	-112.0	+52.0	0.0	-60.0
Subtotal	+278.8	+947.6	+95.5	+1321.9
Total Changes	+1093.7	+1176.4	+140.4	+2410.5
Current Estimate	3797.8	17969.6	187.7	21955.1

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.

13. Cost Variance Analysis (Cont'd)

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

Support: Reestimate of support requirement based on ICA; Redefinition of requirements due to decrease in simulators.

Engineering: Addition of DoD standard avionics racks and On Board Inert Gas Generating System.

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, and DoD standard avionics racks.

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.

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.

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.

c. Current Change Explanations-

(Dollars in Millions)

RDT&E	Base Year	Then Year
Revised economic escalation Indices (Economic)	N/A	+1.6
Adjustments for current and prior year escalation change (Estimating)	- 3.1	- 4.2
Net impact of increase to Training and decreases in Data and PSE requirements (Support)	-112.0	-157.2
Added Live Fire Test requirements and capability enhancements (Engineering)	+48.2	+71.0
Increase to Development costs due to revised projection of engineering manhours (Estimating)	+157.5	+240.0
Reestimate of contract cost identified in comprehensive Annual Estimates (Estimating)	+188.2	+262.4
PROCUREMENT		
Revised economic escalation indices. (Economic)	N/A	- 523.1
Adjustment for current and prior year recurring flyaway escalation change (Estimating)	+4.0	+ 6.3
Adjustment for current and prior year support escalation change (Support)	+1.1	+1.6

13. Cost Variance Analysis (Cont'd)

c. Current Change Explanations (Cont'd)

Increase in support requirements due to additional Auxiliary Power Units, Quick Engine Change Kits and Training System Spares (Support)	+50.9	+ 51.1
Added capability enhancements*(Engineering)	+36.3	+64.1
Change in estimate due to addition of Multiyear acquisition strategy for FY93-96 (Estimating)**	-518.6	-931.9
Increase to recurring Airframe based on revised manufacturing learning curve projections (Estimating)***	+535.0	+978.0
Decrease to engine based upon projected lower negotiated costs (Estimating)	- 89.8	-157.4
Reestimate of Flyaway cost based on higher recurring Airframe and Avionics (Estimating)***	+928.7	+1706.6
MILCON		
Revised economic escalation indices (Economic)	N/A	-2.9
Adjustments for current and prior year escalation change (Estimating)	- .1	- .1
Reestimate of construction costs based on updated site surveys and estimating factors (Estimating)	+95.6	+153.6

*The Air Force is currently negotiating an agreement with Douglas Aircraft Company which would add capability to the C-17 weapon system. While the content of this package is subject to change, it includes such enhancements as SATCOM Group A/Army Radio, cockpit Night Vision Goggle (NVG) capability, Automatic Stabilizer Struts, underfloor smoke detection, IFF Group A.

**SAR values are prior to Douglas Aircraft Company's final estimates of multiyear impacts. The program office has updated numbers since budget inputs were made to the SAR. The current multiyear values will continue to be evaluated and will be incorporated in future SAR updates as required.

***While there is some risk that these costs will occur, the Air Force (program office) has initiated several efforts to avoid these costs and is managing to a zero delta. These initiatives include specific Total Quality Management efforts, incremental should cost, could cost, procurement pooling and other efforts. As these efforts come to fruition, the program office will update the SAR to reflect the best estimate.

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 (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
188.407	-30.167	0	2.592	1.809	7.712	7.157	0	-10.897	177.510

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

a. RDT&E

McDonnell Douglas Corp.

Douglas Aircraft Co.
Long Beach, CA
F33657-81-C-2108 FPIF
AWARD: 23 July 1982
Definitized: 31 Dec 1985

Initial Contract Price		
Target	Ceiling	QTY
$31.6	$31.6	0

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
4244.0	4912.5*	1	4687.0	4848.4

* 130% of target cost

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-24.5	$-49.1
Cumulative Variances to Date (27 Nov 88)	$-203.7	$-158.5
Net Change	$-179.2	$-109.4

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

a. RDT&E (Cont'd)

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 15% over the plan to minimize schedule delays.

Schedule Variance: The net change in schedule variance is a result of late engineering drawing releases to suppliers and tooling capacity limitations. A manufacturing rephase was adopted to realign need dates to expected delivery milestones in order to protect T-1 First Flight of Aug 90.

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: 9 years/ 18 years = 50%

(2) Percent Program Cost Appropriated: $5117.2/ $37454.6 = 13.7%

b. Appropriation Summary --

Appropriation	Prior Years (FY81 - 89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance To Complete (FY 92 - 98)	Total
RDT&E	3297.6	954.4	503.9	605.4	5361.3
Procurement	1814.6	1979.3	2595.7	25397.8	31787.4
MILCON	5.0	4.7	16.6	279.6	305.9
Total	5117.2	2938.4	3116.2	26282.8	37454.6

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

c. Annual Summary --

Fiscal Year	FY 81 Base-Year Dollars Qty	Flyaway Nonrec	Flyaway Rec	Total	Total Then-Year $ Program	Obligated*	Expended*	Escl Rate %
				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				473.7	628.6	625.6	607.0	2.7
1988				802.7	1105.3	1096.0	527.2	3.1
1989				681.0	972.5	878.7	.4	4.0
1990				647.1	954.4			3.6
1991				331.7	503.9			3.3
1992				297.2	462.5			2.8
1993				81.6	129.5			2.3
1994				8.3	13.4			1.8
Subtotal	1	N/A	N/A	3797.8	5361.3	3191.5	1725.3	
				APPROPRIATION: PROCUREMENT				
1987	0	9.6	0	32.9	49.1	49.0	15.6	2.7
1988	2	47.4	355.4	430.9	666.2	653.4	.6	3.1
1989	4	17.9	499.6	687.9	1099.3			4.0
1990	6	43.7	701.8	1203.2	1979.3			3.6
1991	10	65.7	967.5	1539.6	2595.7			3.3
1992	20	70.4	1631.5	2517.9	4333.3			2.8
1993	29	0	1888.7	2590.5	4541.1			2.3
1994	29	0	1869.3	2133.9	3806.9			1.8
1995	29	0	1751.5	1919.0	3484.9			1.8
1996	29	0	1686.3	1756.6	3248.0			1.8
1997	29	0	1757.8	1929.3	3630.9			1.8
1998	23	0	1366.2	1227.9	2352.7			1.8
Subtotal	210	254.7	14475.6	17969.6	31787.4	702.4	16.2	

* Reflects Program Office records as of 31 Dec 88.

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

APPROPRIATION - MILCON*

Fiscal Year	Qty	Flyaway Base Year 81 $ Non Rec	Flyaway Base Year 81 $ Rec	Total Base Year 81$	Total Then-Year $ Program	Obligated	Expended	Escl Rate %
1989				3.4	5.0	0	0	4.0
1990				3.1	4.7			3.6
1991				10.7	16.6			3.3
1992				9.4	14.9			2.8
1993				53.4	85.9			2.3
1994				42.6	69.8			1.8
1995				57.9	96.7			1.8
1996				7.2	12.3			1.8
Subtotal				187.7	305.9			
Total	211	254.7	14475.6	21955.1	37454.6	3893.9	1741.5	

*These values represent active duty requirements through FY 96. Requirements beyond FY96 are still under evaluation and will be reported in a future SAR as required.

17. Production Rate Data: (Cont'd)

a. Annualized Production Rates-- The equivalent annualized production rates shown below differ from the annual funded quantities because the funded delivery period is as follows: FY88-4, FY89-6, FY90-10, FY91-9, FY92-10, FY93-12, FY94-12, FY95-12, FY96-12, FY97-12, FY98-10.

Production Rates (Quantity/Year)

Fiscal Year Buy	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
88	2	N/A	6.0	N/A
89	4	N/A	8.0	N/A
90	10	N/A	7.2	N/A
91	20	N/A	13.3	N/A
92	25	N/A	24.0	N/A
93	25	N/A	29.0	N/A
94	25	N/A	29.0	N/A
95	25	N/A	29.0	N/A
96	25	N/A	29.0	N/A
97	25	N/A	29.0	N/A
98	24	N/A	27.6	N/A
SUB TOTAL	210	N/A		N/A

17. Production Rate Data (Cont'd)

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$)	N/A	N/A	21955.1	N/A	N/A
	(TY$)	N/A	N/A	37454.6	N/A	N/A
PAUC	(BY$)	N/A	N/A	104.053	N/A	N/A
	(TY$)	N/A	N/A	177.510	N/A	N/A

c. 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	1/90	N/A	N/A
Duration (in Months)	N/A	N/A	121	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	1/00	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: 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)	0	0	8.8	TBD	8.8
Industrial Fund	0	0	0	TBD	0.0
Total	0	0	8.8	TBD	8.8

SAR-88-086

AF-5 C-5B

SELECTED ACQUISITION REPORT(RCS:DD-COMP(QA)823)

PROGRAM: C-5B

AS OF: DECEMBER 31, 1988

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1. Designation and Nomenclature (Popular Name): C-5B (GALAXY)

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

Cargo Division
Directorate of Transport & Trainers
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433

PM: MR FRANCIS C. LYMBURNER
Assigned: 21 SEPTEMBER 1987
AV 785-7300; COMM (513) 255-7300

4. Program Elements/Procurement Line Items:

PROCUREMENT: APPN 3010 PE 0401119F ICN C005B0
MILCON: APPN 3300 PE 0401896 (Shared funding)

CLEARED
FEB 10 1989

5. Related Programs: C-5A Wing Modification

6. Mission and Description: Additional airlift is needed for rapid intertheater deployment of combat forces to support national strategy goals and to meet the mobility requirements of a modern army. The C-5B Program was initiated to fulfill the immediate need for additional intertheater airlift capability. The C-5B provides a near term reduction to the airlift shortfall. The aircraft is basically a C-5A with minor configuration changes intended to improve reliability. The aircraft will be a multi-engine turbofan aircraft designed to airlift substantial payloads, including outsize combat equipment,

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over intercontinental ranges without refueling and deliver this equipment/cargo for rapid intertheater deployment of combat forces. The C-5B augments existing C-5A squadrons.

7. Program Highlights:

a. Significant Historical Developments. The Lockheed-Georgia Company submitted an unsolicited Firm Fixed Price (FFP) Proposal for C-5B aircraft to the Secretary of the Air Force in October 1981. Based on the unsolicited proposal the Air Force was directed to procure 50 aircraft officially designated as the C-5B. A preliminary production contract was awarded to Lockheed in October 1982 for start-up and long lead efforts. A supplemental agreement was issued in December 1982 for FY83 start-up, long lead and procurement of one aircraft to be delivered in December 1985. The U.S. Air Force exercised Option One (four aircraft) in December 1983, Option Two (eight aircraft) in December 1984, and Option Three (sixteen aircraft) in November 1985. First flight of the C-5B occurred on September 10, 1985 (on schedule) and delivery of the first aircraft was accomplished on December 28, 1985 (also on schedule). Renegotiation of the FY87 option (Option Four) for the final 21 aircraft was completed and the option exercised in January 1987. The renegotiated option resulted in a $273M saving. Program Management Responsibility Transfer from Systems Command to Logistics Command has been set at March 1989, after the delivery of the 50th C-5B.

b. Significant Developments Since Last Report. Program is on schedule with 45 aircraft delivered. The Contracting Officer has issued a determination of Defective Pricing against the contractor in the amount of $95M. The contract price was reduced by this amount. Lockheed has appealed this decision to the Armed Services Board of Contract Appeals. The C-5B maintainability demonstration was cancelled based on thorough analysis of field data which indicated that the aircraft were operating at 35.4* maintenance manhours per flying hour (MMH/FH) with a 1.58 - 3.04 utilization rate (UTE). With an adjusted rate of 3.2 (in accordance with the contract) the C-5B would have achieved 24.0 MMH/FH.

The C-5B program is expected to meet mission requirements. This is the final Selected Acquisition Report (SAR) for the C-5B Program due to the program being 93.8% expended and having 90% of deliveries complete.

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

8. Threshold Breaches: -- No DCP. There are no DAE Baseline (dated February 1988) breaches.

* Based on total C-5B fleet SEP/86 to OCT/88.

9. Schedule:

a. Milestones --	Production Estimate/ Approved Program	Current Estimate
Award Initial Contract	Oct 82/N/A	Oct 82
Award Production Contract	Dec 82/Dec 82	Dec 82
First Flight	Sep 85/Sep 85	Sep 85
First Delivery	Dec 85/Dec 85	Dec 85
16th Aircraft Delivery	Jun 87/N/A	Aug 87
50th Aircraft Delivery	Mar 89/Feb 89	Mar 89 (CH-2)
IOC 1/	N/A/N/A	N/A

b. Previous Change Explanations -- The 50th aircraft delivery was erroneously reported as Mar 89 in the Dec 84 SAR. The 16th aircraft delivery occurred in Aug 87 (vs Jun 87). This delay was due primarily to noisy bearings in the main landing gear that had to be replaced.

c. Current Change Explanations -- (CH-1) The current estimate for the 50th aircraft delivery has been changed to Mar 89. This change was due to the use of some critical C-5B parts for the higher priority (FAD 1-1) C-5A Space Cargo Modification Program to fill part shortages.

d. References -- Production Estimate: PMD 2072 (5), 5 April 1983.
Approved Program: DAE baseline dated 9 February 1988.

1/ Follow-on procurement of C-5 aircraft which adds an additional 50 C-5B aircraft to the current C-5A fleet.

10. Technical/Operational Characteristics:

a. Technical --	Prod Estimate/ Appr Prog	Demonstrated Perf	Current Estimate
Maintainability MMH/FH 2/	N/A/N/A	N/A	40.0
Cargo Compartment Size (Ft)			
Height	13.5/13.5	13.5*	13.5
Width	19.0/19.0	19.0*	19.0
Length	144.8/144.8	144.8*	144.8
Wing Span (Ft)	222.8/222.8	222.8*	222.8
b. Operational --			
Payload/Range (lbs/NM)	216,000/2,850/ 216,000/2,850	259,304/2,461	216,000/2,850
Landing Distance (Ft)	2,490/2,490	2,185	2,490
Takeoff Distance (Ft)	7,950/7,950	8,526	7,950
Cruise Speed (KTAS)	450/ 450	450	450

* Mean value

2/ The C-5B contract is structured with a goal of 40 MMH/FH. This is based on operating sixteen aircraft at an average rate of 3.2 flight hours per day per aircraft over three consecutive months from one main operating base. The current fleet average adjusted for the 3.2 UTE rate is 26.6.

c. Previous Changes Explanations -- Demonstrated values for payload/range and takeoff distance are based on increased takeoff gross weight of 797,000-lbs., whereas the production estimate/approved program performance values were based on a takeoff gross weight of 769,000-lbs. The demonstrated performance values for payload/range and takeoff distance reflect performance better than estimated as reported in the Air Force Approved C-5B Flight Test Report, October 1986. Program structured with a goal of 40 MMH/FH.

d. Current Changes -- None.

e. References -- Production Estimate: PMD 2072 (5), 5 April 1983.
Approved Program: DAE baseline dated 9 February 1988.

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

A. Cost --	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	--	--	--
Procurement	5723.9	4418.4	4418.4
Flyaway	(5105.2)	(4210.1)	(4210.1)
Other Wpn Sys Cost	(268.9)	(130.9)	(130.9)
Initial Spares	(349.8)	(77.4)	(77.4)
Construction (MILCON)	121.8	13.8	13.8
Total: Constant FY80$	5845.7	4432.2	4432.2
Escalation	3821.6	2569.9	2569.9
Development			
Procurement	(3750.2)	(2562.3)	(2562.3)
Construction (MILCON)	(71.4)	(7.6)	(7.6)
Total Program Cost (TY$)	9667.3	7002.1	7002.1
B. Quantities			
Development (RDT&E)	--	--	--
Procurement	50	50	50
Total	50	50	50

C. Foreign Military Sales -- None

D. Nuclear Costs -- None

E. References --
Production Estimate: FY1984 President's Budget, January 1983
Approved Program: FY 90-91 President's Budget

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 88 SAR)	(DEC 87 SAR)	(DEC 88 SAR)
(1) Cost	7002.1	7021.1	7002.1
(2) Quantity	50	50	50
(3) Unit Cost	140.042	140.422	140.042
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
(3) Unit Cost	0.0	0.0	0.0

13. Cost Variance Analysis:

A. Summary -- [Current (Then-Year) Dollars in Millions]

	RDTE	PROC	MILCON	TOTAL
Production Estimate	--	9474.1	193.2	9667.3
Previous Changes:				
Economic	--	-273.9	-6.8	-280.7
Quantity	--	--	--	--
Schedule	--	36.0	--	36.0
Engineering	--	--	--	--
Estimating	--	-1578.0	-173.1	-1751.1
Other	--	--	--	--
Support	--	-650.4	--	-650.4
Subtotal	--	-2466.3	-179.9	-2646.2
Current Changes:				
Economic	--	-13.6	--	-13.6
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	-11.0	8.1	-2.9
Other	--	--	--	--
Support	--	-2.5	--	-2.5
Subtotal	--	-27.1	8.1	-19.0
Total Changes	--	-2493.4	-171.8	-2665.2
Current Estimate	--	6980.7	21.4	7002.1

FY 1980 Constant Dollars (Base-Year) in Millions

	RDTE	PROC	MILCON	TOTAL
Production Estimate	--	5723.9	121.8	5845.7
Previous Changes:				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	-888.2	-113.1	-1001.3
Other	--	--	--	--
Support	--	-408.8	--	-408.8
Subtotal	--	-1297.0	-113.1	-1410.1
Current Changes:				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	-6.9	5.1	-1.8
Other	--	--	--	--
Support	--	-1.6	--	-1.6
Subtotal	--	-8.5	5.1	-3.4
Total Changes	--	-1305.5	-108.0	-1413.5
Current Estimate	--	4418.4	13.8	4432.2

13. Cost Variance Analysis (Cont'd):
b. Previous Change Explanations --

RDTE None.

Procurement
Economic: Revised escalation indices.
Estimating: Reduction for ECO and EPA adjustments; re-estimate for prior year escalation; reduction for Defective Pricing; one-time change in advance procurement inflation methodology; adjustment for current and prior year escalation; reduction for re-negotiation of FY87 option.
Support: Reduction of spares requirements and other peculiar support equipment, through the Support Equipment Recommendation Data (SERD) process.
Schedule: Slip of two aircraft from FY85 to FY87.

MILCON
Economic: Revised escalation indices.
Estimating: Adjustment for current and prior year escalation; decrease due to the shift of funding responsibility for reserve aircraft from the C-5B to C-5A Program; additional facilities identified by MAC; USAF reduction of required funding for maintenance hangar and parking ramp extension at Altus AFB, re-estimate for prior year escalation and reduction in MILCON requirements.

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDTE		
N/A		
(2) Procurement		
Revised economic escalation indices. (Economic)	N/A	-13.6
Adjustment for current and prior year escalation. (Estimating)	+8.3	+13.6
Reduction for Defective Pricing. (Estimating)	-0.1	-0.2
Increase for Government Bills of Lading (GBL), Fuel, and MILSTRIP. (Estimating)	+2.1	+3.4
Reduction for Economic Price Adjustments. (Estimating)	-17.2	-27.8

Reduction of provisioning spares due to definitization of actual spare requirements. (Support)	-9.0	-14.9
Increase due to reprogramming of additional funds necessary to acquire the Fuel Savings Advisory Systems/Inertial Navigation System (FSAS/INS) Maintenance Trainer (FIT), Malfunction Detection Analysis Recording Trainer System (MADARTS), Peculiar Ground Support Equipment (PGSE), and Tech Data requirements. (Support)	+7.4	+12.4

(3) MILCON

Increase in FY88 MILCON due to erroneous deletion of required funding for maintenance hangar and parking ramp at Altus AFB. (Estimating)	+ 5.1	+ 8.1

14. Program Acquisition Unit Cost (PAUC) History:
(Millions of Then-Year Dollars)
Initial SAR Estimate to Current Baseline Estimate

Production Estimate PAUC (INITIAL SAR)	ECON	QTY	SCH	ENG	EST	SPT	OTHER	TOTAL	Current Estimate PAUC
193.346	-5.886	--	+.720	--	-35.080	-13.058	--	-53.304	140.042

15. Contract Information: (Then-Year Dollars in Millions)
a. RDTE -- N/A
b. Procurement --

Aircraft	Initial Contract Price Target	Ceiling	Qty
Lockheed-Georgia Co. Marietta, GA F33657-82-C-2117 FFP	$50.0	N/A	0

Award: Oct 22, 1982 Definitzed: Oct 22, 1982

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$6699.5	N/A	50	$6699.5	$6699.5

Aircrew Training System
United Airlines Aircrew
Training Inc.
Lakewood, CO
F33657-84-C-0052 FFP
Award: Oct 30, 1984

Initial Contract Price		
Target	Ceiling	Qty
$120.7	N/A	1

Definitized: Oct 30, 1984

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$121.1	N/A	1	$121.1	$121.1

c. MILCON -- N/A

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

A. Program Status --

(1) Percent Program Completed: 100% (6 yrs/6 yrs)

(2) Percent Program Cost Appropriated: 100%
($7002.1/$7002.1)

B. Appropriated Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY83-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (92-94)	Total
RDT&E	--	--	--	--	
Procurement	6980.7	--	--	--	6980.7
MILCON	21.4	--	--	--	21.4
TOTAL	7002.1	--	--	--	7002.1

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

C. Annual Summary --

FISCAL YEAR	QTY	FLYAWAY BASE YEAR $ 1980 NONREC	FLYAWAY BASE YEAR $ 1980 REC	TOTAL BASE YEAR $	THEN-YEAR DOLLARS PROGRAM	THEN-YEAR DOLLARS OBLIGATED	THEN-YEAR DOLLARS EXPENDED	ESCL. RATE (%)
APPROPRIATION: PROCUREMENT								
1983	1	189.9	204.2	528.5	770.0	770.0	770.0	9.1
1984	4	182.8	506.7	828.1	1257.0	1256.4	1267.4	8.0
1985	8	67.1	719.1	885.6	1389.4	1389.4	1312.8	3.4
1986	16	4.0	1153.0	1206.9	1945.6	1902.0	1793.5	2.8
1987	21	5.2	1178.2	969.3	1618.7	1613.1	1418.4	2.7
SUB-TOTAL	50	449.0	3761.2	4418.4	6980.7	6930.9	6562.1	--

Reflects program office records as of 31 Dec 88.
FY84 expenditures are overstated due to the unilateral deobligation of funds for defective pricing which occured after the contractor had received payment. Demand for payment letter was issued but has not been acted upon pending decision on Lockheed's appeal to the Armed Services Board of Contracts Appeal.
Differences in FY84 and FY86 between obligations and appropriations are due to state tax contingent liability (FY84), defective pricing liability and trainer definitized contractual action (UCA) in FY86. The state tax issue will be resolved at completion of litigation and the defective pricing issue will be resolved when the deferment decision is finalized.

APPROPRIATION: MILCON								
1986	--	--	--	4.6	6.8	6.8	3.8	2.8
1987	--	--	--	0.0	--	--	--	2.7
1988	--	--	--	9.2	14.6	0.0	0.0	3.1
SUB-TOTAL	--	--	--	13.8	21.4	6.8	3.8	--
TOTAL	50	449.0	3761.2	4432.2	7002.1	6937.7	6565.9	--

17. Production Rate Data:

A. Annualized Production Rates -- The annual production rates shown differ from the annual funded quantities because the funded delivery period is 6.0 mos for FY84, 10.0 mos for FY85, 13.0 mos for FY86 and 9.0 mos for FY87.

FISCAL YEAR	PRODUCTION RATES (QUANTITY/YEAR) PRODUCTION ESTIMATE	CURRENT ESTIMATE	MAXIMUM ECONOMIC
APPROPRIATION: PROCUREMENT			
1983	12.0	12.0	12.0
1984	6.9	8.0	8.0
1985	10.9	9.6	9.6
1986	16.0	14.8	14.8
1987	25.3	28.0	28.0

B. Cost variance -- Dollars in Millions

ITEM		PRODUCTION ESTIMATE	VARIANCE (CE-PdE)	CURRENT ESTIMATE	VARIANCE (CE-Max)	MAXIMUM ECONOMIC
Prog Acq Cost	(BY$)	5845.7	-1413.5	4432.2	--	4432.2
	(TY$)	9667.3	-2665.2	7002.1	--	7002.1
AUC	(BY$)	116.914	-28.270	88.644	--	88.644
	(TY$)	193.346	-53.304	140.042	--	140.042

C. Schedule Variance --

ITEM	PRODUCTION ESTIMATE	VARIANCE (CE-PdE)	CURRENT ESTIMATE	VARIANCE (CE-Max)	MAXIMUM ECONOMIC
Start Date (Mo/Yr)	12/82	--	12/82	--	12/82
Duration (in Months)	76.0		76.0		76.0
End Date (Mo/Yr)	3/89	--	3/89	--	3/89

17. Production Rate Data (continued):

D. Deliveries (Plan/Actual) --

	To Date
Procurement	45 / 45

E. Approved Design to Cost Goal -- N/A

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)	3.0	2.6	2.6	TBD	8.2
Industrial Fund	0	0	0	TBD	0.0
Total	3.0	2.6	2.6	TBD	8.2

(3) ~~SECRET~~ SAR-88-066

AF-9 DMSP

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: DMSP BLOCK 5D-2 IMPROVED/5D-3 (U)

AS OF DATE: December 31, 1988

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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 Program Office
Space Division
P.O. Box 92960
Los Angeles AFB, CA 90009-2960

Col Juri Randmaa
Assigned: December 22, 1987
AV: 833-0404; COMM (213) 643-0404

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

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5. (U) Related Programs: None.

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[redacted]

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OASD(PA) DFOISR 89-T-0020

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. 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. Congress approved transition from Atlas to Titan II surplus ICBMs as space launch vehicles beginning in FY 90. 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; CDR was completed in Feb 87. 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. C^3 Sites I, II, and V were turned over to AFSPACECOM. Program Management Responsibility Transfer of Mark IIa and IIIs occurred in Jul 87. New flight software independent validation and verification (IV&V) contract awarded in Feb 87.

b. (U) Significant Developments Since Last Report -- Satellite S-11, the first unit on the multiyear procurement contract, completed testing and was delivered in Dec 88. In Aug 88 an RFP for the procurement of five 5D-3 spacecraft was released; dual multiyear procurement and annual buy proposals were received in Sep 88 and are currently being evaluated; Congressional approval of the multiyear procurement was received in Sep 88. Modification of the Flight Vehicle Simulation Facility (FVSF) was placed on contract in Apr 88.

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

b. (U) Significant Developments Since Last Report (Cont'd) -- The second and third 5D-3 Operational Linescan Systems were delivered in Mar 88 and Nov 88. In Sep 88 a contract was awarded for the procurement of five 5D-3 Operational Linescan Systems. A contract for two microwave sounder/temperature water vapor profile sensors was awarded in Feb 88. Validation of the microwave imager sensor data was completed in Sep 88. P^3I improvements to the Satellite Data Handling System (SDHS) continued; a contract for shared processing for the SDHS was awarded in Sep 88. Program Management Responsibility Transfer (PMRT) of the C^3 system occurred in Oct 88. 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 the Mark IVB Tactical Terminals was awarded in Oct 88 to Lockheed. The Multi-Purpose Satellite Operations Center (MPSOC) upgrade was placed on contract in Sep 88.

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 has been a DAE baseline (dated February 1988) breach of the Block 5D-2. Improved Sattellite (S-11) delivery milestone.

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:			
S-11	N/A/N/A	1 Qtr 90	(CH-1)
S-12	N/A/N/A	4 Qtr 90	(CH-1)
S-13	N/A/N/A	3 Qtr 91	(CH-1)
S-14	N/A/N/A	3 Qtr 92	(CH-1)
S-15	N/A/N/A	4 Qtr 93	(CH-1)
Satellite Deliveries:			
S-11	Jul 87/Nov 87	Dec 88	(CH-2)
S-12	N/A /Sep 89	Sep 89	(CH-3)
S-13	N/A /Mar 90	Mar 90	(CH-3)
S-14	N/A /Sep 90	Sep 90	(CH-3)
S-15	N/A /Sep 90	Sep 90	(CH-3)
IOC - Block 5D-2 Improved (F-11) 1/	TBD/TBD	TBD	
Initial Titan II Capability	N/A/N/A	Oct 90	(CH-1)
Primary Sensor (S11-14) Prod Contract Awd	Jan 84/ N/A	Jan 84	
Spacecraft (S15) Design Contract Awd	Nov 85/ N/A	Jul 86	
IOC - Block 5D-3 (F-15) 1/	TBD/N/A	TBD	
Primary Sensor (S15) Design Contract Awd	Sep 82/ N/A	Sep 82	
Block 5D-3 MY Procurement Contract Award	N/A/N/A	Mar 89	(CH-1)

1/ 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):

a. (U) Milestones (Cont'd)

	Production Estimate/ Approved Program	Current Estimate
Fairchild Satellite Operations Center (FSOC) Operational	Sep 87/N/A	May 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(Ch-5)
Mark IVB Contract Award (Ch 1)	N/A/N/A	Oct 88(Ch-1)
Begin Mark IVB IOT&E (Ch 1)	N/A/N/A	Sep 90(Ch-1)
Mark IVB Production Start (Ch 1)	N/A/N/A	Feb 91(Ch-1)
Mark IVB Retrofit Start (Ch 1)	N/A/N/A	Feb 91(Ch-1)
Final Mark IVB Delivery (Ch 1)	N/A/N/A	Sep 95(Ch-1)
DMSP Milestone V (Ch 1)	N/A/N/A	FY 93 (Ch-1)

b. (U) Previous Change Explanations --

Fairchild (Back-Up) Satellite Operations Center operational (IOC) slipped from Sep 88 to Jan 89 due to delay in contract award, and a second proposal was required to address all AFSPACECOM requirements. Spacecraft (SIS) 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 Oct 88 due to materials problems and late delivery of Government furnished equipment. Thule CRS slipped from Sep 87 to Feb 88 due to FMFM S-Band Downlink Capability modification extending the contract period of performance.

c. (U) Current Change Explanations --

(Ch-1) Not previously reported.

(Ch-2) Slipped from Oct 88 to Dec 88 due to late delivery of electronic piece-parts, qualification problems after spacecraft electronic redesign (due to new parts sources), late delivery of Government furnished equipment, and diversion of manpower to support two launches.

(Ch-3) Reflects DAE Approved Baseline.

(Ch-4) Slipped from Jan 89 to May 89 due to delay in contract award, increased scope of training, and the fact that the original definition of IOC did not account for time required for IOT&E.

(Ch-5) Slipped from Sep 88 to Jun 90 by determination of AFSPACECOM.

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

d. (U) References --

Production Estimate:
PMD R-S 3015 (20), dated 31 May 1983, subject "DMSP"

Approved Program: DAE baseline dated February 1988,

(b)(1)

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.

d. (U) Current Change Explanations --
(Ch 1) Moved from paragraph 10b, Operational Section, as shown in Dec 87 SAR to reflect DAE Baseline.
(Ch 2) Reflects DAE Baseline.

e. (U) References:

Production Estimate:
PMD R-S 3015 (20), dated 31 May 1983, subject "DMSP"

Approved Program: DAE baseline dated February 1988,

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	$ 224.9	$ 224.9
Procurement	491.6	500.1	500.1
Launch Vehicle	(26.0)	(7.2)	(7.2)
Spacecraft	(201.3)	(208.2)	(208.2)
Primary Sensor	(79.6)	(79.7)	(79.7)
Mission Sensors	(57.1)	(62.1)	(62.1)
Support	(48.9)	(50.4)	(50.4)
Total Flyaway	(412.9)	(407.6)	(407.6)
Ground System	(58.0)	(71.1)	(71.1)
Field Level Support	(19.8)	(0.0)*	(0.0)*
Initial Spares	(0.9)	(21.4)	(21.4)
Total Non-Flyaway	(78.7)	(92.5)	(92.5)
Construction (MILCON)	2.6	3.0	3.0
Total FY75 Base-Year $	718.7	728.0	728.0
Escalation	1160.3	1090.1	1090.1
Development (RDT&E)	(318.1)	(299.6)	(299.6)
Procurement	(839.1)	(787.2)	(787.2)
Construction (MILCON)	(3.1)	(3.3)	(3.3)
Total Then-Year $	$1879.0	$1818.1	$1818.1

* Current Estimate now included in Initial Spares Line.

11. (U) Program Acquisition Cost (Cont'd):

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 31 May 1983, subject "DMSP"

Approved Program: FY 90-91 President's Budget.

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1)	Cost	1818.1	1872.4	1818.1
(2)	Quantity	10	10	10
(3)	Unit Cost	181.810	187.240	181.810
b. (U)	Current Procurement --	(FY 1989)	(FY 1989 APPN)*	(FY 1990)
(1)	Cost	173.9	173.9	139.2
	Less CY Adv Proc	-69.0	-69.0	-57.0
	Plus PY Adv Proc	+29.2	+29.2	+46.2
	Net Total	134.1	134.1	128.4
(2)	Quantity	1	1	1
(3)	Unit Cost	134.100	134.100	128.400

* Differs from the Dec 87 SAR to reflect the FY 89 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	-31.1	-132.8	-0.2	-164.1
Quantity	-	+190.2	-	+190.2
Schedule	-	-	-	-
Engineering	-13.6	-52.0	-	-65.6
Estimating	-0.6	-57.6	-	-58.2
Other	-	-	-	-
Support	+25.3	+65.0	+0.8	+91.1
Subtotal	-20.0	+12.8	+0.6	-6.6
Current Changes:				
Economic	-1.8	-2.3	-0.1	-4.2
Quantity	-	-	-	-
Schedule	-	+1.9	-	+1.9
Engineering	-	-	-	-
Estimating	+2.8	-44.3	-	-41.5
Other	-	-	-	-
Support	+0.9	-11.5	+0.1	-10.5
Subtotal	+1.9	-56.2	0.0	-54.3
Total Changes	-18.1	-43.4	+0.6	-60.9
Current Estimate	524.5	1287.3	6.3	1818.1

(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	-34.0	-	-39.3
Other	-	-	-	-
Support	+9.8	+19.1	+0.4	+29.3
Subtotal	-0.7	+27.9	+0.4	+27.6
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+1.0	-14.1	-	-13.1
Other	-	-	-	-
Support	+0.1	-5.3	-	-5.2
Subtotal	+1.1	-19.4	0.0	-18.3
Total Changes	+0.4	+8.5	+0.4	+9.3
Current Estimate	224.9	500.1	3.0	728.0

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; 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.

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.

Procurement

Economic: revised escalation indices.

Quantity: add one 5D-3 satellite (S-20) due to extension of 5D-3 program.

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).

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

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

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

Procurement (Cont'd)
Estimating (Cont'd):
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.

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.

MILCON:
Economic: revised escalation indices.
Support: adjustments to correct current and prior year escalation; increase to backup satellite operations facility at Fairchild AFB.

c. (U) Current Change Explanations--

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised economic escalation indices. (Economic)	N/A	-1.8
Adjustments to current and prior years escalation. (Estimating)	- 0.1	- 0.2
Decrease in spacecraft and sensor studies and technical support in current and prior years. (Estimating)	- 0.8	- 2.0

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

	(Dollars in Millions) Base-Year	Then-Year
c. (U) Current Change Explanations (Cont'd) --		
(1) RDT&E (Cont'd)		
Re-estimate of 5D-3 development (S-15) effort. (Estimating)	- 2.5	- 6.3
Increased costs for spacecraft, primary sensor, and mission sensor support and service effort. (Estimating)	+ 1.8	+ 4.4
Revised estimate of 5D-3 spacecraft (S-15) performance incentives. (Estimating)	+ 0.7	+ 2.0
Revised estimate of program management and technical support. (Estimating)	+ 1.9	+ 4.9
Decrease to command, control, and communications (C^3) requirements. (Support)	- 1.2	- 3.5
Definitization of DMSP tactical terminal development requirements. (Support)	- 1.7	- 4.1
Re-estimate of development of new combat tactical terminal. (Support)	+ 2.8	+ 7.6
Increased costs for launch and on-orbit checkout for spacecraft S15 and related launch and on-orbit costs added. (Support)	+ 0.2	+ 0.9
(2) Procurement		
Revised economic escalation indices. (Economic)	N/A	- 2.3
Restructure of multiyear procurement of Block 5D-3 spacecraft 16-20. (Schedule)	N/A	+ 1.9
Adjustments to current & prior year escalation. (Estimating)	- 0.7	- 1.8
Adjustments to current & prior years to reflect funding reductions. (Estimating)	- 0.5	- 1.6
Refinement of estimate for restructuring the multiyear procurement of Block 5D-3 spacecraft 16-20. (Estimating)	+ 1.6	+ 4.5

	(Dollars in Millions) Base-Year	Then-Year
13. (U) Cost Variance Analysis (Cont'd):		
c. (U) Current Change Explanations (Cont'd) --		
(2) Procurement (Cont'd)		
Definitization of procurement of primary sensors OLS 17-21. (Estimating)	- 6.2	-17.7
Adjustments to technical support and mission sensor contingency. (Estimating)	-14.6	-45.2
Re-estimate of special sensor buy as a competitive procurement. (Estimating)	+ 2.2	+ 6.1
Refinement of estimate for procurement of space sensors. (Estimating)	+ 4.1	+11.4
Adjustments to current & prior year escalation. (Support)	+ 0.1	+ 0.2
Adjustments to current and prior years for ground system and initial spares procurement to reflect actuals. (Support)	- 0.3	- 0.6
Increased cost for replacement of out-dated site equipment. (Support)	+ 7.9	+22.1
Definitization of DMSP tactical terminal upgrade requirements. (Support)	- 8.7	-22.3
Re-estimate for DMSP connectivity to New Hampshire tracking station. (Support)	+ 0.1	+ 0.4
Revised estimate of initial spares allocation due to better analysis of future requirements. (Support)	- 4.4	-11.3
(3) MILCON		
Revised economic escalation indices. (Economic)	N/A	- 0.1
Adjustments to current & prior year escalation. (Support)	0	+ 0.1

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	-16.830	-1.858	+0.190	-6.560	-9.970	--	+8.060	-26.968	181.810

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
$73.6	$80.6	1	$68.0	$68.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ +1.4	$ -2.3
Cumulative Variances To Date (11/20/88)	$ +2.2	$-14.0
Net Change	$ +0.8	$-11.7

Explanation of Change: Schedule variance due to delayed manufacturing build-up. Material is in-house, but labor and material earned value cannot be taken because of slow build-up. Subsystem schedules being modified to include additional work day a week and third shift to meet schedule delivery date. Cost variance due to less manpower and greater efficiencies in Program Management. No impact is anticipated.

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
$199.9	$211.3	4	$183.1	$185.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ +5.8	$-14.4
Cumulative Variances To Date (11/20/88)	$ +8.7	$-18.3
Net Change	$ +2.9	$ -3.9

Explanation of Change: Schedule variance attributed to lack of substantial progression on S-12, S-13 and S-14. Late box deliveries, particularly the central processing units (CPUs) which are in redesign, have continued to impede the integration and test activity in these spacecraft. Spacecraft will not meet contractual delivery dates. Government is asking for consideration. 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.

* Differs from previous report; CPFF portion of contract now included in contract price.

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

b. (U) Procurement (Cont'd)

5D-3 Operational Linescan System

Westinghouse Corp., Baltimore, MD,
F04701-83-C-0048, FPIF, PI
Award: January 19, 1984
Definitized: January 19, 1984

Initial Contract Price		
Target	Ceiling	Qty
$51.5	$54.8	4

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$64.7	$68.9	4	$64.4	$66.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -0.7	$ -3.9
Cumulative Variances To Date (11/30/88)	$ -4.1	$ -2.7
Net Change	$ -3.4	$ +1.2

Explanation of Change: Schedule variance change due to deliveries of OLS 14 and 15. Cost variance due to problems in system test equipment (STE) upgrade. Software integration of customized off-the-shelf hardware has proven to be more difficult than anticipated. Contractor will not meet STE contractual delivery dates. Government is asking for consideration. Program impacts are being evaluated and contractor's estimate at completion is being reviewed per Government's request.

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
$55.0	$61.1	2	$55.0	$55.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (11/30/88)	-0-	-0-
Net Change	-0-	-0-

New contract. First time reported in SAR.

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
$41.3	$43.8	6	$42.2	$42.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (11/25/88)	$ -3.7	$ -1.2
Net Change	$ -3.7	$ -1.2

Explanation of Change: Schedule variance due to late receipt of piece parts and replan of material due to buy decision of machined parts versus making in-house. Cost variance due to unrecoverable overruns due to late parts procurement, additional effort and higher costs for reprocurement of parts, and workarounds to meet delivery dates. No program impact is anticipated.

* Contract reinstated in SAR as price now exceeds $40 million.

c. (U) MILCON - N/A

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

a. (U) Program Status --

(1) Percent Program Completed: 47.1% (8 yrs/17 yrs)

(2) Percent Program Cost Appropriated: 54.2% ($986.1/$1818.1)

b. (U) 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	284.3	47.6	34.7	157.9	524.5
Procurement - Missile	604.7	137.4	150.1	161.2	1053.4
Procurement - Other	90.8	1.8	17.7	123.6	233.9
MILCON	6.3	-	-	-	6.3
Total	986.1	186.8	202.5	442.7	1818.1

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	15.3	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	36.4	3.4
1986				23.8	50.4	50.4	42.8	2.8
1987				26.9	58.7	58.7	40.1	2.7
1988				16.6	37.5	36.2	13.8	3.1
1989				20.4	47.9	18.2	0.4	4.0
1990				19.6	47.6			3.6
1991				13.9	34.7			3.3
1992				9.5	24.4			2.8
1993				7.5	19.7			2.3
1994				8.7	23.2			1.8
1995				8.2	22.1			1.8
1996				9.0	24.9			1.8
1997				8.0	22.3			1.8
1998				7.5	21.3			1.8
Subtotal	1			224.9	524.5	253.3	184.2	

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 30 December 1988.

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		6.9	14.2	14.2	15.7**	9.6
1983	2	3.8	58.6	69.1	151.2	151.2	112.5	9.0
1984		3.7		12.2	27.8	27.8	23.9	8.0
1985	2	5.0	74.2	54.7	127.9	127.6	60.6	3.4
1986		4.1	12.2*	16.2	39.6	39.6	18.7	2.8
1987		3.6		6.9	17.5	17.5	8.7	2.7
1988		2.8		26.2	68.7	65.8	6.1	3.1
1989	1	2.7	45.3	58.4	157.8	7.3	0.0	4.0
1990	1	2.7	35.9	49.5	137.4			3.6
1991	1	2.7	45.5	52.9	150.1			3.3
1992	2	2.8	85.5	38.1	110.2			2.8
1993		2.6		2.6	7.8			2.3
1994		2.7		2.7	8.0			1.8
1995		2.8		2.8	8.5			1.8
1996		2.8		2.8	8.7			1.8
1997		2.8		2.8	8.9			1.8
1998		2.8		2.8	9.1			1.8
Subtotal	9	50.4	357.2	407.6	1053.4	451.0	246.2	

* 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 30 December 1988.

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	12.7	12.6	3.8
1985				13.3	28.7	25.7	20.3	3.4
1986				4.2	9.4	4.9	6.5*	2.8
1987				3.0	7.0	4.8	0.4	2.7
1988				3.8	9.0	6.8	0.3	3.1
1989				6.6	16.1	14.6	0.0	4.0
1990				0.7	1.8			3.6
1991				6.8	17.7			3.3
1992				9.6	25.4			2.8
1993				3.2	8.6			2.3
1994				6.0	16.6			1.8
1995				6.0	16.8			1.8
1996				6.2	17.7			1.8
1997				6.4	18.6			1.8
1998				6.7	19.9			1.8
Subtotal				92.5	233.9	77.0	47.2	
Appropriation: MILCON								
1985				3.0	6.3	N/A	N/A	3.4
Subtotal				3.0	6.3			
Total	10	357.2	50.4	728.0	1818.1	781.3	477.6	

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 30 December 1988. Only DMSP/AFSC obligations/expenditures are shown.

3/ Total Program dollars include SM-ALC/AFLC Programmed and Contractual funds in PE35160F.

* DCASR billing error.

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

18. (U) Operating and Support Costs:

a. N/A

b. N/A .

c. Contractor Support Costs - N/A

SAR-88-067

SECRET

(1)

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823 (U))
PROGRAM: Defense Support Program (DSP) (U)

AF-11 DSP

AS OF DATE: December 31, 1988

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1.(U) Designation and Nomenclature (Popular Name): Defense Support Program Strategic Surveillance and Warning Satellite System (DSP).

[redacted]

FEB 15 1989 19

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

3.(U) Responsible Office and Telephone Number:

[redacted]

Director, Defense Support Systems
Space Division
Los Angeles AFB, CA 90009

PM: Col Wayne J. Craft
Assigned: April 1, 1985
AUTOVON 833-1150
Commercial: (213) 643-1150

4.(U) Program Element:
RDT&E: PE 0102431F
PROCUREMENT: APPN 3020 ICN MS0647
APPN 3080 ICN 833100
MILCON: PE 0102431F

5.(U) 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).

(b)(1)

[redacted]

SECRET

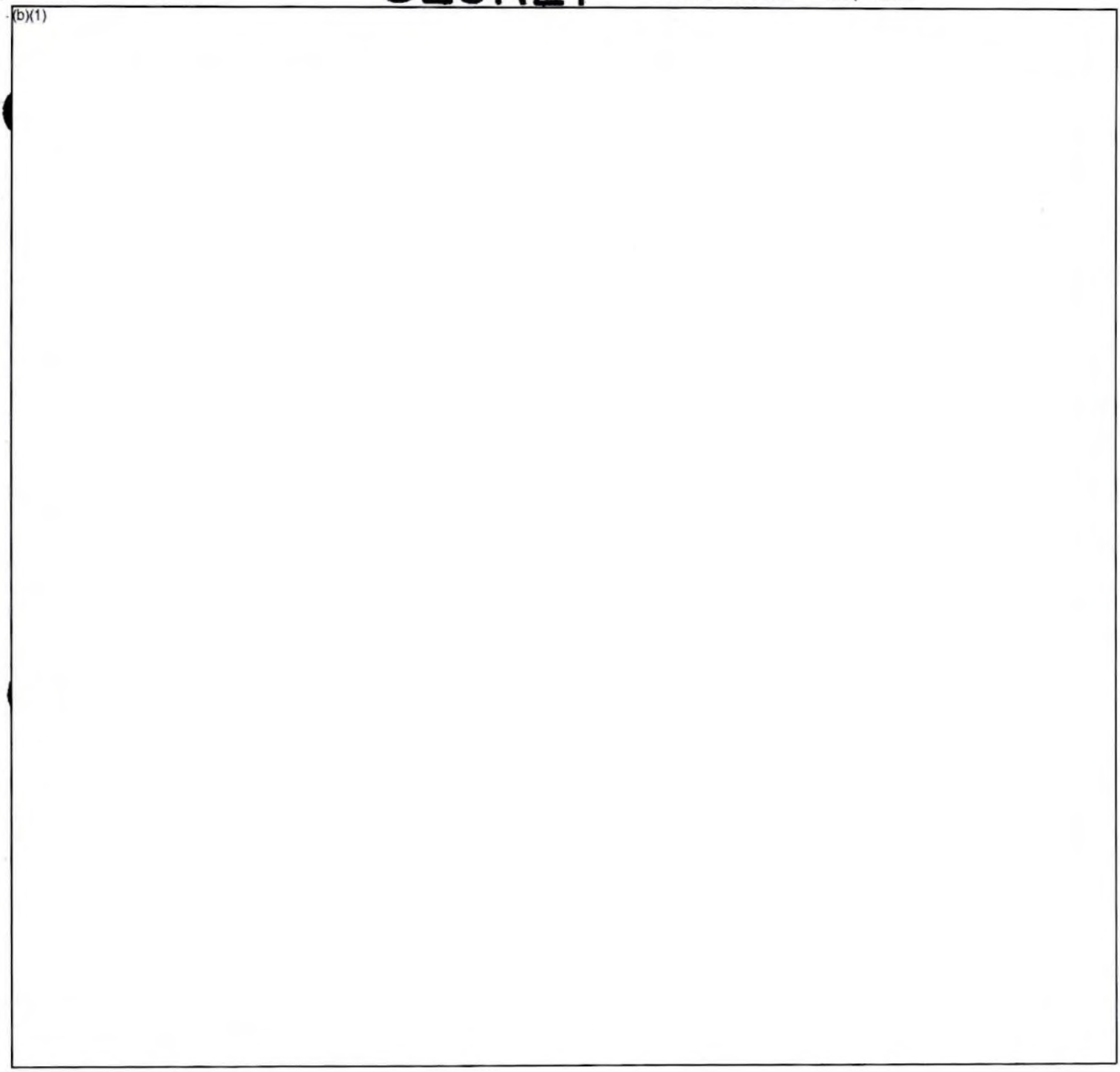
89-00274

(b)(1)

7.(U) Program Highlights:

(b)(1)

(b)(1)



(b)(1)

(b)(1)

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.

(b)(1)

d. (U) References --

Development Estimate:

PMD No. R-S 4047 (24), October 18, 1983;
FY 85 RDT&E Descriptive Summaries, January 1984.

Approved Program: DAE baseline dated February 1988.

(b)(1)

(b)(1)

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

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	$1304.3	$1618.3	$1618.3
Procurement	3094.6	$4095.2	$4095.2
Total Flyaway	(2364.4)	($3202.7)	($3202.7)
Other System Costs	(730.2)	($ 892.5)	($ 892.5)
Construction (MILCON)	25.7	$25.5	$25.5
Total FY 78 Base Year $	4424.6	$5739.0	$5739.0
Escalation	1123.0	2570.9	2570.9
Development (RDT&E)	(-30.4)	(263.6)	(263.6)
Procurement	(+1151.6)	(2305.3)	(2305.3)
Construction (MILCON)	(+1.8)	(2.0)	(2.0)
Total Then-Year $	$5547.6	$8309.9	8309.9
b. Quantities --			
Development (RDT&E)	4	4	4
Procurement	15	22	22
Total	19	26	26

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: FY 1990-91 President's Budget.

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

	Current Est (Dec 88 SAR)	Current Year UCR Baseline (Dec 87 SAR)	Budget Year UCR Baseline (Dec 88 SAR)
a. Program Acquisition --			
(1) Cost	8309.9	8283.1	8309.9
(2) Quantity	26	26	26
(3) Unit Cost	319.612	318.581	319.612
b. Current Procurement --	(FY 1989)	(FY 1989)*	(FY 1990)
(1) Cost	432.3	432.3	463.0
Less CY Adv Proc	-36.4	-36.4	-12.3
Plus PY Adv Proc	111.0	111.0	72.4
Net Total	506.9	506.9	523.1
(2) Quantity	2	2	1
(3) Unit Cost	253.450	253.450	523.100

*Adjusted to reflect FY 89 Appropriations Act in accordance with Congressional change to SAR law.

13. (U) 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	-15.8	-158.4	-0.2	-174.4
Quantity	-	+2731.3	-	+2731.3
Schedule	+0.4	+51.8	-	+52.2
Engineering	-	-	-	-
Estimating	+271.0	-686.2	+0.2	-415.0
Other	-	-	-	-
Support	+244.2	+297.2	-	+541.4
Subtotal	+499.8	+2235.7	-	+2735.5
Current Changes:				
Economic	-0.1	+4.3	+0.1	+4.3
Quantity	-		-	
Schedule	-	+18.3	-	+18.3
Engineering	-	-	-	-
Estimating	+63.1	-148.7	-0.1	-85.7
Other	-	-	-	-
Support	+45.2	+44.7	-	+89.9
Subtotal	+108.2	-81.4	0.0	+26.8
Total Changes	+608.0	+2154.3	-	+2762.3
Current Estimate	1881.9	6400.5	27.5	8309.9

(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	+135.8	-327.1	-0.1	-191.4
Other	-	-	-	-
Support	+126.2	+143.5	-	+269.7
Subtotal	+262.0	+1027.9	-0.1	+1289.8
Current Changes:				
Quantity	-		-	
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+29.1	-46.1	-0.1	-17.1
Other	-	-	-	-
Support	+22.9	+18.8	-	+41.7
Subtotal	+52.0	-27.3	-0.1	+24.6
Total Changes	+314.0	+1000.6	-0.2	+1314.4
Current Estimate	1618.3	4095.2	25.5	5739.0

b. Previous Change Explanat[illegible]

RDT&E

Economic: revised economic escalation indices.

Schedule: delay in integration effort due to launch standdown.

Estimating: revised 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 93, GRH reductions and to reflect FB funding.

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.

Procurement

Economic: revised economic escalation indices.

Quantity: acquisition of additional satellites in FY 89, FY90, FY 91, FY 92, and FY 93.

Schedule: one year delay of start of procurement for Satellite 18 and two years for Satellite 19.

Estimating: new satellite procurement strategy (two in FY 88 versus one each in years FY 87 and FY 88); revised prior year approved cost, escalation indices, and appropriated costs. New Acquisition Strategy (Multi-year Procurement) for Satellites. Revised 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.

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.

MILCON

Estimating: Adjustment to prior year inflation indices.

Economic: Revised economic escalation indices.

c. Current Change Explanations --

	(Dollars in Millions) Base Year	Then Year
(1) RDT&E		
Revised economic escalation indices. (Economic)	-	-0.1
Adjustment for current and prior year escalation changes (Estimating)	-0.3	-0.3

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

c. Current Change Explanations --

	(Dollars in Millions) Base Year	Then Year
(1) RDT&E (Cont'd)		
Reestimation of the following efforts:	+41.0	+86.4
Decrease of FY88 funds for Champus/ Overseas allowances limited MGT-14 software development (Estimating)	(-0.6)	(-1.2)
Increase of FY89 funds for DSP Upgrade Studies(Estimating)	(+6.8)	(+12.9)
Increase of FY91-93 funds for Launch Vehicle Integration Efforts (Estimating)	(+0.5)	(+1.1)
Program Development extended one year to FY 1994 (Estimating)	(+34.3)	(+73.6)
Correct Dec 87 SAR to re-categorize Satellite Readout Station Upgrade per OSD direction		
(Estimating)	-11.6	-23.0
(Support)	+11.6	+23.0
Increase of FY 90 funds for Ground System Upgrades (GSU) (Support)	+11.3	+22.2
(2) Procurement		
Revised economic escalation indices. (Economic)	-	+4.3
Adjustment for current and prior year escalation changes:		
(Estimating)	-4.0	-8.2
(Support)	+0.4	+0.5
Production of Satellites 23-26 delayed one year (Schedule)	-	+18.3
Funds reprofiled for Satellites 14-17 deferred testing and shipping preps (Estimating)	+8.8	-12.9
ZBT adjusted FY 90 funds for Ground System Upgrade (Estimating)	-45.4	-100.4
(Support)	+20.3	+42.3

13. (U) Cost Variance Analysis

c. Current Change Explanations--

	(Dollars in Millions) Base Year	Then Year
(2) Procurement (Cont'd)		
Decreased FY 86 program to fund a classified unfunded requirement (Estimating)	-2.6	-5.1
Decreased FY 88 funds for Champus/ Overseas Allowance cut resulting in delayed production of the Data Control System (Estimating)	-18.4	-38.4
Congressional reduction of FY 89 funds for consulting fees decreased technical support for launch vehicle integration and ground systems (Estimating)	-1.0	-2.3
(Support)	-0.1	-0.2
Addition of FY 94 funds to fully fund Satellites 23-25 on an annual buy basis. (Estimating)	+54.6	+108.7
Reprogrammed buy of Satellites 23-25 from an annual year to multi-year profile (Estimating)	-38.1	-90.1
Reestimate of initial spares costs (Support)	-14.9	-28.0
FY 85 funds increased for Contingent Liabilities (Support)	+0.6	+1.1
Reduced expired FY 86 funds for logistic support (Support)	-2.4	-4.2
FY 90 to FY 91 delay of logistic support for Ground Systems Upgrade (Support)	-0.7	-1.0
Addition of Ground Support Costs for FY 94 (Support)	+15.6	+34.2
(3) MILCON		
Revised economic escalation indices (Economic)	-	+0.1
Adjustment for current and prior year escalation changes (Estimating)	-0.1	-0.1

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

UNCLASSIFIED

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	-6.542	+26.440	+2.712	-	-19.258	-	+24.281	+27.633	319.612

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

a. RDT&E -

System 1 Software Development
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
$84.4	$86.4	0

Estimated Price at Completion	
Contractor	Program Manager
$86.4	$87.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+0.3	$-0.6
Cumulative Variances to Date (10/21/88)	$-2.9	$-1.1
Net Change	$-3.2	$-0.5

Explanation of Change: This contract has seen a significant overrun in the functional baseline portion of the Systems Requirements WBS. This effort is now greater than 90% complete and IBM does not foresee additional problems with future work. Schedule variance is due to system engineering difficulties. Program Manager's estimate is that the contract will overrun slightly at completion.

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
$94.3	$96.7	0

Estimated Price at Completion	
Contractor	Program Manager
$96.7	$95.3

	Cost Variance	Sched Variance
Previous Cumulative Variances	$+3.0	$-1.7
Cumulative Variances to Date (10/21/88)	$+2.9	$-1.2
Net Change	$-0.1	$+0.5

UNCLASSIFIED

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

Explanation of Change: Problems in Satellite 14 Operations Design and Development and Large Processing Station Software Enhancements have caused a minor schedule variance, but the schedule variance continues to improve. Cost performance remains steady. The Program Manager's assessment is that this contract will complete on schedule with a slight underrun.

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
$158.9	$167.3	6

Estimated Price At Completion	
Contractor	Program Manager
$178.3	$169.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-0.7	$-6.9
Cumulative Variances To Date (10/21/88)	$-11.8	$-7.3
Net Change	$-11.1	$-0.4

Explanation of Change: Schedule variance due to late delivery of subcontracted hardware, late delivery of GFE, and problems with prime mission software. Cost variance was originally due to the software problems, but is now being driven by the schedule problems. Schedule is being re-negotiated with change order definitization anticipated in January 1989. Large variance between contractor and Air Force estimated price at completion is due to contractor including unpriced work in estimate. There are data problems with IBM reporting, and the program office is taking an active role in helping IBM resolve this issue. Difference between ceiling price and estimated price reflects authorized unpriced work.

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
$599.6	$626.2	4

Estimated Price At Completion	
Contractor	Program Manager
$634.4	$636.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-26.2	$-26.4
Cumulative Variances To Date (11/04/88)	$-35.4	$-7.6
Net Change	$- 9.2	$+18.8

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

Explanation of Change: The contract cost variance remains unfavorable due to schedule recovery expenditures in the communications subsystems, and system level assembly and test difficulties for a first time build. The dramatic improvement in schedule variance is due to a TRW reassesment of the Laser Crosslink Subsystem (MDAC) progress. Overall decrease in price is due to the termination of Long-Lead C/SSR reporting (99% complete). Difference between ceiling price and estimated price reflects authorized unpriced work.

b. Procurement (Cont)

Satellite 18-22 Production and Long-Lead
TRW Electronics and Defense.
Redondo Beach, CA,
F04701-86-C-0022, FPI/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
$743.5	$757.4	5

Estimated Price At Completion

Contractor	Program Manager
$742.9	$733.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+0.2	$-0.4
Cumulative Variances To Date (11/04/88)	$-2.6	$-5.2
Net Change	$-2.8	$-4.8

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 components. No impact to contract or program.

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
$431.5	$453.6	5

Estimated Price At Completion

Contractor	Program Manager
$426.1	$426.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+2.5	$+3.5
Cumulative Variances To Date (10/28/88)	$+2.1	$-0.4
Net Change	$-0.4	$-3.9

Explanation of Change: Cost performance remains steady. Late deliveries from subcontractors are the driver of the slight schedule variance. No impact to program or contract.

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

a. Program Status --
(1) Percent Program Completed: 82.1% (23 yrs/28 years)

(2) Percent Program Cost Appropriated: 68.1% ($5659.7/$8309.9)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY67-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-94)	Total
RDT&E	1,453.3	134.0	61.5	233.1	1,881.9
Procurement - Missile	3,328.3	371.6	542.8	977.4	5,220.1
Procurement - Other	850.6	91.4	77.3	161.1	1,180.4
MILCON	27.5	-	-	-	27.5
Total	5,659.7	597.0	681.6	1,371.6	8,309.9

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
197T	-	-	-	0	0	0	0	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	-	-	-	37.2	63.5	63.5	46.9	2.8
1987	-	-	-	63.8	112.4	112.4	78.0	2.7
1988	-	-	-	47.8	87.3	82.8	28.0	3.1
1989	-	-	-	51.2	97.0	44.4	0.1	4.0
1990	-	-	-	68.4	134.0	-	-	3.6
1991	-	-	-	30.5	61.5	-	-	3.3
1992	-	-	-	30.9	63.8	-	-	2.8
1993	-	-	-	45.4	95.7	-	-	2.3
1994	-	-	-	34.3	73.6	-	-	1.8
Subtotal	4			1618.3	1881.9	1396.2	1246.1	

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: 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
197T	-	-	-	0	0	0	0	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	-	580.6	271.6	474.8	474.8	414.4	9.0
1984	2	-	580.6	230.9	420.3	420.3	340.7	8.0
1985	-	-	-	28.4	53.0	53.0	53.0	3.4
1986	-	-	-	57.2	111.4	111.4	69.5	2.8
1987	-	-	-	130.6	264.0	257.8	210.5	2.7
1988	1	-	132.6	168.8	353.4	294.2	11.4	3.1
1989	2	-	265.2	199.4	430.5	386.6	0	4.0
1990	1	-	132.6	167.5	371.6	-	-	3.6
1991	1	-	132.6	239.2	542.8	-	-	3.3
1992	2	-	265.2	260.1	601.6	-	-	2.8
1993	1	-	132.6	123.9	292.0	-	-	2.3
1994	1	-	132.9	34.9	83.8	-	-	1.8
Subtotal	22	-	3202.7	3202.7	5220.1	3219.0	2320.4	-

16. (U) 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: 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
197T	-	-	-	0	0	0	0	7.9
1977	-	-	-	13.6	13.6	13.6	13.6	7.5
1978	-	-	-	0.3	0.3	0.3	0.3	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	-	-	-	64.4	100.1	100.1	100.1	9.2
1983	-	-	-	54.4	87.8	87.8	87.8	4.9
1984	-	-	-	21.7	36.1	36.1	35.1	3.8
1985	-	-	-	29.6	50.8	49.7	35.8	3.4
1986	-	-	-	68.1	120.5	120.5	51.7	2.8
1987	-	-	-	48.7	89.4	68.9	18.9	2.7
1988	-	-	-	14.0	26.6	12.8	4.3	3.1
1989	-	-	-	0.9	1.8	0.9	0	4.0
1990	-	-	-	45.2	91.4	-	-	3.6
1991	-	-	-	37.3	77.3	-	-	3.3
1992	-	-	-	29.4	62.2	-	-	2.8
1993	-	-	-	30.0	64.7	-	-	2.3
1994	-	-	-	15.6	34.2	-	-	1.8
Subtotal	-	-	-	892.5	1180.4	814.3	671.2	-
Appropriation: Construction								
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
Subtotal	-	-	-	25.5	27.5	27.5	27.5	-
Total	26	-	3202.7	5739.0	8309.9	5457.0	4265.2	-

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

18. (U) 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)	7.1	5.4	5.2	TBD	17.7
Industrial Fund	0	0	0	TBD	0.0
Total	7.1	5.4	5.2	TBD	17.7

N-16 EA-6B-3

SAR-88-002

[redacted]

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: EA-6B

AS OF DATE: 31 DECEMBER 1988

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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 SYSTEMS COMMAND
WASHINGTON, DC 20361-1234
PROGRAM MANAGER: CAPT M. KEARNEY
ASSIGNED: 4 AUGUST 1987
TELEPHONE: (202) 692-8083

4. PROGRAM ELEMENTS:
RDT&E: 0604222N
PROCUREMENT: 0204154N
APPN: 1506 ICN 0115
0116

5. RELATED PROGRAMS: A-6E INTRUDER, E-2/C, F-14 TOMCAT AND F-111.

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OASD(PA) DFOISR 89-T-0584

[redacted]SSION AND DESCRIPTION: (U) The EA-6B's primary mission is the suppression [redacted]gradation of enemy electronic defense systems by use of tactical jamming or [redacted]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:

(b)(1)

8. THRESHOLD BREACHES: There are currently no DAE baseline breaches, DCP (RPG) dated 4 Sept 1985, or DCP (ALQ-149) dated 28 Mar 1988 threshold breaches.

(b)(1)

b. Previous Change Explanations: Production Estimate/Approved Program milestones were updated to reflect the approved NDCP for EW Counter Response dated September 1985.

Current 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 - COMNAVAIRSYSCOM ltr 13270 Ser PMA-2342/C082 of 18 Nov 1988 requests formal milestone revision as directed by USD(A). (USD(A) memo of 17 Feb 1988 applies.) This request has been approved by ASN(S&L).

d. References: Production Estimate: EW Counter Response NDCP dated 9 September 1985.
Approved Program: DAE baseline approved 17 February 1988.

(b)(1)

(b)(1)

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	376.4
Procurement	2,029.0	3,940.4	3,940.4
Airframe	(639.9)	(1,342.6)	(1,342.6)
Engine	(98.9)	(158.2)	(158.2)
Avionics	(490.9)	(1,037.5)	(1,037.5)
Total Flyaway	(1,229.7)	(2,538.3)	(2,538.3)
Other Wpn Sys Cost	(678.6)	(1,094.2)	(1,094.2)
Initial Spares	(120.7)	(307.9)	(307.9)
Construction (MILCON)	-0-	-0-	-0-
Total FY84 Base-Year $	2,239.6	4,316.8	4,316.8
Escalation	508.2	923.0	923.0
Development (RDT&E)	(30.9)	(61.0)	(61.0)
Procurement	(477.3)	(862.0)	(862.0)
Construction (MILCON)	0.0	0.0	0.0
Total Then-Year $	2,747.8	5,239.8	5,239.8

b. Quantities -

Development (RDT&E)	0	0	0
Procurement	38	98	98
Total	38	98	98

c. Foreign Military Sales - N/A

d. Nuclear Costs - N/A

e. References: FY 90/91 President's Budget

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	5,239.8	4,587.2	5,239.8
(2) Quantity	98	86	98
(3) Unit Cost	53.5	53.3	53.5
b. Current Procurement	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	555.6	555.6	147.1
Less CY Adv Proc	- 0.0	- 0.0	- 24.9
Plus PY Adv Proc	+ 27.7	+ 27.7	+ 0.0
Net Total	583.3	583.3	122.2
(2) Quantity	12	12	0
(3) Unit Cost	48.6	48.6	0

12 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	+ 45.4	+ 532.4		+ 577.8
Quantity		+2,369.4		+2,369.4
Schedule	+148.9	- 81.1		+ 67.8
Engineering				
Estimating	- 7.1	-1,586.1		-1,593.2
Other				
Support		+ 417.6		+ 417.6
Subtotal	+187.2	+1,652.2		+1,839.4
Current Changes				
Economic	+ 1.7	- 133.4		- 131.7
Quantity		+ 283.3		+ 283.3
Schedule		+ 257.4		+ 257.4
Engineering		+ 0.4		+ 0.4
Estimating	+ 7.0	- 176.9		- 169.9
Other				
Support		+ 413.1		+ 413.1
Subtotal	+ 8.7	+ 643.9		+ 652.6
Total Changes	+195.9	+2,296.1		+2,492.0
Current Estimate	437.4	4,802.4		5,239.8

(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		+1,851.8		+1,851.8
Schedule	+124.5	- 71.3		+ 53.2
Engineering				
Estimating	+ 36.4	- 644.8		- 608.4
Other				
Support		+ 299.9		+ 299.9
Subtotal	+160.9	+1,435.6		+1,596.5
Current Changes:				
Economic				
Quantity		+ 205.4		+ 205.4
Schedule		+ 189.0		+ 189.0
Engineering		+ 0.4		+ 0.4
Estimating	+ 4.9	- 221.9		- 217.0
Other				
Support		+ 302.9		+ 302.9
Subtotal	+ 4.9	+ 475.8		+ 480.7
Total Changes	+165.8	+1,911.4		+2,077.2
Current Estimate	376.4	3,940.4		4,316.8

13. b. Previous Change Explanations -

(1) RDT&E
Economic: Revised escalation indices.
Estimating: Revised program estimates.

(2) PROCUREMENT
Economic: Revised escalation indices.
Quantity: Increase in the total number of budgeted aircraft.
Schedule: Decrease is associated with the increase in the number of budgeted aircraft.
Estimating: Decrease is due to revised program estimates.
Support: Attributed to additional support material/services and initial spares required for the additional aircraft.

(3) MILCON: None.

c. Current Change Explanations -

		BASE YEAR	THEN YEAR
(1) RDT&E			
Economic:	Revised escalation indices.	-	+ 1.7
Estimating:	Revised program estimates.	+ 4.9	+ 7.0
(2) PROCUREMENT			
Economic:	Revised escalation indices.	-	-133.4
Quantity:	Increase of twelve (12) aircraft.	+205.4	+283.3
Schedule:		+189.0	+257.4
Engineering:		+ 0.4	+ 0.4
Estimating:	Decrease is due to revised program estimates.	-221.9	-176.9
Support:	Increase due to PGSE, training, pubs and ILS requirements and initial spares necessary to support the additional 12 aircraft and two additional fiscal years.	+302.9	+413.1

Number of Aircraft:

	FY87 & Prior	FY88	FY89	FY90	FY91	FY92	FY93	FY94
New	38	12	12	0	3	9	12	12
Old	38	12	9	9	9	9	0	0

(3) MILCON
None

PROGRAM ACQUISITION UNIT COST (PAUC) HISTORY:
(Millions of then-year dollars)

a. Initial SAR Estimate to Current Estimate -

PAUC (PdE Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	EST	Other	Spt	Total	
72.311	+4.552	-17.204	+3.318	+0.004	-17.991	-	+8.476	-18.845	53.466

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
$250.2	N/A	6

Current Contract Price

Target	Ceiling	Qty
$250.2	N/A	6

Estimated Price at Completion

Contractor	Program Manager
$250.2	$250.2

Previous Cumulative Variances to Date - N/A
Cumulative Variance to Date - N/A

b. PROCUREMENT:

AIRFRAME
Grumman Aerospace
Bethpage, LI, NY 11714
N00019-85-C-0380/FFP
Award Date: May 1986
Definitization: Mar 1987

Initial Contract Price

Target	Ceiling	Qty
$234.6	N/A	12

Current Contract Price

Target	Ceiling	Qty
$234.6	N/A	12

Estimated Price at Completion

Contractor	Program Manager
$234.6	$234.6

Explanation of increase: Previous SAR reflected airframe cost only. Current guidance instructs airframe plus all support items costs be included.

Previous Cumulative Variances to Date - N/A
Cumulative Variance to Date - N/A

15. b. PROCUREMENT (con't):

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
$223.1	N/A	12

Estimated Price at Completion

Contractor	Program Manager
$223.1	$223.1

Previous Cumulative Variances to Date - N/A
Cumulative Variance to Date - N/A

UNIVERSAL EXCITERS
Eaton Corporation
AIL, Deer Park, NY 11729
N00019-85-C-0442/FFP
Award Date: Mar 1985
Definitization: Sep 1987

Initial Contract Price

Target	Ceiling	Qty
$214.7	N/A	454

Current Contract Price

Target	Ceiling	Qty
$214.7	N/A	454

Estimated Price at Completion

Contractor	Program Manager
$214.7	$214.7

Previous Cumulative Variances to Date - N/A
Cumulative Variance to Date - N/A

16. PROGRAM FUNDING SUMMARY: (Current Estimate in Millions of Dollars)

a. Program Status -
(1) Percent Program Completed: 58.3%
(2) Percent Program Cost Appropriated: 57.4% ($3,009.6/$5,239.8)

b. Appropriation Summary -

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY84-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-94)	Total
RDT&E	296.2	25.8	8.5	106.9	437.4
Procurement	2,713.4	147.0	389.8	1,552.2	4,802.4
MILCON	-0-	-0-	-0-	-0-	-0-
Total	3,009.6	172.8	398.3	1,659.1	5,239.8

PROGRAM FUNDING SUMMARY (CON'T):

c. (U) 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								
1984				24.8	25.3	25.3	24.0	3.8
1985				34.1	35.8	35.8	33.2	3.4
1986				75.0	81.0	81.0	64.2	2.8
1987				54.2	60.3	60.3	36.4	2.7
1988				53.7	61.8	61.8	33.4	3.1
1989				26.8	32.0	7.8	0.0	4.0
1990				20.9	25.8			3.6
1991				6.6	8.5			3.3
1992				21.2	27.6			2.8
1993				30.0	39.9			2.3
1994				29.1	39.4			1.8
TOTAL				376.4	437.4	272.0	191.2	
Appropriation: Procurement								
1983				16.2	17.0			9.0
1984	8	2.5	221.7	440.1	463.7	463.7	441.8	8.0
1985	6	9.9	182.9	334.5	362.5	362.5	325.3	3.4
1986	12	26.6	277.0	375.5	418.6	418.6	336.8	2.8
1987	12	3.8	276.8	379.3	437.4	429.0	224.2	2.7
1988	12	4.5	289.2	383.9	458.6	421.6	71.9	3.1
1989	12	72.2	310.3	450.6	555.6	185.0	0.0	4.0
1990	0	43.3	0.0	115.3	147.1			3.6
1991	3	23.0	119.5	298.8	389.7			3.3
1992	9	2.3	221.8	407.2	608.7			2.8
1993	12	0.0	253.6	421.9	499.5			2.3
1994	12	0.0	197.4	317.1	444.0			1.8
TOTAL		188.1	2350.2	3940.4	4802.4	2280.4	1400.0	

17. PRODUCTION RATE DATA:

a. Annual Production Rates

Production Rates (Qty/Yr)				
Fiscal Year	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	24
1991	N/A	12	4.0	24
1992	N/A		9.0	24
1993	N/A		12.0	
1994	N/A		12.0	

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$)	2,239.6	+2,077.2	4,316.8	-	4,316.8
	(TY$)	2,747.8	+2,492.0	5,239.8	-	5,239.8
PAUC	(BY$)	58.9	- 15.5	43.4	-	43.4
	(TY$)	72.3	-18.8	53.5	-	53.5

c. Schedule Variance

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date	SEP 85		SEP 85		SEP 85
Duration	70	+63	133	--	133
End Date	JUL 91		OCT 96		OCT 96

d. Deliveries (Plan/Actual)

	To Date
RDT&E	0/0
Procurement	31/31

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 -

(Then-Year Dollars in Millions)

	FY 89 & Prior	FY 90	FY 91	Total
O&M,N	69.1	32.2	22.5	123.8
Industrial Fund	5.4	3.5	3.5	12.4
Total	74.5	35.7	26.0	136.2

SAR-88-006

~~SECRET~~

15 E-6A

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: E-6A

AS OF DATE: DECEMBER 31, 1988

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Designation/Nomenclature: E-6A Airborne Strategic Communications

2. DoD Component: U. S. Navy

Responsible Office and Telephone Number:

E-6A Program Office (PMA271)
Naval Air Systems Command
Washington, DC 20361-1271

PM: CAPT Ernest L. Lewis, USN
Assigned: 30 December 1985
AV 222-8086; COMM (202) 692-8086

AS AMENDED

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

[redacted]

[redacted]

1

OASD(PA) DFOISR 89-T-0577

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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 longlead 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 tail stabilator at high bank angle 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).

b. Significant Developments Since Last Report -- 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 FYs 88 and 89, $49.9M, 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.

8. Threshold Breaches: There are currently no DAE Baseline breaches.

(b)(1)

Schedule: (Cont'd)

d. References:

Development Estimate: Operational Requirement W1438 11 Jan 1982 Annex C to JSPD 84-91 (Secret) PE 0101402N.

Approved Program: DAE baseline approved 17 February 1988.

10. Technical/Operational Characteristics:

(b)(1)

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

	Development Estimate	Approved Program	Current Estimate
a. Cost —			
Development (RDT&E)	292.6	325.5	325.5
Procurement	1292.1	1114.9	1114.9
Airframe	(653.7)	(876.3)	(876.3)
Engine	(168.7)	-	-
Avionics	(121.6)	(20.0)	(20.0)
Total Flyaway	(944.0)	(896.3)	(896.3)
Other Wpn Sys Cost	(213.2)	(116.4)	(116.4)
Initial Spares	(134.9)	(102.2)	(102.2)
Construction (MILCON)	-	53.1	53.1
Total FY 82 Base-Year $	1584.7	1493.5	1493.5
Escalation	667.0	483.4	483.4
Development (RDT&E)	(61.6)	(51.6)	(51.6)
Procurement	(605.4)	(413.5)	(413.5)
Construction (MILCON)	-	(18.3)	(18.3)
Total Then-Year $	2251.7	1976.9	1976.9
b. Quantities —			
Development (RDT&E)	1	1	1
Procurement	14	15	15
Total	15	16	16

c. Foreign Military Sales — None

d. Nuclear Costs — None

e. References —

Development Estimate: Operational Requirement W1438 11 Jan 1982 Annex C to JSPD 84-91 PE #0101402N.

Approved Program: FY 1990/1991 President's Budget.

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

	Current Est (Dec 88 SAR)	UCR Baseline (Dec 87 SAR)	UCR Baseline (Dec 88 SAR)
a. Program Acquisition			
(1) Cost	1976.9	1900.2	1976.9
(2) Quantity	16	16	16
(3) Unit Cost	123.6	118.8	123.6

	Current Year		Budget Year
b. Current Procurement —	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	361.3	361.3	N/A
Less CY Adv Proc	-	-	N/A
Plus PY Adv Proc	137.7	137.7	N/A
Net Total	499.0	499.0	N/A
(2) Quantity	7	7	N/A
(3) Unit Cost	71.3	71.3	N/A

18. Cost Variance Summary:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	354.2	1897.5	-	2251.7
Previous Changes:				
Economic	-10.4	-211.4	-1.9	-223.7
Quantity	-	+61.2	-	+61.2
Schedule	-	-5.5	-	-5.5
Engineering	-2.9	+50.5	-	+47.6
Estimating	+34.7	+2.1	+51.8	+88.6
Other	-	-	-	-
Support	+2.9	-322.6	-	-319.7
Subtotal	+24.3	-425.7	+49.9	-351.5
Current Changes:				
Economic	-0.1	-9.6	-0.1	-9.8
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-1.3	+14.6	+21.6	+34.9
Other	-	-	-	-
Support	-	+51.6	-	+51.6
Subtotal	-1.4	+56.6	+21.5	+76.7
Total Changes	+22.9	-369.1	+71.4	-274.8
Current Estimate	377.1	1528.4	71.4	1976.9

(FY 1982 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	292.6	1292.1	-	1584.7
Previous Changes:				
Quantity	-	+41.1	-	+41.1
Schedule	-	-5.3	-	-5.3
Engineering	-2.4	-7.1	-	-9.5
Estimating	+28.1	-45.2	+37.4	+20.3
Other	-	-	-	-
Support	+8.2	-206.9	-	-198.7
Subtotal	+33.9	-223.4	+37.4	-152.1
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-1.0	+10.6	+15.7	+25.3
Other	-	-	-	-
Support	-	+35.6	-	+35.6
Subtotal	-1.0	+46.2	+15.7	+60.9
Total Changes	+32.9	-177.2	+53.1	-91.2
Current Estimate	325.5	1114.9	53.1	1493.5

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:	

(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
Support:	refinement of Support Equipment Requirements Document; refinement of support requirements

(3) MILCON

Economic:	revised escalation indices
Estimating:	reduced hanger facilities; refined estimates

c. Current Change Explanations --

	(Dollars in Millions) Base Year	Then Year
(1) RDT&E		
Revised Dec 88 economic escalation rates (Economic)	N/A	-0.1
Adjustment for current and prior year escalation (Estimating)	+0.1	+0.1
Program realignment and refined estimates (Estimating)	-1.1	-1.4
(2) Procurement		
Revised Dec 88 economic escalation rates (Economic)	N/A	-9.6
Adjustment for current and prior year escalation (Estimating)	+6.9	+9.6
Refinements in FY-89 estimates (Estimating)	-1.5	-2.3
Incorporation of transitioning EVS/EVP system in avionics suite (Estimating)	+5.2	+7.3
Increased requirement for initial spares (Support)	+25.7	+38.5
Increase required by contract pricing and revised support costs (Support)	+9.9	+13.1
(3) MILCON		
Revised Dec 89 economic escalation rates (Economic)	N/A	-0.1
Adjustment for current and prior year escalation (Estimating)	+0.1	+0.1
Revised requirement for siting the aircraft at Tinker AFB (Estimating)	+15.6	+21.5

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

a. Initial SAR Estimate to Current Baseline Estimate
(1) Same as Current Baseline Estimate.

b. Current Baseline Estimate to Current Estimate

PAUC Development Estimate	CHANGES (Then Year) Dollars in Millions								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
+150.113	-14.594	-5.557	-0.344	+2.975	+7.719	-	-16.756	-26.557	+123.556

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

a. RDT&E —

FSD Aircraft:	Initial Contract Price Target	Ceiling	Qty
Boeing Aerospace Co., Seattle, Washington	316.5	N/A	1

N00019-83-C-0176, Firm Fixed Price
Award date: 29 April 1983
Definitization date: June 1986

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
316.5	N/A	1	316.5	316.5

	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

b. Procurement —

Production Aircraft	Initial Contract Price Target	Ceiling	Qty
Boeing Aerospace Co., Seattle, Washington	NTE 1,126.2	N/A	14

N00019-83-C-0176, Advance Acquisition Contract
Award date: 30 June 1984
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 Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
TBD 1/	N/A	15	NTE 1,126.2	TBD 1/

	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

c. MILCON: N/A

1/ Disclosure could jeopardize negotiations.

UNCLASSIFIED

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

a. Program Status —

(1) Percent Program Completed: 81.8% (9/11)

(2) Percent Program Cost Appropriated: 96.9% ($1916.9/1976.9)

b. Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY81-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete N/A	Total
RDT&E	377.1	-	-	-	377.1
Procurement	1489.9	35.6	2.9	-	1528.4
MILCON	49.9	21.5	-	-	71.4
Total	1916.9	57.1	2.9	-	1976.9

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: 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	1			34.7	37.2	37.2	31.6	4.9
1984	-			63.1	70.0	70.0	46.5	3.8
1985	-			59.0	67.4	67.3	63.7	3.4
1986	-			76.6	90.2	89.8	80.9	2.8
1987	-			62.8	76.1	75.9	57.3	2.7
1988	-			27.4	34.3	33.9	7.7	3.1
Sub-total	1			325.5	377.1	376.0	289.6	
Appropriation: Procurement								
1984	-	-		79.6	98.4	98.2	98.2	3.8
1985	-	-		-	-	-	-	3.4
1986	2	136.2	118.3	264.0	345.9	345.9	268.8	2.8
1987	3	-	170.9	261.3	354.0	290.0	164.4	2.7
1988	3	-	162.8	235.3	330.3	302.5	46.7	3.1
1989	7	-	308.1	248.9	361.3	314.2	-	2.7
1990	-	-	-	23.8	35.6	-	-	3.1
1991	-	-	-	1.9	2.9	-	-	3.1
Sub-total	15	136.2	760.1	1114.9	1528.4	1350.8	578.1	

c. Annual Summary (Con't)— UNCLASSIFIED

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: MILCON								
1988				9.1	11.8	0.8	-	3.1
1989				28.4	38.1	-	-	4.0
1990				15.6	21.5	-	-	3.6
Sub-total				53.1	71.4	0.8	-	
Total				1493.5	1976.9	1727.6	867.7	

17. Production Rate Data:

a. Annualized Production Rates:

Fiscal Year Buy	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
1990		N/A		N/A
1991				
1992				

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	1,493.5	N/A	N/A
TY$	N/A	N/A	1,976.9	N/A	N/A
PAUC BY$	N/A	N/A	93.3	N/A	N/A
TY$	N/A	N/A	123.6	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/86	N/A	N/A
Duration(in Months)	N/A	N/A	35	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	0/0
Procurement	0/0

e. Approved Design to Cost Goals - N/A

18. 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	11.9	38.9	53.3	Not Available	104.1
Industrial Fund	-	-	-	-	-
Total	11.9	38.9	53.3	Not Available	104.1

SAR-88-100

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: Army Tactical Missile System (Army TACMS)

A ATACMS

AS OF DATE: December 31, 1988

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1. (U) Designation and Nomenclature (Popular Name): Not Assigned/Army Tactical Missile System (Army TACMS)

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

3. (U) Responsible Office and Telephone Number:

Army Tactical Missile System Project Office (AMCPM-AT)
U.S. Army Missile Command
Redstone Arsenal, AL 35898-5650

COL Thomas J. Kunhart
Assigned: 15 Mar 85
AV 746-1141
COMM (205) 876-1141

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

RDT&E: PE 64324 Project D302
PROCUREMENT: APPN 2032 SSN C98500
APPN 2032 SSN CA0261
MILCON: PE 024030

5. (U) Related Programs: Multiple Launch Rocket System (MLRS); Army TACMS Smart Submunition Warhead

6. (U) Mission and Description:

(U) The Army has an urgent need for a long-range weapon that operates in near all-weather, day or night, is air-transportable, and capable of effectively engaging high priority land targets at ranges beyond the capability of cannons, rockets, and the LANCE Missile System. The system will be used to attack tactical surface-to-surface missile sites, air defense systems, logistic elements, command/control/communication complexes, and second echelon maneuver units arrayed in depth throughout the corps area of influence.

OASD(PA) DEOISR 89-T-0602

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(U) The system will be a ground-launched missile system consisting of a surface-to-surface guided ballistic missile with an anti-personnel/anti-materiel (APAM) warhead configuration. A later phase of the program will be development of an advanced technology warhead. Army TACMS will be fired from the modified M270 launcher. The system shall utilize targeting systems, engagement systems, and command and control systems that are the same as the MLRS.

7. (U) 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 requests for proposal (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 for the M/LPA. The sole source integration contract was awarded March 27, 1986. A Decision Coordinating Paper (DCP) was submitted on May 20, 1986 and received OSD approval on September 11, 1986. The procurement of the production quantities are included in the current R&D Contract DAAH01-86-C-A036 as not-to-exceed options. During 1987, static test firing of seven flight weight rocket motors was successfully completed. The M74 Grenade Fuzes (M219E1A1) was successfully tested. Army TACMS was selected to receive the DoD Acquisition Streamlining Excellence Award at the National Conference on Acquisition Streamlining. The Army TACMS development baseline document was signed by the Army Acquisition Executive and approved by the Defense Acquisition Executive. Army TACMS Integration Contract Summary Critical Design Review (CDR) was successfully conducted. The CDR included all hardware items except the fire direction data manager (FDDM). The Army is currently working to complete a study which defines the total Army TACMS requirement. This will be submitted to Congress as soon as it is completed.

Army TACMS is expected to satisfy the mission requirements.

b. (U) Significant Developments Since Last Report. Started logistics demonstration in March 1988. Completed seven engineering development flight tests. Awarded long lead time items contract in May 1988.

c. (U) Changes Since "As of" Date. The Low Rate Initial Production (LRIP) Contract was awarded in February 1989. Development test II (DT II) started in February 1989.

8. (U) Threshold Breaches: The Army TACMS Decision Coordinating Paper was approved September 11, 1986 and the Secretary of Defense Decision Memorandum is dated March 18, 1986. Threshold breaches have occurred in the Army TACMS Milestones schedule. These breaches are shown in paragraph 9.a. below.

9. (U) Schedule:

a. (U)

Milestones	Dev Estimate	Approved Program	Current Estimate
(U) Began Assault Breaker Technology Demonstration	Apr 78	Apr 78	Apr 78
(U) Began Special Task Force	Mar 81	Mar 81	Mar 81
(U) Mission Element Need Statement (MENS) Approval	Apr 81	Apr 81	Apr 81
(U) Joint Program Directed	Jun 82	Jun 82	Jun 82
(U) Completed Assault Breaker Technology Demonstration	Dec 82	Dec 82	Dec 82
(U) ROC Approved	May 85	May 85	May 85
(U) RFP Released	Jun 85	Jun 85	Jun 85
(U) Milestone II (ASARC)	Dec 85	Dec 85	Dec 85
(U) Milestone II (DSARC)	Feb 86	Feb 86	Feb 86
(U) FSD Contract Award	Mar 86	Mar 86	Mar 86
(U) LLTI Contract Option Award	N/A	May 88	May 88 (Ch-1)
(U) EDT-C Completion	N/A	Dec 88	Dec 88 (Ch-2)
(U) DA Program Review (ASARC IIIa)	N/A	Feb 89	Feb 89 (Ch-3)
(U) LRIP Contract Option Award	N/A	Feb 89	Feb 89 (Ch-2)
(U) Type Classification Limited Production (TC-LP)	N/A	N/A	Sep 88 (Ch-4)
(U) DT II Completion	N/A	N/A	N/A (Ch-4)

9. (U) Schedule (continued):

(U) Milestones	Development Estimate	Approved Program	Current Estimate
(U) DT II Flight Test Start	N/A	Feb 89	Feb 89 (Ch-3)
(U) DT II Flight Test Complete	N/A	Sep 89	Sep 89 (Ch-3)
(U) OT II Completion	N/A	N/A	N/A (Ch-4)
(U) OT Readiness Review	N/A	Sep 89	Sep 89 (Ch-3)
(U) OT II Flight Test Start	N/A	Sep 89	Sep 89 (Ch-3)
(U) OT II Flight Test Complete	N/A	Jan 90	Jan 90 (Ch-3)
(U) OT II Ground Test Start	N/A	Nov 89	Nov 89 (Ch-3)
(U) OT II Ground Test Complete	N/A	Jan 90	Jan 90 (Ch-3)
(U) Milestone III (ASARC)	N/A	Feb 90	Feb 90 (Ch-3)
(U) First LRIP Delivery	N/A	Feb 90	Feb 90 (Ch-3)
(U) Confirmatory Test Completion	N/A	Jul 90	Jul 90 (Ch-3)
(U) IOC	Jun 90	N/A	N/A (Ch-4)
(U) FUE	N/A	Jul 90	Jul 90 (Ch-3)
(U) PVT Completion (if required)	N/A	Jul 90	Jul 90 (Ch-3)

b. (U) 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.

c. (U) Current Change Explanations:

(U) (Ch-1) LLTI Contract actual award was May 1988.

(U) (Ch-2) Changes are necessary due to problem prime contractor has encountered with a major subcontractor resulting in the slips reflected. Congress was provided the Program Deviation Report.

(U) (Ch-3) DAE Approved Program Baseline dtd Feb 89.

(U) (Ch-4) Previous SAR value no longer applicable. These values will be deleted in the next SAR.

d. (U) References:

(U) Development Estimate: SDDM, dated March 18, 1986, subject: "Army Tactical Missile System (Army TACMS) Block I," based on Milestone II (DSARC) decision.

(U) Approved Program: DAE Baseline approved Feb 1989

(b)(1)

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	$ 571.6	$ 570.6
Procurement	484.4	437.5	839.1
Missiles	(460.8)	(412.3)	(817.3)
Ground Support Equipment	(.8)	(1.5)	(1.1)
Total Flyaway	(461.6)	(413.8)	(818.4)
Other Weapon System Cost	(22.2)	(19.6)	(20.7)
Initial Spares	(.6)	(4.1)	(0)
Construction (MILCON)	0	0	3.8
Total FY87 Base-Year $	$1135.9	$ 1009.1	$1413.5
Escalation	86.4	88.5	190.5
Development (RDT&E)	(5.2)	(5.4)	(3.3)
Procurement	(81.2)	(83.1)	(186.4)
Construction (MILCON)	0	(0)	(.8)
Total Then-Year $	$1222.3	$ 1097.6	$1604.0
b. (U) Quantities:			
Development (RDT&E)	50	50	50
Procurement	1000	1000	2187
Total	1050	1050	2237

c. (U) Foreign Military Sales: None.

d. (U) Nuclear Costs: None.

e. (U) References:

(U) Development Estimate: SDDM, dated March 18, 1986, subject: "Army Tactical Missile System (Army TACMS) Block I," based on Milestone II (DSARC) decision.

(U) Approved Program: President's Budget. FY 1990-91

* Army TACMS is a Milestone Authorization Program. Program Baseline Approved Program column of the SAR will be updated to reflect the total Army TACMS requirement when congressional notification is complete.

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

	Current Est (Dec 88 SAR)	Current Year UCR Baseline (Dec 87 SAR)	Budget Year UCR Baseline (Dec 88 SAR)
a. (U) Program Acquisition			
(1) (U) Cost	1604.0	1144.3	1604.0
(2) (U) Quantity	2237	1050	2237
(3) (U) Unit Cost	.7	1.1	.7
b. (U) Current Procurement	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) (U) Cost	70.7	70.7	140.9
Less CY Adv Proc	- 4.3	- 4.3	- 7.6
Plus PY Adv Proc	4.3	4.3	4.3
Net Total	70.7	70.7	137.6
(2) (U) Quantity	66	66	276
(3) (U) Unit Cost	1.1	1.1	.5

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-	1222.3
Previous Changes:				
Economic	-.9	-2.0		-2.9
Quantity				
Schedule				
Engineering				
Estimating	- 57.3	- 17.8		- 75.1
Other				
Support				
Subtotal	- 58.2	- 19.8	-0-	- 78.0
Current Changes:				
Economic	- .1	+ 7.2		+ 7.1
Quantity		479.8		479.8
Schedule				
Engineering				
Estimating	- 24.5	- ~~7.3~~ 5.2	4.6	- 27.2
Other				
Support		- 2.1		
Subtotal	- 24.6	479.7	4.6	459.7
Total Changes	- 82.8	459.9	4.6	381.7
Current Estimate	573.9	1025.5	4.6	1604.0

2237
1050
1187

13. (U) Cost Variance Analysis (Cont) (FY87 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	651.5	484.4	-0-	1135.9
Previous Changes:				
Quantity				
Schedule				
Engineering				
Estimating	- 60.7	- 25.5		- 86.2
Other				
Support				
Subtotal	- 60.7	- 25.5	-0-	- 86.2
Current Changes:				
Quantity		380.2		380.2
Schedule				
Engineering				
Estimating	- 20.2		3.8	- 16.4
Other				
Support				
Subtotal	- 20.2	380.2	3.8	363.8
Total Changes	- 80.9	354.7	3.8	277.6
Current Estimate	570.6	839.1	3.8	1413.5

b. (U) Previous Change Explanations

(1) (U) RDT&E

Economic: Revised escalation indices.

Estimating: Program cost estimate revision is mandated by a funding reduction contained in Program Budget Decision (PBD) 231. TRACE will be adjusted in order to comply with approved funding.

(2) (U) Procurement

Economic: Revised escalation indices.

Estimating: Program cost estimate revision is mandated by a funding reduction contained in PBD 104.

13. (U) Cost Variance Analysis (Cont)

c. (U) Current Change Explanations:

		(Dollars in Millions) Base-Year	Then-Year
(1) (U) RDTE			
Economic:	Revised escalation indices	-	- .1
	Correction to Dec 87 SAR	-	+ 1.8
Estimating:	Program cost estimate revision is mandated by funding reductions.	- 20.2	- 24.5
	Correction to Dec 87 SAR	-	- 1.8
(2) (U) Procurement			
Economic:	Revised escalation indices	-	- .1
	Correction to Dec 87 SAR	-	+ 7.3
Quantity:	Amended to reflect quantity increase shown in FY90-91 President's Budget	+380.2	+479.8
Estimating:	Correction to Dec 87 SAR	-	- 7.3
(3) (U) MILCON			
Estimating:	Funds required to modify facilities in USAEUR for Army TACMS.	+3.8	+4.6

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

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

PAUC (Dec 84 SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
2.087	-.083	-.002		+.138	- .991		+.015	-.923	1.164

Since quantities were not available in the Initial SAR (September 1984), this entry assumes the current estimate of the first SAR in which quantities appeared (i.e., December 1984).

b. (U) Current Baseline Estimate to Current Estimate:

PAUC (Dev Est)	Changes								PAUC (Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1.164	.002	-.403			-.046			-.447	.717

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

a. (U) RDT&E:

M/LPA
LTV Aerospace & Defense Co.
Dallas, TX
DAAH01-86-C-A036, FPI
Award: 26 March 1986
Definitized: 26 Mar 86

Initial Contract Price		
Target	Ceiling	Qty
$180.4	$203.4	50

Current Contract Price		
Target	Ceiling	Qty
$183.0	$206.4	50

Estimated Price at Completion	
Contractor	Program Manager
$ 190.1	$ 190.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -1.015	$ -7.280
Cumulative Variances to Date 31 October 1988	$ -7.290	-7.074
Net Change	$ -6.275	$ .206

M/LPA

Explanation of Change: The unfavorable cumulative schedule variance of $7.1M consists of materiels ($4.5M) of which $776K is currently in stores. Overhead rates and factors account for $1.1M of the schedule variance. The remaining $1.5M schedule variance is in the engineering, quality and manufacturing engineering, and is due to late receipt of hardware deliveries which has impacted the testing and fabrication process. The schedule is still being impacted by late Control System Electronic Units (CSEUs), Integrated Guidance Units (IGUs), and Pulse Code Modulation (PCM) encoder deliveries. The current and cumulative unfavorable cost variance is due to rework, refabrication, and additional manufacturing set ups for splitting of lots to achieve recovery of the schedule position.

Integration

LTV Aerospace & Defense Co.
Dallas, TX
DAAH01-86-C-A037, FPI
Award: 27 March 1986
Definitized: 27 Mar 86

Initial Contract Price		
Target	Ceiling	Qty
$ 83.0	$ 94.4	0

15. (U) Contract Information (Cont)

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 96.4	$109.7	0	$ 102.4	$102.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ .779	$ -6.169
Cumulative Variances to Date 31 October 88	$-4.489	$-13.237
Net Change	$-5.268	$ -7.068

Explanation of Change: The unfavorable cumulative schedule variance of $13.2M is attributed to late receipt of materiel ($10.1M) of which $1.7M is currently in stores. Engineering, logistics, and manufacturing are behind schedule ($2.1M) due to late receipt of hardware deliveries which are impacting the fabrication/integration process. The remainder ($1.0M) is associated with overhead rates. The unfavorable cumulative schedule variance is continuing to be driven by late deliveries of IEUs, IEU Kits, PIMs, FCS, FDDM and training devices. Additional improvement to the cumulative schedule is expected to occur in Dec; however, significant improvement is not anticipated until the Jan 89 timeframe. The unfavorable cost variance is caused by greater effort than budgeted being required to complete software tasks. The projected cost growth is in the FDDM and the FCS software areas. Further, potential cost growth is associated with settlement of out-of-scope claims from subcontractors for FCS Version 6.0 software and PIM development. The contract is being closely monitored to ensure that all risk areas are being addressed to avoid any further cost and schedule increases.

b. (U) Procurement: N/A.

c. (U) MILCON: N/A.

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

a. (U) Program Status

(1) (U) Percent Program Completed: 67% (10 yrs/15 yrs)

(2) (U) Percent Program Cost Appropriated: 38% (606.9/1604.0)

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

Appropriation	Current & Prior Yrs (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-FY94)	Total
RDTE	$ 527.1	$ 46.8	$ -0-	$ -0-	$ 573.9
Procurement	79.8	140.9	188.9	615.9	1025.5
MILCON	-0-	-0-	0	4.6	4.6
Total	$ 606.9	$ 187.7	$ 188.9	$ 620.5	$ 1604.0

16. (U) Program Funding Summary (Cont)

c. (U) Annual Summary.

Fiscal Year	Qty	Flyaway FY87 Dollars		Total Base Year $*	Total Then-Year Dollars			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
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	33.8	3.8
1985				79.2	76.4	51.2	50.1	3.4
1986				107.3	106.6	106.5	105.5	2.8
1987				74.9	76.5	76.5	64.0	2.7
1988				94.8	100.2	100.2	62.5	3.1
1989				69.4	76.0	37.1	.3	4.0
1990				41.3	46.8	N/A	N/A	3.6
Subtotal	50			570.6	573.9	446.4	357.1	
Appropriation: Procurement								
1988		N/A	N/A	8.2	9.1	2.9		3.1
1989	66	N/A	51.9	61.7	70.7	27.6		4.0
1990	276	N/A	112.1	119.8	140.9			3.6
1991	452	N/A	158.8	156.9	188.9			3.3
1992	440	N/A	161.7	167.9	206.2			2.8
1993	470	N/A	166.9	164.2	205.4			2.3
1994	483	N/A	166.9	160.4	204.3			1.8
Subtotal	2187	N/A	818.3	839.1	1025.5	30.5		
Appropriation: MILCON								
1992				3.8	4.6			2.8
Subtotal				3.8	4.6			
Total	2237			1413.5	1604.0	476.9	357.1	

*Based on 22 Dec 88 Inflation Indices

17. (U) Production Rate Data

a. (U) Annual Production Rates:

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1990 89	66	N/A	66	N/A
1991	276	N/A	276	N/A
1992	452	N/A	452	N/A
1993	440*	N/A	440	N/A
1994	470*	N/A	470	N/A
1995	483*	N/A	483	N/A

* Includes 1187 missiles not initially part of DE.

b. (U) Cost Variance:

Item	Production Estimate	Variance Estimate	Current Estimate	Variance Economic	Maximum Economic
Prog Acq Cost (BY $)	N/A	N/A	1413.1	N/A	N/A
(TY$)	N/A	N/A	1604.0	N/A	N/A
PAUC (BY$)	N/A	N/A	.632	N/A	N/A
(TY$)	N/A	N/A	.717	N/A	N/A

c. (U) Schedule Variance:

	Production Estimate	Variance Estimate	Current Estimate	Variance Economic	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	02/89	N/A	02/89
Duration (in months)	N/A	N/A	80	N/A	80
End Date (Mo/Yr)	N/A	N/A	10/95	N/A	10/95

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

	To Date
RDTE	10/10
Procurement	0/0

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

(Average Unit Fly-Away Cost)

	Development Estimate	Current Estimate	Latest Approved Threshold
@ Peak Rate 38/mo.	1000	2187	2187
FY87 Base-Year Dollars	.462	.374	.393
Then-Year Dollars	.539	.458	.481

17. (U) Production Rate Data (Cont)

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

(Average Unit Fly-Away Cost)

	Development Estimate	Current Estimate	Latest Approved Threshold
@ Peak Rate 38/mo.	342	342	342
FY87 Base-Year Dollars	.587	.480	.504
Then-Year Dollars	.673	.558	.586

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules -- N/A

b. (U) Costs -- N/A

c. (U) Contractor Support Costs --

(Then-year Dollars in Millions)

	FY1989 1/ & PRIOR	FY1990 YEAR	FY1991 YEAR	BALANCE TO 2/ COMPLETE	TOTAL
O&M	.3	1.0	1.4	---	2.7

1/ Includes FY88-89
2/ Includes BTC PYs

N-17 V-22

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: V-22 (OSPREY)

AS OF DATE: December 31, 1988

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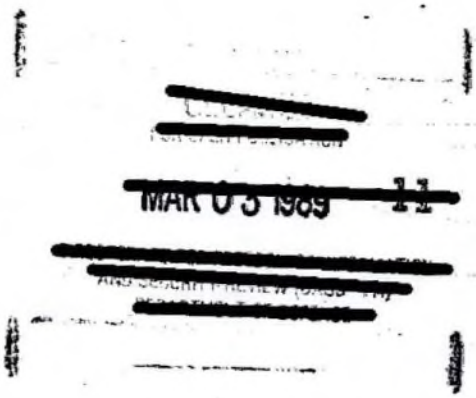

1. Designation and Nomenclature (Popular Name): V-22 Joint Services Advanced Vertical Lift Aircraft (Osprey)

2. 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: BGEN H.W. Blot, USMC
   Assigned: January 21, 1986
   (202) 692-7413
   AUTOVON 222-7413

4. Program Elements/Procurement Line Items:
   RDT&E: PE 0603203N
   PE 0604262N
   PE 0603256N
   PE 64222A
   PE 1110011F (Shared Funding)
   PE 64227F
   PROCUREMENT: APPN 1506 ICN 0163
   PE 1110011F
   PE 0206121M
   MILCON: N/A



5. Related Programs: None

OASD(PA) DFOISR 88-T-0594

Mission and Description: The V-22 Osprey is 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 is 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 will replace 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 will be capable of flying over 2000 nautical miles without refueling, giving the services the advantage of a VSTOL aircraft that can 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.

b. Significant Developments Since Last Report -- Rollout of aircraft #1 occurred 23 May 1988. The engine manufacture (Allison) has delivered engines #2 and #3 plus spares to the airframe manufacturer (Bell-Boeing). The ground test article preflight whirl test was completed successfully and Aircraft #1 has been assembled and ground testing begun. Assembly of aircraft #2 through aircraft #6 has begun.

This SAR reflects refined estimating techniques in the area of learning curve analysis, utilization of the latest information about the weight of the aircraft and the latest information regarding composite material manufacturing complexity. The Air Force quantity has been reduced from 80 aircraft to 55. The total buy of 657 aircraft has been rephased each year with three year extension. This SAR also reflects the effect on pricing of the Army withdrawal of 231 aircraft in accordance with program highlight comments in the 31 December 1987 SAR.

The V-22 system is expected to satisfy all the mission requirements.

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

8. Threshold Breaches: There are currently no DAE baseline breaches.

9. 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 (Adv Acq)	Jan 89/Jan 89	Mar 89
Operational Testing IIA	Aug 89/Aug 89	Aug 89
Milestone IIIA (USMC Pilot Prod)	Dec 89/Dec 89	Dec 89
Operational Testing (IIB)	Aug 90/Aug 90	Aug 90
Milestone IIIB (All Serv Ltd Prod)	Dec 90/Dec 90	Dec 90
Operational Testing IIC (OPEVAL)	Aug 91/Aug 91	Aug 91
Operational Testing IID (AF OPEVAL)	Aug 91/Aug 91	Aug 91
First Fleet Deliveries	Dec 91/Dec 91	Dec 91
Milestone IIIC (USN/MC/A Full Prod)	Dec 91/Dec 91	Dec 91
Milestone IIID (USAF Full Prod)	Dec 91/N/A	Dec 91
USMC IOC (5 Acft Training Det)	1992/May 92	1992
USAF IOC (6 Acft Mission Capabable)	1994/1994	1994
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.

c. Current Change Explanations -- None.

d. References --

Development Estimate: DCP dtd 1 May 1986.

Approved Program: DAE baseline approved 17 Feb 1988.

10. Technical/Operational Characteristics:

a. Technical

	Development Estimate	Approved Program	Demons Perf.	Current Estimate
Length, ft Folded/Unfolded	62.24/57.33	62.24/57.33		62.24/57.33
Width, ft Folded/Unfolded	18.42/83.83	18.42/83.83		18.42/83.83
Height, ft Folded/Unfolded	17.98/21.73	17.98/21.73		17.98/21.73
Empty Weight, lbs	31,768	31,786		31,768
b. Operational				
Readiness, msn capability rate (% MC)	70	70		70
Mission Complete Probability, Rate (MFHBMA - Design Controllable)	98	98		98
Direct Maintenance Man-Hours per Flight Hour, Design Controllable:				
Org. Level, Unscheduled (Corrective)	7.0	7.0		7.0
Org. Level, Schedule (Preventive)	2.5	2.5		2.5
World-wide Self-Deployment, nm (minimum distance)	2100	2100		2100
Continuous Cruise Speed, kts	250	250		250
Dash Speed, kts	275	275		275
Instantaneous G-Loading (+/-)	+4.0/-1.0	+4.0/-1.0		+4.0/-1.0
Troop Capacity	24	24		24
External Cargo, lbs	10,000	10,000		10,000

c. Previous Change Explanations -- None.

d. Current Change Explanations -- None.

e. References --

Development Estimate: DCP dtd 1 May 1986.

Approved Program: DAE baseline approved 17 Feb 1988.

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

a. Cost --	Development Estimate	Approved Baseline	Current Estimate
Development (RDT&E)	2443.7	2471.0	2471.0
Procurement	20493.1	17425.5	17425.5
Airframe	(11013.0)	(10272.1)	(10272.1)
Engine	(1519.8)	(1289.7)	(1289.7)
Avionics	(1293.5)	(1015.0)	(1015.0)
Other Hardware	(493.7)	(379.7)	(379.7)
Non Recurring	(1197.1)	(973.9)	(973.9)
Total Flyaway	(15517.1)	(13930.4)	(13930.4)
Other Wpn Sys Cost	(3299.6)	(2288.7)	(2288.7)
Initial Spares	(1676.4)	(1206.4)	(1206.4)
Construction (MILCON)	136.2	134.4	134.4
Total FY 86 Base-Year $	23073.0	20030.9	20030.9
Escalation	6589.3	5824.5	5824.5
Development (RDT&E)	(181.5)	(189.5)	(189.5)
Procurement	(6371.1)	(5595.4)	(5595.4)
Construction (MILCON)	(36.7)	(39.6)	(39.6)
Total Then-Year $	29662.3	25855.4	25855.4
b. Quantities --			
Development (RDT&E)	6	6	6
Procurement	913	657	657
Total	919	663	663

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --
Development Estimate: FY 1988/89 President's Budget.

Approved Program: DAE baseline approved 17 Feb 1988.
FY 1990/91 President's Budget.

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

	Current Est (Dec 88 SAR)	UCR Baseline (Dec 87 SAR)	UCR Baseline (Dec 88 SAR)
a. Program Acquisition --			
(1) Cost	25855.4	23666.3	25855.4
(2) Quantity	663	688	663
(3) Unit Cost	39.0	34.4	39.0

	Current Year		Budget Year
b. Current Procurement --	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	333.9	333.9	1418.6
Less CY Adv Proc	-333.9	-333.9	120.2
Plus PY Adv Proc	0	0	333.9
Net Total	0	0	1632.3
(2) Quantity	0	0	12
(3) Unit Cost	N/A	N/A	136.0

13. Cost Variance Summary:

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	+1.2	+214.3	+1.6	+217.1
Quantity	-	-6308.2	-	-6308.2
Schedule	+0.6	-	-	+0.6
Engineering	-	-	-	-
Estimating	+36.1	+95.9	-0.1	+131.9
Other	-	-	-	-
Support	-	-37.4	-	-37.4
Subtotal	+37.9	-6035.4	+1.5	-5996.0
Current Changes:				
Economic	-3.3	-377.7	-1.8	-382.8
Quantity	-	+1683.5	-	+1683.5
Schedule	+0.6	+257.8	+3.9	+262.3
Engineering	-24.1	-	-	-24.1
Estimating	+24.2	+2509.5	-2.5	+2531.2
Other	-	-	-	-
Support	-	-1881.0	-	-1881.0
Subtotal	-2.6	+2192.1	-0.4	+2189.1
Total Changes	+35.3	-3843.3	+1.1	-3806.9
Current Estimate	2660.5	23020.9	174.0	25855.4

(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	-	-4623.2	-	-4623.2
Schedule	-	-	-	-
Engineering		-	-	-
Estimating	+27.7	+71.6	-0.1	+99.2
Other	-	-	-	-
Support	-	-30.2	-	-30.2
Subtotal	+27.7	-4581.8	-0.1	-4554.2
Current Changes:				
Quantity	-	+1256.1	-	+1256.1
Schedule	-	-59.1	-	-59.1
Engineering	-18.8	-	-	-18.8
Estimating	+18.4	+1763.8	-1.7	+1780.5
Other	-	-	-	-
Support	-	-1446.6	-	-1446.6
Subtotal	-0.4	+1514.2	-1.7	+1512.1
Total Changes	+27.3	-3067.6	-1.8	-3042.1
Current Estimate	+2471.0	+17425.5	+134.4	+20030.9

13. Cost Variance Summary (Con't):

b. Previous Change Explanations --

RDT&E

Economic: Revised escalation indices.
Schedule: Air Force rescheduled EW suite and fuel tank development from 1990 to 1992.
Estimating: ASN and Navy reprogrammings, escalation indices not reflected in controls, outyear adjustments to meet FY 89 controls, Air Force additional requirements, and Air Force supplemental budget disapproved.

Procurement

Economic: Revised escalation indices.
Quantity: Army withdrawal.
Estimating: Navy adjustment in tooling estimate, Air Force adjustment due to official escalation indices.
Support: Navy increased requirement in spares, Navy/Air Force adjustments due to official escalation indices, Army withdrawal.

MILCON

Economic: Revised escalation indices.
Estimating: Adjustments due to official escalation indices.

c. Current Change Explanations --

	(Dollars in Millions) Base-Year $	Then-Year $
(1) RDT&E		
Revised Jan 90/91 escalation indices (Economic)	N/A	-3.3
Air Force rescheduled the simulator modification from 1991 to 1992 (Schedule)	0	+0.6
Air Force deleted the Integrated Defensive Avionics Digital System effort (Engineering)	-20.0	-25.4
Air Force added effort for an analysis of the EW requirements (Engineering)	+1.2	+1.3
Navy reprogrammings and adjustments (Estimating)	-6.0	-6.0
Navy budget adjustments (FY82/85/86) (Estimating)	(-1.1)	(-1.0)
Navy reprogrammings to Bomb Fuse, AH-1, F-14D, External Drop Tank (FY87) (Estimating)	(-1.7)	(-1.8)
Navy reprogrammings to CV Launch, A-6E Weapon Integration, Undistributed Congressional (FY88) (Estimating)	(-1.3)	(-1.4)

13. Cost Variance Analysis (Cont'd):

	(Dollars in Millions) Base-Year $	Then-Year $
(1) RDT&E (Con't)		
Navy Congressional, Contractor Advisory and Assistance Services (CAAS), Inflation, adjustments (FY89) (Estimating)	(-2.8)	(-3.0)
Navy CAAS, Inflation Adjustments (FY90/92) (Estimating)	(-1.2)	(-1.5)
Navy OSD Adjustments (FY93/94) (Estimating)	(+2.1)	(+2.7)
Air Force ECP (Estimating)	+24.4	+30.2
Air Force reestimate of unique engineering change proposal (ECP) requirements (Estimating)	(+20.8)	(+25.9)
Air Force reestimate of ECO and Mission Support requirements due to change in the unique ECP (Estimating)	(+3.4)	(+4.3)
(2) Procurement		
Revised Jan 90/91 escalation indices (Economic)	N/A	-377.7
Air Force reduction in aircraft from 80 to 55 (Quantity)	-293.8	-394.9
Correction of Quantity variance in previous SAR due to Army withdrawal in accordance with OSD memo dated 16 Dec 1988 (Quantity)	+1549.9	+2078.4
Navy Rephasing of program quantities (Schedule)	-59.1	+239.1
Air Force change in buy schedule from 1992 to 1993 (Schedule)	0	+18.7
Repricing of Navy aircraft reflecting impact of Army withdrawal and Air Force reduction in quantity in accordance with program highlight comments in 31 Dec 1987 SAR (Estimating)	+536.5	+737.9
Repricing of Air Force aircraft reflecting impact of Army withdrawal in accordance with program highlight comments in 31 Dec 1987 SAR (Estimating)	+65.4	+88.5

13. Cost Variance Analysis (Cont'd):

	(Dollars in Millions) Base-Year $	Then-Year $
(2) Procurement (Con't)		
Navy refinement in estimating including refined learning curve analysis, weight information and composite material manufacturing complexity techniques (Estimating)	1141.1	+1657.0
Navy articles of GFE moved to CFE status in first two years of procurement (Estimating)	+20.8	+25.8
Air Force adjustment in tooling estimate to agree with contract (Estimating)	+0.1	+0.3
Navy reestimate of spares due to rephasing of program and corrects Material Support Date incorrectly calculated last year (Support)	+264.7	+358.7
Navy revised estimate of support (Support)	-197.2	-211.7
Air Force increase in initial spares requirements (Support)	+31.4	+44.8
Air Force decrease in Peculiar Support Equipment and data requirements due to reduction in quantity (Support)	-25.6	-32.7
Air Force addition of trainer/simulator requirements (Support)	+30.0	+38.3
Correction of Support variance in previous SAR due to Army withdrawal in accordance with OSD memo dated 16 Dec 1988 (Support)	- 1549.9	- 2078.4
(3) MILCON		
Revised Jan 90/91 escalation indices (Economic)	N/A	-1.8
Air Force rephasing facilities requirements (Schedule)	0	+3.9
Navy reestimate of requirements (Estimating)	-1.7	-2.5

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

14. Program Acquisition Unit (PAUC) History (Con't):
(Then-Year Dollars in Millions)

b. Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	CHANGES								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
+32.278	-0.250	+5.484	+0.397	-0.036	+4.018	-	-2.894	+6.720	+38.998

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
$1714.0	$1810.0	6

Current Contract Price		
Target	Ceiling	Qty
$1,727.1	$1,823.8	6

Estimated Price at Completion	
Contractor	Program Manager
$1823.8	$1823.8

	Cost Variance	Schedule Variance
Previous Cumulative Variance	$-116.2	$-141.9
Cumulative Variances to Date (11/30/87)	$-214.0	$-142.8
Net Change	$-97.8	$-.9

Explanation of Change: Unfavorable cost and schedule variances continue to grow reflecting increased tooling, production rework associated with early assembly conditions, resolution of fit problems and redesign activities. Functional check-out of the Ground Test Article and Aircraft Number 1 have required extensive use of overtime hours adversely affecting both cost and schedule. Additionally, redesign activities resulted in late engineering releases that have impacted testing, tooling and developmental tasks.

The contract effort was increased for provisioned items increasing the target price by $9.0M and the ceiling by $9.5M.

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
$82.9	$82.9	21

Estimated Price at Compleation	
Contractor	Program Manager
$82.9	$82.9

Explanation of Change: The contract effort was increased for provisioned items.

b. APN -- N/A

c. MILCON -- N/A

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

a. Program Status --

(1) Percent Program Completed: 40.0% (8 yrs/20 yrs)

(2) Percent Program Cost Appropriated: 9.3% ($2402.0/$25855.4)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (82-89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance to Complete (FY 92-01)	Total
RDT&E	2068.1	243.4	182.5	166.5	2660.5
Procurement	333.9	1418.6	1726.6	19541.8	23020.9
MILCON	-	5.7	8.1	160.2	174.0
Total	2402.0	1667.7	1917.2	19868.5	25855.4

c. 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: RDT&E Total (Navy, Air Force and Army)								
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	83.3	3.80
1985	-			176.4	174.2	174.2	172.2	3.40
1986	6			516.2	524.9	524.9	516.4	2.80
1987	-			403.3	422.3	422.3	411.6	2.70
1988	-			457.1	495.3	486.9	310.2	3.10
1989	-			292.7	329.1	237.8	15.3	4.00
1990	-			209.4	243.4			3.60
1991	-			152.4	182.5			3.30
1992	-			105.2	129.2			2.80
1993	-			9.8	12.3			2.30
1994	-			12.4	15.8			1.80
1995	-			7.1	9.2			1.80
Subtotl	6			2471.0	2660.5	1968.4	1544.6	

16. Program Funding Summary (Con't): (Current Estimate in Millions of Dollars)
c. Annual Summary --

Fiscal Year	Qty	Flyaway FY 86 Dollars Nonrec	Flyaway FY 86 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Obligated	Expended	Escl Rate (%)
Appropriation: Procurement Total (Navy and Air Force)								
1989	-	-	-	279.5	333.9	5.0	0	4.00
1990	12	439.8	596.1	1185.0	1418.6			3.60
1991	24	94.1	783.7	1406.4	1726.6			3.30
1992	45	43.6	1118.7	1698.8	2129.3			2.80
1993	60	88.7	1289.5	1990.5	2541.1			2.30
1994	70	70.6	1438.3	2054.8	2670.3			1.80
1995	76	51.3	1461.3	1845.7	2442.1			1.80
1996	77	47.6	1424.6	1671.4	2250.6			1.80
1997	58	42.4	991.3	1169.8	1604.1			1.80
1998	58	38.9	972.6	1105.2	1543.0			1.80
1999	58	33.5	968.3	1081.8	1537.3			1.80
2000	58	15.1	939.3	1017.0	1471.8			1.80
2001	61	8.3	972.8	919.6	1352.2			1.80
Subtotl	657	973.9	12956.5	17425.5	23020.9	5.0	0	
Appropriation: MILCON Total (Navy and Air Force)								
1990				4.8	5.7			3.60
1991				6.6	8.1			3.30
1992				-	-			2.80
1993				3.9	5.0			1.80
1994				71.2	92.4			1.80
1995				39.3	51.9			1.80
Subtotl				134.4	174.0			
Tot Pgm	663	973.9	12956.5	20030.9	25855.4	1973.4	1544.6	
Appropriation: 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	83.3	3.80
1985	-			175.8	173.6	173.6	171.6	3.40
1986	6			514.0	522.7	522.7	514.8	2.80
1987	-			400.5	419.4	419.4	409.7	2.70
1988	-			427.3	463.0	461.5	308.1	3.10
1989	-			269.4	302.9	237.5	15.3	4.00
1990	-			190.3	221.2			3.60
1991	-			133.7	160.1			3.30
1992	-			78.0	95.8			2.80
1993	-			1.1	1.4			2.30
1994	-			1.0	1.3			1.80
Subtotl	6			2320.1	2483.7			
1937.0	1538.4							

NOTE: FY 1983 RDT&E $'s reflect $29.9M of Army funds (P.E. 64222A)

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)
c. 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: RDT&E Air Force								
1985	-			0.6	0.6	0.6	0.6	3.40
1986	-			2.2	2.2	2.2	1.6	2.80
1987	-			2.8	2.9	2.9	1.9	2.70
1988	-			29.8	32.3	25.4	2.1	3.10
1989	-			23.3	26.2	.3	0	4.00
1990	-			19.1	22.2			3.60
1991	-			18.7	22.4			3.30
1992	-			27.2	33.4			2.80
1993	-			8.7	10.9			2.30
1994	-			11.4	14.5			1.80
1995	-			7.1	9.2			1.80
Subtotl	-			150.9	176.8	31.4	6.2	
Appropriation: Procurement Navy								
1989	-	-	-	279.5	333.9	5.0	0	4.00
1990	12	439.8	596.1	1185.0	1418.6			3.60
1991	24	94.1	783.7	1406.4	1726.6			3.30
1992	45	43.6	1118.7	1679.7	2105.0			2.80
1993	54	79.6	1151.9	1758.4	2244.4			2.30
994	58	58.0	1123.7	1626.2	2113.0			1.80
995	58	38.3	1050.6	1311.1	1734.8			1.80
1996	58	34.8	1008.9	1189.0	1601.9			1.80
1997	58	42.4	991.3	1169.8	1604.1			1.80
1998	58	38.9	972.6	1105.2	1543.0			1.80
1999	58	33.5	968.3	1081.8	1537.3			1.80
2000	58	15.1	939.3	1017.0	1471.8			1.80
2001	61	8.3	972.8	919.6	1352.2			1.80
Subtotl	602	926.4	11677.9	15728.7	20786.6	5.0	0	
Appropriation: Procurement Air Force								
1992	-	-	-	19.1	24.3			2.80
1993	6	9.1	137.6	232.1	296.7			2.30
1994	12	12.6	314.6	428.6	557.3			1.80
1995	18	13.0	410.7	534.6	707.3			1.80
1996	19	12.8	415.7	482.4	648.7			1.80
Subtotl	55	47.5	1278.6	1696.8	2234.3			
Appropriation: MILCON Navy								
1990				4.8	5.7			3.60
1991				6.6	8.1			3.30
1992				-	-			2.80
1993				3.9	5.0			2.30
Subtotl				15.3	18.8			
ot Navy	608	47.5	1278.6	18064.1	23289.1	1942.0	1538.4	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)
c. 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: MILCON Air Force								
1993				8.6	10.9			2.30
1994				71.2	92.4			1.80
1995				39.3	51.9			1.80
Subtotl				119.1	155.2			
Tot AF	55	47.5	1278.6	1966.8	2566.3	31.4	6.2	

17. Production Rate Data:
a. Annualized Production Rates -- (Note): The annualized production rate shown differs from the annual funded buy quantities because the funded delivery period is 7 months for FY 1990.

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
	Production Rates (Quantity/Year)			
1990	12	N/A	21	N/A
1991	45	N/A	24	N/A
1992	75	N/A	45	N/A
1993	108	N/A	54	N/A
1994	132	N/A	58	N/A
1995	132	N/A	58	N/A
1996	132	N/A	58	N/A
1997	132	N/A	58	N/A
1998	116	N/A	58	N/A
1999	29	N/A	58	N/A
2000	0	N/A	58	N/A
2001	0	N/A	61	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	20030.9	N/A	N/A
(TY $)	N/A	N/A	25855.4	N/A	N/A
PAUC (BY $)	N/A	N/A	30.2	N/A	N/A
(TY $)	N/A	N/A	39.0	N/A	N/A

c. Schedule Variance --

Start Date (Mo/Yr)	N/A	N/A	1/89	N/A	N/A
Duration (in Months)	N/A	N/A	177	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	11/03	N/A	N/A

17. Production Rate Data Cont'd:

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. N/A

b. N/A

c. Contractor Support Costs--

(Then Year Dollar in Millions)

	FY 1988	FY 1989	FY 1990	FY 1991	TOTAL
O&M,N	.2	.2	.2	.4	9
Industrial Fund (NIF)	.7	.7	.8	.9	3.1
Total	.8	.9	1.0	1.3	4.0

N-23 LCAC

SAR-88-027

UNCLASSIFIED

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

PROGRAM: LCAC

AS OF DATE: December 31, 1988

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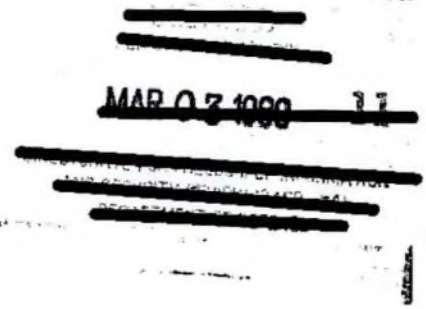


1. (U) Designation/Nomenclature (Popular Name): LCAC/Landing Craft, Air Cushion

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

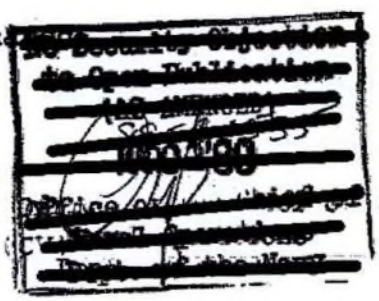
PM: Mr. E. E. Shoults
Assigned: April 29, 1985
AV: 222-8511; COMM: (202) 692-8511

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

RDT&E: PE 0604567N Project 1803, 0857 (Sh

PROCUREMENT: APPN 1611N ICN 5105

MILCON: PE 0204796N (Shared)
PE 0805796N (Shared)



5. (U) Related Programs: AALC; LHD; LSD 41; LSD 41 (

OASD(PA) DFOISR 88-T-0583

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 the first contracts were awarded for the design and construction of prototype Amphibious Assault Landing Craft (AALC). Results from the test program were extremely successful, with the craft satisfying all established performance requirements.

Bell Aeropsace, 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 has required analysis, system redesign, corrective action and evaluation.

A second source builder, Avondale Gulfport Marine, formerly Lockheed Shipbuilding Company, was selected and a contract to produce two FY85 craft was awarded on September 30, 1985.

Operational Testing (OT IIIB) on LCAC was completed on 15 April 1987. Approval for Full Production was granted by ASN on 26 June 1987.

b. (U) Significant Development since last report -- Textron Marine Systems, formerly Bell Aerospace, delivered craft 13 and 14 on 30 September and3 November 1988, respectively. Avondale Gulfport Marine delivered their first craft, LCAC 018, on 2 November 1988. These three craft were transported to ACU-5 at MCB Camp Pendleton, California. ACU 5 now has 9 craft assigned. ACU-4, located at Little Creek, Virginia, has 6 craft assigned.

Avondale Gulfport Marine projects to deliver their second craft, LCAC 21, on 28 February 1989.

Two fixed price incentive contracts were competitively awarded for 15 craft on 13 December 1988, 12 craft to Textron Marine Systems and 3 craft to Avondale Gulfport Marine.

The LCAC 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 breaches or NDCP (SECNAV memo dated 21 December 1981) threshold breaches.

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	Jan 90(CH-1)
(U) NAVAL SUPPORT DATE	Jan 90	Jan 90	Jan 90(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. IOC has been accomplished. The AFP, material support date and naval support date were added to update the DAE baseline of Feb 17, 1988.

c. (U) Current Change Explanation --

(CH-1) MSD has been revised to Jan 90 to coincide with latest data promulgated by the Material Manager (SPCC). The Apr 88 date reflected an incomplete listing of designated LCAC Systems MSDs.

(CH-2) Change from Jan 92 to Jan 90. Corrects error in Dec 87 SAR.

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 Feb 17, 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)	1800	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	195/100	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.

Demonstrated performance.

Improved reliability based on demonstrated performance.

Updated to reflect DAE baseline of Feb 17, 1988

d. (U) Current Change Explanations -- None

e. (U) References --

Production Estimate: Approved LCAC NDCP dated May 25, 1983.

Approved Program: DAE Baseline approved Feb 17, 1988

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

	Production Estimate	Approved Program	Current Estimate
a. Cost			
Development (RDT&E)	21.2	33.5	33.5
Procurement (SCN)	1023.6	2128.6	2128.6
(Sailaway)	(982.3)	(2016.9)	(2016.9)
(Ship System)	(3.3)	(3.7)	(3.7)
(Initial Spares)	(13.4)	(0.0)	(0.0)
(Outfitting/Post Delivery)	(24.6)	(108.0)	(108.0)
Construction (MILCON)	58.5	87.0	87.0
Total FY82 Base-Year $	1103.3	2249.1	2249.1
Escalation	507.4	623.1	623.1
Development (RDT&E)	(0.2)	(0.0)	(0.0)
Procurement	(489.3)	(596.2)	(596.2)
Construction (MILCON)	(17.9)	(26.9)	(26.9)
Total Then-Year $	1610.7	2872.2	2872.2 1/
b. Quantities			
Development (RDT&E)	0	0	0
Procurement	60	105	105
Total	60	105	105

c. Foreign Military Sales -- None.

d. Nuclear Costs -- None.

e. References --
Production Estimate: Approved LCAC NDCP dated May 25, 1983.

Approved Program: FY 90/91 President's Budget.

1/ Excludes advance procurement for craft beyond FY 1994.

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

(Current (Then-Year) Dollars in Millions)

a. Program Acquisition --	Current Est (Dec 88 SAR)	UCR Baseline (Dec 87 SAR)	UCR Baseline (Dec 88 SAR)
(1) Cost	2872.2	2165.8	2872.2
(2) Quantity	105	78	105
(3) Unit Cost	27.4	27.8	27.4

b. Current Procurement --	Current Year (FY 1989)	Current Year (FY 1989 APPN)	Budget Year (FY 1990)
(1) Cost	306.6	306.6	222.2
Less CY Adv Proc	-19.9	-19.9	-22.9
Plus PY Adv Proc	35.3	35.3	19.9
Less OF/PD	-1.1	-1.1	-2.9
Less PY Escal	0.0	0.0	0.0
Net Total	320.9	320.9	216.3
(2) Quantity	15	15	9
(3) Unit Cost	21.4	21.4	24.0

13(U)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	-2.2	-444.0	-5.9	-452.1
Quantity	0.0	545.5	0.0	545.5
Schedule	0.0	33.3	0.0	33.3
Engineering	0.0	2.8	0.0	2.8
Estimating	16.1	314.8	39.6	370.5
Other	0.0	0.0	0.0	0.0
Support	0.0	55.1	0.0	55.1
Subtotal	13.9	507.5	33.7	555.1
Current Changes:				
Economic	-0.4	-18.2	-0.5	-19.1
Quantity	0.0	697.9	0.0	697.9
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	-1.4	3.8	4.3	6.7
Other	0.0	0.0	0.0	0.0
Support	0.0	20.9	0.0	20.9
Subtotal	-1.8	704.4	3.8	706.4
Total Changes	12.1	1211.9	37.5	1261.5
Current Estimate	33.5	2724.8	113.9	2872.2

13(U)Cost Variance Analysis (Continued):

a. Summary -- (FY 1982 (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	310.2	0.0	310.2
Schedule	0.0	-3.6	0.0	-3.6
Engineering	0.0	2.2	0.0	2.2
Estimating	13.5	235.5	27.1	276.1
Other	0.0	0.0	0.0	0.0
Support	0.0	48.3	0.0	48.3
Subtotal	13.5	592.6	27.1	633.2
Current Changes:				
Quantity	0.0	489.3	0.0	489.3
Schedule	0.0	3.6	0.0	3.6
Engineering	0.0	0.0	0.0	0.0
Estimating	-1.2	3.4	1.4	3.6
Other	0.0	0.0	0.0	0.0
Support	0.0	16.1	0.0	16.1
Subtotal	-1.2	512.4	1.4	512.6
Total Changes	12.3	1105.0	28.5	1145.8
Current Estimate	33.5	2128.6	87.0	2249.1

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

b. Previous Change Explanations--

RDT&E

Economic: Revised Jan 88 economic escalation rates.

Estimating: Revised program estimates.

Procurement

Economic: Revised Jan 88 economic escalation rates.

Engineering: Increase for arctic - configured LCAC.

Estimating: Reflects actual execution, re-phasing of LLTM and repricing based on FY 85/86 Contract Award.

Support: Reflects actual execution and initial ACU 4 cosal buy.

Milcon:

Economic: Revised Jan 88 economic escalation rates; revised program estimates

13. Cost Variance Analysis (Continued):

c. Current Change Explanations

	(Dollars in Millions) Base-Year $	Then-Year $
1) RDT&E		
ECONOMIC		
REVISED JAN 89 ECONOMIC ESCALATION RATES	0.0	-0.4
ESTIMATING	-1.2	-1.4
REVISED PROGRAM ESTIMATES	(0.1)	(0.4)
REDUCED R & D EFFORT	(-1.3)	(-1.8)
2) Procurement		
ECONOMIC		
REVISED JAN 89 ECONOMIC ESCALATION RATES	0.0	-18.2
QUANTITY	489.3	697.9
ADDITION OF 12 CRAFT IN FY 93	(194.7)	(276.4)
ADDITION OF 12 CRAFT IN FY 94	(198.6)	(287.0)
ADDITION OF 3 CRAFT IN FY 92	(52.4)	(73.1)
AP ASSOC WITH 12 ADDITIONAL CRAFT IN FY 93	(21.8)	(30.4)
AP ASSOC WITH 12 ADDITIONAL CRAFT IN FY 94	(21.8)	(31.0)
SCHEDULE	3.6	0.0
REPHASING 3 CRAFT BASED ON FY 89 CONG FROM FY90 TO 89	(1.0)	(0.0)
REPHASING 3 CRAFT BASED ON FY 89 CONG FROM FY92 TO 89	(2.6)	(0.0)
ESTIMATING	3.4	3.8
REVISED PROGRAM ESTIMATES	(14.0)	(18.2)
INCREASE TO OFFSET REDUCED AP IN FY88	(0.9)	(1.2)
REDUCED LLTM REQUIREMENTS	(-2.1)	(-2.8)
REDUCED PROGRAM ESTIMATE	(-2.0)	(-2.7)
REFLECTS CONTRACT OPTION PRICE	(2.2)	(3.0)
REPHASING OF PROGRAM ESTIMATES	(0.1)	(0.1)
RETURNED COST ON COMPLETED PROGRAM	(-2.1)	(-2.3)
TRANSFER OF CAS(CONTRACT ADVISORY SUPPORT) TO INHOUSE	(-7.7)	(-10.9)
TRANSFER OF CRAFT REPAIR & CRAMIL(CRAFT REPAIR AND MAINTENANCE ITEM LIST) FROM FY90 TO 89	(0.1)	(0.0)
SUPPORT	16.1	20.9
INCREASE IN OUTFITTING TO SUPPORT ADDL 27 CRAFT	(5.1)	(5.7)
INCREASE IN POST DELIVERY FOR ADD'L 27 CRAFT	(8.0)	(11.2)
REPHASING OF POST DELIVERY REQUIREMENTS	(5.4)	(6.6)
RETURNED OUTFITTING COST ON COMPLETED PROGRAM	(-2.4)	(-2.6)
3) MILCON		
ECONOMIC		
REVISED JAN 89 ECONOMIC ESCALATION RATES	0.0	-0.5
ESTIMATING		

13. Cost Variance Analysis (Continued):

c. Current Change Explanations

	(Dollars in Millions) Base-Year $	Then-Year $
REVISED PROGRAM ESTIMATES	1.4	4.3

14(U)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. Current Baseline Estimate to Current Estimate

PAUC (Product. Estimate)	Changes (Then Year Dollars in Millions) Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC (Current Estimate)
26.8	-4.5	0.5	0.3	0.0	3.6	0.0	0.7	0.6	27.4

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

a. (U) RDT&E -- N/A

b. (U) Procurement --

LCAC (24-33)	Initial Target	Contract Ceiling	Price Qty
Textron Marine Systems, New Orleans, LA	$166.6	$181.8	10

N00024-87-C-2096, FPI
Award: July 1, 1987
Definitized: July 1, 1987

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$166.6	$181.8	10	$163.5	$166.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-0.3	$+ 5.8
Cumulative Variances to Date (11/27/88)	$-4.2	$+16.6
Net Change	$-3.9	$+10.8

Explanation of Change: The unfavorable cost variance is due to higher than planned overhead. The favorable schedule variance is primarily due to early receipt of material. The Program Manager's assessment takes into consideration the above variance. The increasing negative cost variance is due to contractor overhead rates being greater than anticipated. The change in schedule variance results from the transfer of material from other contracts ahead of required construction need dates.

LCAC (15-17, 19-20, 22-23)	Initial Target	Contract Ceiling	Price Qty
Avondale Gulfport Marine, Inc. 1/ Gulfport, MS	$115.2	$122.9	7

N00024-87-C-2089, FPI
Award: July 1, 1987
Definitized: July 1, 1987

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$115.2	$122.9	7	$111.0	$115.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$+0.6
Cumulative Variances To Date (11/30/88)	$+1.5	$ -.9
	$+1.5	$-1.5

Explanation of Change: The favorable cost variance is a result of the contractor experiencing better efficiencies in early start of construction. The majority of the unfavorable schedule variance is identified with craft assembly which is being affected by late material deliveries.

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

b. (U) Procurement --

	Initial Target	Contract Ceiling	Price Qty
LCAC (37-48) Textron Marine Systems 2/ 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	*	$132.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances to Date (12/31/88)	$ 0.0	$ 0.0
Net Change	$ 0.0	$ 0.0

Explanation of Change: None.

* No reports received from contractor yet.

	Initial Target	Contract Ceiling	Price Qty
LCAC (34-36) Avondale Gulfport Marine, Inc. 2/ 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

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances to Date (12/31 87)	$ 0.0	$ 0.0
Net Change	$ 0.0	$ 0.0

Explanation of Change: None.

* No report received from contractor yet.

1/ Shipyard name changed from Lockheed Shipbuilding Company to Avondale Gulfport Marine, Inc.

2/ Added.

c. (U) Milcon -- N/A

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

a. Program Status --

(1) Percent Program Completed: 13/20 = 65.0%
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 1397.6/ 2872.2 = 48.7%
(Funds Appropriated To Date/Total Program Funding in Millions)

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	31.5	1.0	1.0	0.0	33.5
Procurement	1308.5	222.2	288.3	905.8	2724.8
MILCON	57.6	0.0	12.4	43.9	113.9
Total	1397.6	223.2	301.7	949.7	2872.2

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY82 Dollars Nonrec.	Sailaway FY82 Dollars Rec.	Base Year $	Total Then-Year $ Program	Obligated	Expended	Escl Rate %
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	1.7	2.0	0.6	0.6	3.40
1986	0	0.0	0.0	3.1	3.7	3.6	2.9	2.80
1987	0	0.0	0.0	1.7	2.0	2.0	1.8	2.70
1988	0	0.0	0.0	0.3	0.4	0.4	0.1	3.10
1989	0	0.0	0.0	0.0	0.0	0.0	0.0	4.00
1990	0	0.0	0.0	0.7	1.0	0.0	0.0	3.60
1991	0	0.0	0.0	0.7	1.0	0.0	0.0	3.30
1992	0	0.0	0.0	0.0	0.0	0.0	0.0	2.80
Subtotal	0	0.0	0.0	33.5	33.5	30.0	28.8	--

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY82 Dollars Nonrec.	Sailaway FY82 Dollars Rec.	Base Year $	Total Then-Year $ Program	Obligated	Expended	Escl Rate %
APPROPRIATION: Procurement								
1981	0	0.0	0.0	50.6	53.5	53.5	50.6	9.60
1982	3	55.0	96.1	105.5	114.9	114.9	113.6	7.50
1983	3	0.0	64.5	63.2	69.9	69.9	66.1	3.80
1984	6	0.0	119.9	150.5	169.4	169.0	147.4	3.60
1985	9	0.0	193.0	225.4	258.2	241.6	164.0	2.10
1986	12	0.0	232.6	229.4	271.8	250.5	56.8	1.00
1987	0	0.0	0.0	23.1	26.0	24.4	16.6	1.50
988	0	0.0	0.0	30.3	38.2	34.7	0.1	2.60
1989	15	0.0	246.5	234.8	306.6	272.5	0.0	4.00
1990	9	0.0	161.9	166.1	222.2	0.0	0.0	3.60
1991	12	0.0	204.2	210.9	288.3	0.0	0.0	3.30
1992	12	0.0	210.1	214.0	298.2	0.0	0.0	2.80
1993	12	0.0	214.8	217.5	308.5	0.0	0.0	2.30
1994	12	0.0	218.3	199.3	287.9	0.0	0.0	1.80
1995	0	0.0	0.0	8.0	11.2	0.0	0.0	1.80
Subtotal	105	55.0	1961.9	2128.6	2724.8	1231.0	615.2	--

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY82 Dollars Nonrec.	Sailaway FY82 Dollars Rec.	Base Year $	Total Then-Year $ Program	Obligated	Expended	Escl Rate %
APPROPRIATION: MILCON								
1984	0	0.0	0.0	19.2	21.9	19.7	18.9	3.80
1985	0	0.0	0.0	16.5	19.4	17.9	17.9	3.40
1986	0	0.0	0.0	12.3	14.9	14.9	14.8	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	3.10
1989	0	0.0	0.0	1.0	1.4	0.0	0.0	4.00
1990	0	0.0	0.0	0.0	0.0	0.0	0.0	3.60
991	0	0.0	0.0	8.7	12.4	0.0	0.0	3.30
1992	0	0.0	0.0	11.8	17.1	0.0	0.0	2.80
1993	0	0.0	0.0	0.0	0.0	0.0	0.0	2.30
1994	0	0.0	0.0	6.0	9.0	0.0	0.0	1.80
1995	0	0.0	0.0	5.8	8.9	0.0	0.0	1.80
1996	0	0.0	0.0	5.7	8.9	0.0	0.0	1.80
Subtotal	0	0.0	0.0	87.0	113.9	52.5	51.6	--
Total	105	55.0	2069.8	2249.1	2872.2	1314.8	696.7	--

17(U)Production Rate Data:

a. Annual Production Rates

Fiscal Year	Production Rates (Quantity/Year) Development Estimate	Production 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	9	15
1991	N/A	0	12	15
1992	N/A	0	12	0
1993	N/A	0	12	0
1994	N/A	0	12	0
1995	N/A	0	0	0
1996	N/A	0	0	0

b. Cost Variance (Dollars in Millions)

Item	Production Estimates	Variance (CE less Pde)	Current Estimates	Variance (CE less Max)	Maximum
Prod Acq. Cost (BY $)	1103.3	1145.8	2249.1	40.8	2208.3
(TY $)	1610.7	1261.5	2872.2	241.4	2630.8
PAUC (BY $)	18.4	3.0	21.4	0.4	21.0
(TY $)	26.8	0.6	27.4	2.3	25.1

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

c. Schedule Variance --

	Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less (Max)	Maximum Economic
Start Date (Mo/Yr)	2/82	-	2/82	-	2/82
Duration (in Months)	110	+71	181	-36	145
End Date (Mo/Yr)	4/91	+71	3/97	-36	3/94

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
Procurement	16/15

e. Approved Design to Cost Goal --

(Average Unit Sailaway Cost)

	Development Estimate	Current Estimate	Latest Approved Threshold
@ Qty 105 - @ Peak Rate:	6/yr		
FY 82 Base-Year $	20.237	20.237	20.237
Then-Year $	25.912	25.912	25.912
@ Qty 12 (1st three years) - @ Peak Rate:	6/yr		
FY 82 Base-Year $	28.817	28.817	28.817
Then-Year $	31.742	31.742	31.742

18. (U) Operating and Support Costs:

a. Assumptions and Ground Rules -- N/A

b. Costs -- N/A

c. Contractor Support Costs --

(Then Year Dollar in Millions)

	FY 1988	FY 1989	FY 1990	FY 1991	TOTAL
O&M,N	.7	.7	.7	.7	2.8
Industrial Fund (NIF)					
Total	7	7	.7	.7	2.8

(2) [redacted]

SAR-88-028

N-24 LHD-1

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

PROGRAM: LHD 1 CLASS

AS OF DATE: December 31, 1988

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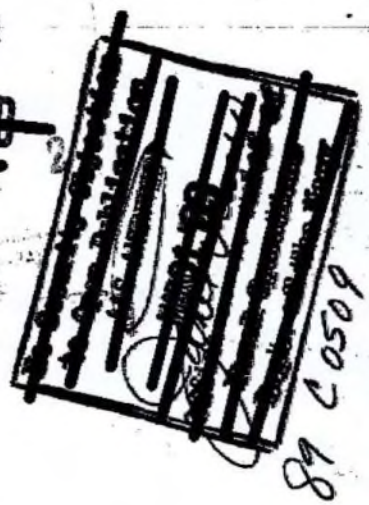

1. (U) Designation/Nomenclature (Popular Name): LHD 1/Amphibious Assault Ship

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

PM: Mr. E. E. Shoults
Assigned: April 29, 1985
AV: 222-8511; COMM: (202) 692-8511

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

RDT&E: PE 0603564N Project 0408 (Shared)
PE 0604567N Project S0857, 01803 (Shared)

PROCUREMENT: APPN 1611N ICN 3035

5. (U) Related Programs: Landing Craft, Air Cushion (LCAC)

[redacted]

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[redacted]

OASD(PA) DFOISR 88-T-0502

6. (U) 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. (U) Program Highlights:

a. (U) 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. The LHD was intended to be a traditional, new design ship development program with lead ship authorization in 1987. In the spring of 1981, in response to SECNAV direction to rapidly increasing amphibious lift capability, the Navy accelerated the LHD program by moving lead ship authorization forward from 1987 to 1985. In June 1981, SECNAV proposed that the LHD have a convertible sea control mission; and, in November, directed that the Program be accelerated in a 1984 Authorization as a modified LHA design.

A detail design and construction contract was awarded to Ingalls Shipbuilding Incorporated on 28 February 1984 for the Lead Ship in the LHD Program. The LHD 1 was launched on 4 August 1987 and christened as WASP on 19 September 1987.

A detailed testing program for each ship is scheduled during construction to verify compliance with specified requirements. INSURV will conduct standard at-sea trials (Acceptance and Final Contract), at completion. Experience from the LHA Class program has been utilized in the development of the LHD 1 Class design. A ship shock test will be performed on the lead ship to validate that shock hardening criteria applied to the LHD 1 design was followed, to identify deficiencies and develop corrective measures for follow ships of the class.

b. (U) Significant Development Since Last Report -- Planning for LHD 5 commenced in April 1988 with the establishment of LHD 5 SCIB Working Group. LHD 2 LLTM was subsumed in the LHD 2 contract on 18 May 1988. Fabrication on LHD 2 began on 11 July 1988. The option for detail design and construction of LHD 4 was exercised 3 October 1988. The LHD 1 initial builders trials were held 5-8 December 1988. Feasibility studies for LHD 5 were completed during December 1988. As of 1 December 1988, LHD 1 was 92% complete. The LHD 1 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 breaches or NDCP (dated 15 August 1985) threshold breaches.

(b)(1)

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 Feb 17, 1988

(b)(1)

(b)(1)

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

	Development Estimate	Approved Program	Current Estimate
a. Cost			
Development (RDT&E)	39.9	48.9	48.9
Procurement (SCN)	2891.9	4756.8	4756.8
(Sailaway)	(2794.9)	(4541.7)	(4541.7)
(Ship System)	(10.1)	(11.5)	(11.5)
(Initial Spares)	(9.3)	(10.6)	(10.6)
(Outfitting/Post Delivery)	(77.6)	(193.0)	(193.0)
Total FY82 Base-Year $	2931.8	4805.7	4805.7
Escalation	1519.2	1269.0	1269.0
Development (RDT&E)	(3.7)	(6.0)	(6.0)
Procurement	(1515.5)	(1263.0)	(1263.0)
Total Then-Year $	4451.0	6074.7	6074.7
* Excludes FY94 advance procurement for the FY95 ship.			
b. Quantities			
Development (RDT&E)	0	0	0
Procurement	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: FY 1990-91 President's Budget.

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

(Current (Then-Year) Dollars in Millions)

	Current Est (Dec 88 SAR)	UCR Baseline (Dec 87 SAR)	UCR Baseline (DEC 88 SAR)
a. Program Acquisition --			
(1) Cost	6074.7	5131.0	6074.7
(2) Quantity	6	5	6
(3) Unit Cost	1012.4	1026.2	1012.4
	Current Year (FY 1989)	Current Year (FY 1989 APPN)	Budget Year (FY 1990)
b. Current Procurement --			
(1) Cost	758.0	758.0	5.3
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	32.2	32.2	0.0
Less OF/PD	-24.9	-24.9	-5.3
Less PY Escal	0.0	0.0	0.0
Net Total	765.3	765.3	0.0
(2) Quantity	1	1	0
(3) Unit Cost	765.3	765.3	0.0

13(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	-0.5	-1474.5	0.0	-1475.0
Quantity	0.0	3075.0	0.0	3075.0
Schedule	0.0	-233.9	0.0	-233.9
Engineering	0.0	0.0	0.0	0.0
Estimating	2.3	-834.6	0.0	-832.3
Other	0.0	0.0	0.0	0.0
Support	0.0	146.2	0.0	146.2
Subtotal	1.8	678.2	0.0	680.0
Current Changes:				
Economic	0.2	-43.5	0.0	-43.3
Quantity	0.0	930.5	0.0	930.5
Schedule	0.0	27.1	0.0	27.1
Engineering	0.0	0.0	0.0	0.0
Estimating	9.3	38.6	0.0	47.9
Other	0.0	0.0	0.0	0.0
Support	0.0	-18.5	0.0	-18.5
Subtotal	9.5	934.2	0.0	943.7
Total Changes	11.3	1612.4	0.0	1623.7
Current Estimate	54.9	6019.8	0.0	6074.7

13(U)Cost Variance Analysis (Continued):

a. Summary -- (FY 1982 (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	1872.9	0.0	1872.9
Schedule	0.0	-187.4	0.0	-187.4
Engineering	0.0	0.0	0.0	0.0
Estimating	2.1	-592.0	0.0	-589.9
Other	0.0	0.0	0.0	0.0
Support	0.0	92.6	0.0	92.6
Subtotal	2.1	1186.1	0.0	1188.2
Current Changes:				
Quantity	0.0	656.0	0.0	656.0
Schedule	0.0	19.4	0.0	19.4
Engineering	0.0	0.0	0.0	0.0
Estimating	6.9	20.8	0.0	27.7
Other	0.0	0.0	0.0	0.0
Support	0.0	-17.4	0.0	-17.4
Subtotal	6.9	678.8	0.0	685.7
Total Changes	9.0	1864.9	0.0	1873.9
Current Estimate	48.9	4756.8	0.0	4805.7

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

b. Previous Change Explanations --

RDT&E

Economic: Revised economic escalation rates.

Estimating: Increase in R&D contract design effort.

Procurement:

Economic: Revised economic escalation rates.

Estimating: Actual execution, GFE and other re-pricing.

Support: Re-pricing of outfitting requirements.

13. Cost Variance Analysis (Continued):

c. Current Change Explanations

	(Dollars in Millions) Base-Year $	Then-Year $
1) RDT&E		
ECONOMIC		
REVISED JAN 89 ECONOMIC ESCALATION RATES	0.0	0.2
ESTIMATING	6.9	9.3
REVISED PROGRAM ESTIMATES	(-0.2)	(-0.2)
REVISED ESTIMATE TO COMPLETE CONTRACT DESIGN	(7.1)	(9.5)
2) Procurement		
ECONOMIC		
REVISED JAN 89 ECONOMIC ESCALATION RATES	0.0	-43.5
QUANTITY	656.0	930.5
ADDITION OF (1) SHIP IN FY 93	(630.2)	(894.6)
AP ASSOC. WITH ADDITION OF (1) SHIP IN FY 93	(25.8)	(35.9)
SCHEDULE		
SLIP OF (1) SHIP FROM FY 91 TO FY 92	19.4	27.1
ESTIMATING	20.8	38.6
REVISED PROGRAM ESTIMATES	(20.8)	(43.5)
ESC. SAVINGS	(-7.8)	(-10.8)
INCR. TO COVER COST OVERRUN & ADDL COSAL REQMTS	(17.7)	(19.3)
TRANSFER FROM AP IN FY 91 TO FULL FUNDING IN FY92	(4.3)	(6.0)
TRANSFER OF AP IN FY 91 TO FY 92	(-4.4)	(-6.0)
TRANSFER OF CAS TO INHOUSE	(-9.8)	(-13.4)
SUPPORT	-17.4	-18.5
INCREASED OUTFITTING TO SUPPORT FY 93 SHIP	(17.9)	(26.5)
INCREASED POST DELIVERY TO SUPPORT FY93 SHIP	(12.9)	(19.0)
REPHASING OF OUTFITTING REQMTS BASED ON LEAD SHIP	(-31.3)	(-39.9)
REVISED POST DELIVERY ESTIMATES	(-16.9)	(-24.1)

14(U)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. Current Baseline Estimate to Current Estimate

PAUC (Develop. Estimate)	Changes: Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC (Current Estimate)
1483.7	-253.0	-74.4	-34.5	0.0	-130.7	0.0	21.3	-471.3	1012.4

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

a. (U) RDT&E -- N/A

b. (U) Procurement --

LHD 1	Initial Target	Contract Ceiling	Price 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			*Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$1004.9	$1202.8	1	$1004.9	$1011.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-28.6	$-26.7
Cumulative Variances to Date (11/27/88)	$-57.9	$-13.0
Net Change	$-29.3	$+13.7

Explanation of Change: The unfavorable cost and schedule variances are due to the inefficiencies in construction labor. The Program Manager's assessment takes into consideration the above variance. The increased negative cost variance results from additional construction labor hours and associated overhead. The decrease in the negative schedule variance results from the contractor's re-baselining to a later delivery.

LHD 2 1/	Initial Target	Contract Ceiling	Price 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			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$446.1	$503.4	1	$503.4	$503.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-1.2	$+9.5
Cumulative Variances To Date (11/27/88)	$+1.4	$-9.2
Net Change	$+2.6	$-18.7

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

Explanation of Change: The favorable cost variance is a result of the contractor experiencing better efficiencies in early start of construction. The unfavorable schedule variance is a result of start up not occurring as planned. The Program Manager's assessment takes into consideration the above variances. The change in cost variance is the result of a contract reprogramming. The change in schedule variance is identified with material and relates to an erroneous baseline time-phasing projection for major procurements.

	Initial Target	Contract Ceiling	Price Qty
LHD 3 1/ 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			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$380.4	$409.2	1	$383.4	$409.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances to Date (11/30/88)	$-7.9	$-0.4
Net Change	$-7.9	$-0.4

Explanation of Change: The unfavorable cost variance is due to anticipated material cost growtn. The unfavorable schedule variance is a result of contractor not properly time phasing the material baseline. The Program Manager's assessment takes into consideration the above variances.

	Initial Target	Contract Ceiling	Price Qty
LHD 4 1/ 2/ 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			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$366.9	$391.4	1	*	$391.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances to Date (12/31 88)	$ 0.0	$ 0.0
Net Change	$ 0.0	$ 0.0

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

Explanation of Change: None

* No reports received from contractor yet.

1/ The LHD 2, 3, and 4 contracts are currently budgeted to ceiling.
2/ Added

c. (U) Milcon -- N/A

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

a. Program Status --

(1) Percent Program Completed: 9/18 = 50.0%
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 3898.4/ 6074.7 = 64.2%
(Funds Appropriated To Date/Total Program Funding in Millions)

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

Appropriation	Prior yrs	Budget Year	Budget Year	Balance to Complete	Total
	(FY81-89)	(FY90)	(FY91)	(FY92-98)	
RDT&E	43.0	5.4	6.0	0.5	54.9
Procurement	3855.4	5.3	54.9	2104.2	6019.8
Total	3898.4	10.7	60.9	2104.7	6074.7

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY82 Dollars Nonrec.	Sailaway FY82 Dollars Rec.	Base Year $	Total Then-Year $ Program	Obligated	Expended	Escl Rate %
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	14.2	14.5	11.4	11.1	7.60
1983	0	0.0	0.0	19.2	20.6	19.2	18.8	4.90
1984	0	0.0	0.0	1.0	1.1	0.9	0.9	3.80
1985	0	0.0	0.0	2.4	2.7	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
988	0	0.0	0.0	0.6	0.8	0.8	0.5	3.10
1989	0	0.0	0.0	1.1	1.4	0.0	0.0	4.00
1990	0	0.0	0.0	4.0	5.4	0.0	0.0	3.60
1991	0	0.0	0.0	4.3	6.0	0.0	0.0	3.30
1992	0	0.0	0.0	0.4	0.5	0.0	0.0	2.80
Subtotal	0	0.0	0.0	48.9	54.9	36.2	35.0	--

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY82 Dollars Nonrec.	Sailaway FY82 Dollars Rec.	Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate %
APPROPRIATION: Procurement								
1982	0	0.0	0.0	59.1	64.3	45.0	44.9	7.50
1983	0	0.0	0.0	48.6	53.8	53.7	52.3	3.80
1984	1	150.0	1096.4	1163.0	1313.8	1219.7	1073.3	3.60
1985	0	0.0	0.0	34.0	39.2	39.2	30.8	2.10
1986	1	0.0	726.8	693.3	825.0	661.4	189.6	1.00
1987	0	0.0	0.0	29.2	35.8	35.8	4.5	1.50
1988	1	0.0	596.3	604.1	765.5	549.4	34.0	2.60
989	1	0.0	586.7	582.0	758.0	452.9	0.1	4.00
1990	0	0.0	0.0	4.3	5.3	0.0	0.0	3.60
1991	0	0.0	0.0	41.1	54.9	0.0	0.0	3.30
1992	1	0.0	730.2	760.8	1058.2	0.0	0.0	2.80
1993	1	0.0	655.3	659.9	934.6	0.0	0.0	2.30
1994	0	0.0	0.0	13.8	18.9	0.0	0.0	1.80
1995	0	0.0	0.0	1.3	1.8	0.0	0.0	1.80
1996	0	0.0	0.0	20.6	29.4	0.0	0.0	1.80
1997	0	0.0	0.0	10.9	15.8	0.0	0.0	1.80
1998	0	0.0	0.0	30.8	45.5	0.0	0.0	1.80
Subtotal	6	150.0	4391.7	4756.8	6019.8	3057.1	1429.5	--
Total	6	150.0	4391.7	4805.7	6074.7	3093.3	1464.5	--

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

~~SECRET~~

SAR-88-072

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

24 PEACEKEEPER

Program: Peacekeeper

AS OF DATE: December 31, 1988

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1.(U) Designation and Nomenclature (Popular Name): LGM-118A/Land Based ICBM (Peacekeeper)

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

3.(U) Responsible Office and Telephone Number:

Program Director
Ballistic Missile Office
Norton AFB, CA 92409-6468

Col Thomas J. Speed, III
Assigned: Mar 87
AV 876-3356; COMM (714) 382-3356

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

RDT&E: PE 64312F (Shared Funding)

PROCUREMENT: APPN 3020 ,PE 11215F ICN MMXOLG,MMXYO

MILCON: PE 11215F

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DEPARTMENT OF DEFENSE

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89-0036-T
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. Related Programs: Small ICBM, Peacekeeper Rail Garrison

6. 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. The second 50 Peacekeepers are planned for Peacekeeper Rail Garrison deployment as directed by the President in December 1986.

7. Program Highlights:

a. 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.

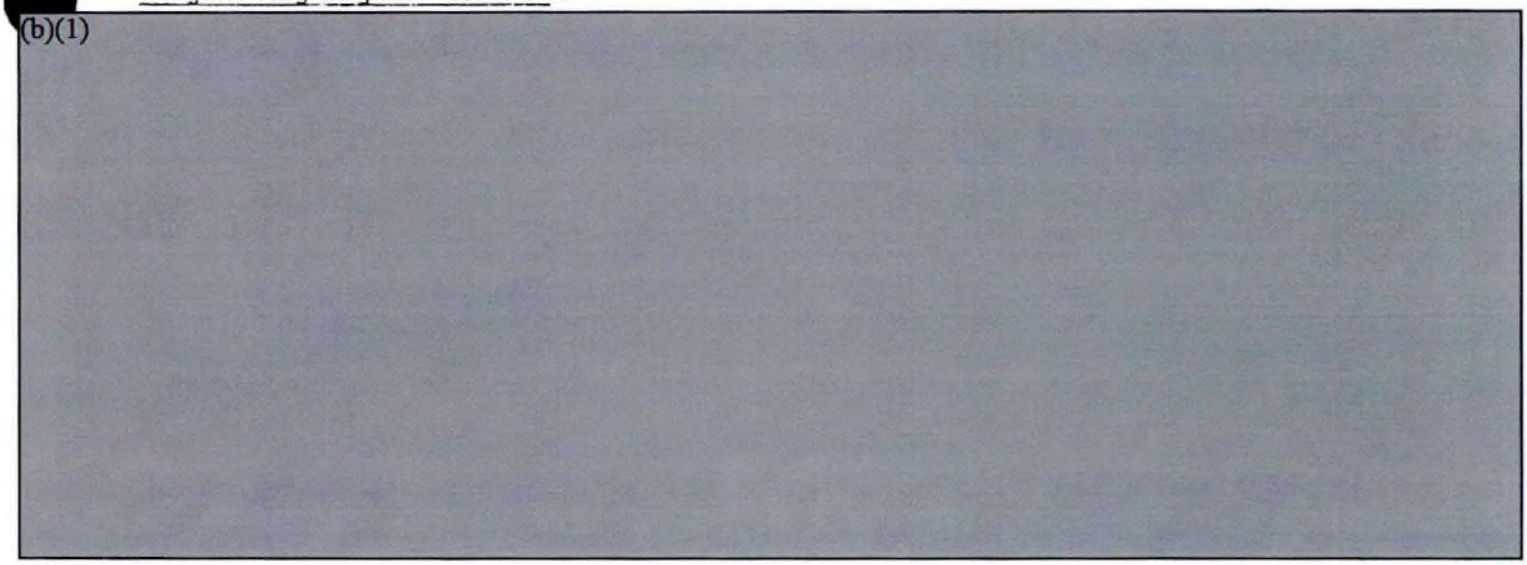
In 1981, the horizontal multiple protective shelter basing mode was terminated and the President directed production of 100 M-X missiles. The President also directed interim deployment of 40 missiles in existing Minuteman and Titan silos while long-term basing options of deep basing, defended fixed basing, 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.

The flight test program was completed up to the 18th flight and displayed accuracies better than the requirement at maturity. 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) lagged contract delivery requirements, but met the BMO recovery schedule established in March 1987. The accelerometer (Specific Force Integrating Receiver

7. Program Highlights (Cont'd):

(b)(1)



The Peacekeeper ICBM system is expected to fulfill all mission requirements.

c. Changes since as of date - None.

8. Threshold Breaches: There are currently no DAE baseline breaches, or SDDM (dated 14 Feb 80) threshold breaches.

9. Schedule:

a. Milestones --

	Development Estimate/ Approved Program*	Current Estimate
Milestone I (DSARC)	Mar 76/Mar 76	Mar 76*
Milestone II (DSARC)	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*
Ordnance Induced Shock Tests Complete	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*
Initial Operational Capability (IOC)	Dec 86/Dec 86	Dec 86*
Full Operational Capability (FOC)	-- /Dec 88	Dec 88*

*Reflects actual dates of accomplishment.

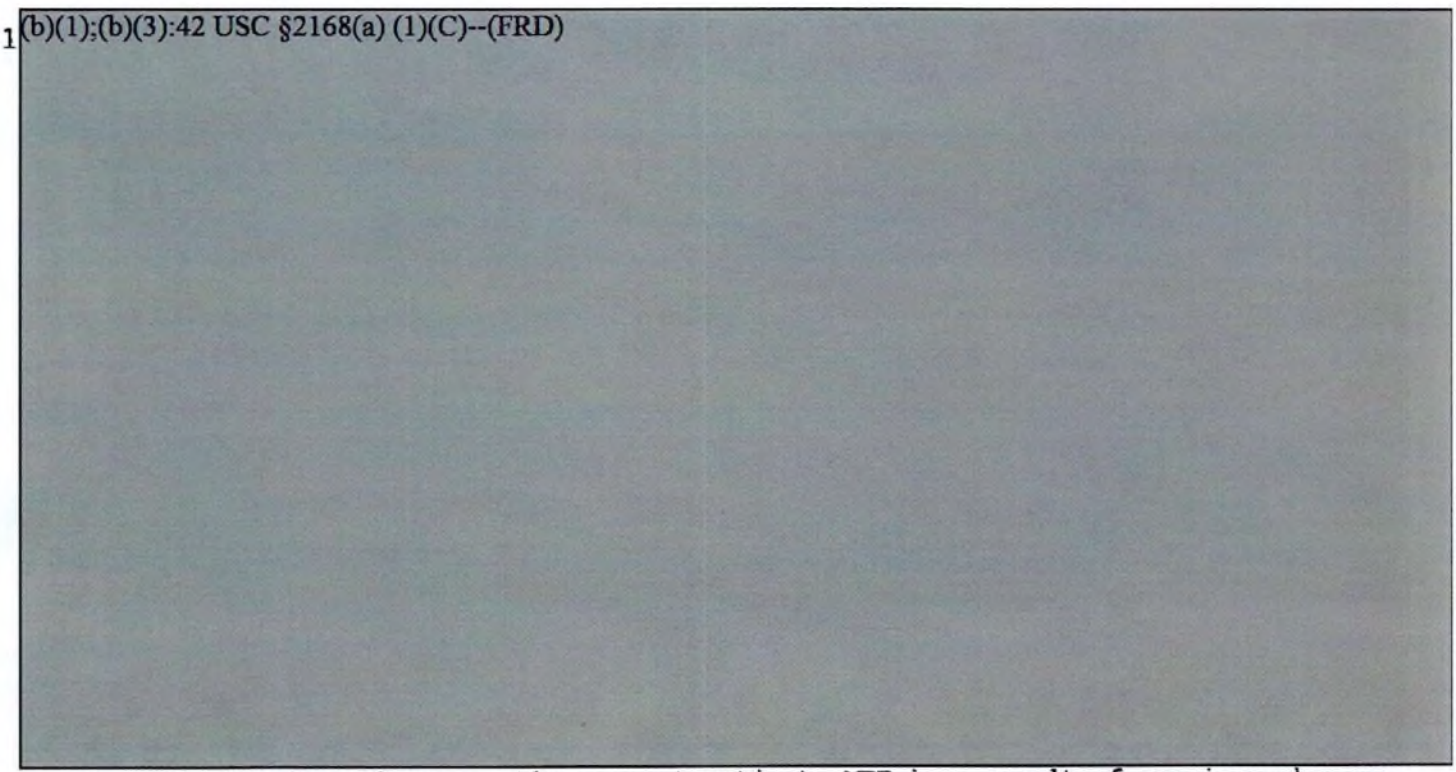
b. Previous Change Explanations --
First flight delayed due to development problems and congressional restrictions which ran concurrently from January to June 1983. Propulsion Flight Proof Tests were completed late due to a redesign of the Stage IV propellant tank which required an additional flight proof test in July 1984.

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

c.(U) Current Change Explanations -- N/A

d.(U) References: Development Estimate: SDDM, dated February 14, 1980.
Approved Program: DAE baseline dated February 1988.

1 (b)(1);(b)(3):42 USC §2168(a) (1)(C)--(FRD)



c. (U) Previous Changes: 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) Explanation of Changes:
(Ch-1) Miscalculated in previous report.
(Ch-2) Erroneous entry - Approved program reflected in current PMD.
(Ch-3) 2nd and 3rd digits inverted in previous report. Figure updated.

e. (U) References: Development Estimate: SDDM, dated February 14, 1980.
Approved Program: DAE baseline dated February 1988.

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

1/ (U) The approved program directs only the MEF. Subelements are provided to explain how the MEF is derived.

2/ (U) 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).

3/ (U) 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.)

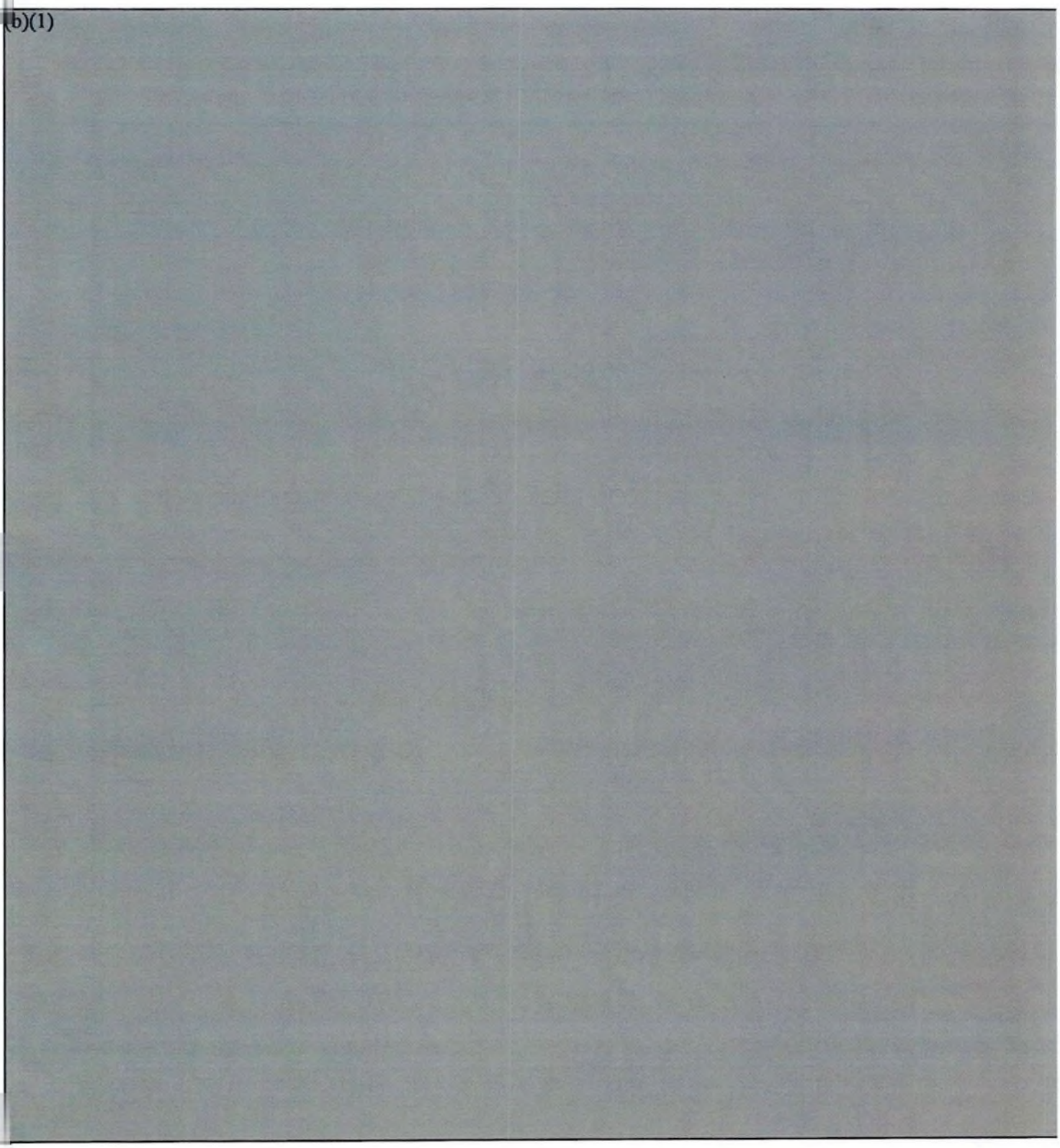
4/ (U) Weapon system availability is the percentage of the missile force, under the jurisdiction of the using command and committed to the wartime mission, which is capable of commitment to the launch sequence at any random point in time.

5/ (U) 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

6/ (U) 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, and applies to a mature system three to five years after IOC.

(b)(1)



1. (U) Program Acquisition Cost (Cont'd) (Current Estimate in Millions of Dollars) 1/

2/ (U) Construction figure does not include $86.1M in FY 82 and prior year funds (then-year dollars associated with earlier basing modes).

3/ (U) 235 production missiles equates to 100 deployment missiles, 120 operational test and evaluation missiles (12 Rail Garrison), and 15 aging and surveillance missiles.

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

	Current Estimate (Dec 88 SAR)	Current Year UCR Baseline (Dec 87 SAR)	Budget Year UCR Baseline (Dec 88 SAR)
a. Program Acquisition --			
(1) Cost	23492.1	21946.1	23492.1
(2) Quantity	255	255	255
(3) Unit Cost	92.126	86.063	92.126
b. Current Procurement --	(FY 1989)	(FY 1989)*	(FY 1990)
(1) Cost	796.6	796.6	1129.7
(2) Quantity	12	12	12
(3) Unit Cost	66.383	66.383	94.142

*Differs from the December 1987 SAR due to the 1989 Appropriations Act.

13. Cost Variance Analysis:

a. 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	-154.4	-722.1	-6.0	-882.5
Quantity		377.6		377.6
Schedule		935.0		935.0
Engineering			-97.1	-97.1
Estimating	-276.3	1640.9	4.8	1369.4
Other				0.0
Support	-0.8	-1376.3	-59.4	-1436.5
Subtotal	-431.5	855.1	-157.7	265.9
Current Changes:				
Economic	1.0	-28.9	-0.2	-28.1
Quantity				0.0
Schedule		124.9		124.9
Engineering				0.0
Estimating	-35.0	1393.3	-18.8	1339.5
Other				0.0
Support		109.7		109.7
Subtotal	-34.0	1599.0	-19.0	1546.0
Total Changes	-465.5	2454.1	-176.7	1811.9
Current Estimate	6431.6	16832.3	228.2	23492.1

13. 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	-242.0	1078.9	3.0	839.9
Other				0.0
Support	-1.3	-1012.3	-49.2	-1062.8
Subtotal	-243.3	320.6	-118.7	-41.4
Current Changes:				
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating	-29.5	737.2	-13.8	693.9
Other				0.0
Support		67.7		67.7
Subtotal	-29.5	804.9	-13.8	761.6
Total Changes	-272.8	1125.5	-132.5	720.2
Current Estimate	5745.4	11417.5	192.2	17355.1

b. Previous Change Explanations --

Development

Economic: Revised economic escalation indices.

Support: Reduce development test data analysis to live within fiscal constraints. Reinstate essential development test data analysis previously reduced by fiscal constraints.

Estimating: Adjustment for current and prior year escalation change.

Estimate refined as a result of high test success. Congressional and OSD and other reductions increased risk to the program.

Congressional rescission in FY 88 reflects reduction of missile buy in FY 88-89.

Procurement

Economic: Revised economic escalation indices.

Quantity: Increased missile buy quantity by 12 to support Rail Garrison basing.

3. Cost Variance Analysis (Cont'd):

Schedule: Congressional cut and revised buy profile of 21 per year.

The procurement schedule was restructured as a direct result of Congressional action (-6 in FY 84) and the revised schedule contained in the President's Budget (-2 in FY 85) and adding the missiles back in FY 89 (+8).

Rephase of 19 missiles from FY 85 to FY 89 due to FY 85 Congressional action.

Reduce FY 86 and FY 87 missile buys and stretch program into FY 91.

Reduce FY 88-89-90 and stretch program to FY 96.

Estimating: Impact of revised economic escalation indices on prior years. Adjustment of prior years amounts to actuals.

Reestimate and realignment of funds to flyaway from support.

Reduced Assembly and Checkout estimate.

Increased missile cost due to FY 86 and FY 87 missile buy reduction. Adjustment for flyaway current and prior year escalation.

Increase fixed program costs. Production rate inefficiencies raised unit costs.

Adjustment for FY 90 and beyond escalation.

Adjustment for reduction in funding - flyaway.

Congressional reduction in FY 86 caused an increase in program risk.

Refinement of estimate to reflect actuals based on Nov 87 Financial Review.

Support: Reduces quantity of initial spares to less than projected requirements. Lower quantities of spares increases risk of reduced weapon system availability to live within fiscal constraints. Impact of revised economic escalation indices on prior years.

Reduced Instrumentation and Flight Safety System estimate.

Reestimate and realignment of funds from support to flyaway.

Increased general support due to FY 86 and FY 87 missile buy reduction.

13. Cost Variance Analysis (Cont'd):

Congressional cut in spares.

Reduction of 50 basing sets.

Increased missile initial spares to support Rail Garrison.

Adjustment for current and prior year escalation in support categories.

Revised buy schedule for Instrumentation and Flight Safety System, lower estimates for mechanical, support equipment, and engineering support.

Adjustment to reschedule the purchase of IFSS from FY 89 to FY 96.

Adjustment for FY 90 and beyond escalation.

Reduction in funding caused a shortage in estimated cost for IFSS in FY 96.

Increased cost for Logistics and General Support for FY 96.

Refinement of estimate for support based on the Nov 87 Financial Review.

Construction

Economic: Revised economic escalation indices.

Estimating: Revised estimate for storage facilities. Adjustment for current and prior year escalation.

Congressional rescission in FY 88 does not effect overall program because of the reduction in missile buys in FY 88 (9) and FY 89 (9).

Engineering: Descope defense access roads due to reduced funding in FY 85 President's Budget. Will not allow completion of road program as scheduled and will impact FOC.

Descope defense access roads due to reduced funding in FY 86 President's Budget. Will not allow completion of road program as scheduled and will affect FOC.

Support: Removal of planning and design funds included in 30 June SAR. This change was directed by higher headquarters since these funds were not considered program unique.

Quantity: Quantity reduction of 50 basing sets.

Adjustment to change Dec 85 entry from quantity to support.

13. Cost Variance Analysis (Cont'd):
c. Current Change Explanations --

		(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E			
Revised economic escalation indices	(Economic)	-	1.0
Adjustment for current and prior year inflation	(Estimating)	-0.7	-0.9
Adjustment to Budget Authority FY 87 increased risk to the program	(Estimating)	-28.8	-34.1
(2) Procurement			
Revised economic escalation indices	(Economic)	-	-28.9
Adjustment for reduced annual purchases from 21 to 12 missiles. Production rate inefficiencies raised unit cost:		1032.6	1972.6
	(Schedule)	-	(124.9)
	(Estimating)	(991.9)	(1775.0)
	(Support)	(40.7)	(72.7)
Adjustment for current and prior year inflation:		-13.4	-19.5
	(Estimating)	(-12.5)	(-17.6)
	(Support)	(-0.9)	(-1.9)
Adjustment for reduction in funding. Reduction in funding caused an increase in program risk:	(Estimating)	-242.2	-364.1
Adjustment to the purchasing of initial spares (PBD 170)	(Support)	27.9	38.9
(3) MILCON			
Revised economic escalation indices	(Economic)	-	-0.2
Adjustment for current and prior year inflation	(Estimating)	0.1	0.1
Refinement of estimate for storage facilities based on schedule change (May 88 Financial Review)	(Estimating)	-13.8	-18.8

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 (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
89.219	-3.571	-2.718	4.156	-0.381	10.623	0.000	-5.202	2.907	92.126

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

Stage I, FY 86-87:
Morton Thiokol, Brigham City, UT
F04704-86-C-0091, FPIF
Award: May 27, 1987
Definitized: May 27, 1987

Initial Contract Price		
Target	Ceiling	Qty
$144.3	$154.2	26

This contract was reported in the Dec 87 SAR and is no longer one of the six largest contracts.

Inertial Measurement Unit, FY 85:
Northrop Electronics Division
Hawthorne, CA
F04704-85-C-0082, FPIF
Award: June 1, 1986
Definitized: July 1, 1986

Initial Contract Price		
Target	Ceiling	Qty
$158.8	$168.4	30

This contract was reported in the Dec 87 SAR and is now over 90 percent complete and no longer being reported.

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

a. RDT&E

None

b. Procurement

Canister Procurement:	Initial Contract Price		
Westinghouse Electric Corp.	Target	Ceiling	Qty
(Marine Division) Sunnyvale, CA			
FO4704-85-C-0067, FPIF	$120.5	$133.8	33
Award: August 7, 1985			
Definitized: August 7, 1985			

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$203.8	$223.5	51	$201.5	$201.5 1/

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+2.3	$-0.8
Cumulative Variances to Date (11/30/88)	$+3.4	$+0.8
Net Change	$+1.1	$+1.6

Explanation of Change: The favorable cost and schedule variances are due to performance being claimed for completion of Nuclear Components Division's efforts on this contract. No program or contract impact. This contract is over 90% complete and will no longer be reported in the SAR.

1/ Includes authorized undefinitized work. To prevent disclosure of our negotiating position, the authorized undefinitized work is valued at the contractor's estimate for purposes of this report.

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

Guidance and Control, FY 86:
Rockwell International,
Autonetics, Anaheim, CA
F04704-87-C-0029, FPIF/CPFF 1/
Award: April 10, 1987
Definitized: June 18, 1987

Initial Contract Price		
Target	Ceiling	Qty
$165.0	$175.4	25

Current Contract Price		
Target	Ceiling	Qty
$241.2	$193.6 3/	25

Estimated Price At Completion	
Contractor	Program Manager
$241.2	$241.2 2/

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+0.7	$-2.0
Cumulative Variances to Date (11/30/88)	$+0.9	$0.0
Net Change	$+0.2	$+2.0

Explanation of Change: The cost variance change is insignificant. The schedule variance change is due to the recovered reporting of the previously late accounting of delivered subcontracted hardware. Award and Definitization date changed becaused of previous erroneous entries. No program or contract impact.

1 Previously reported as F04704-86-C-0029, FPIF.

2/ Includes authorized undefinitized work. To prevent disclosure of our negotiating position, the authorized undefinitized work is valued at the contractor's estimate for purposes of this report. No program or contract impact.

3/ The contract ceiling price does not include an amount for the CPFF support portion of this contract.

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

Inertial Measurement Unit:	Initial Contract Price		
	Target	Ceiling	Qty
Northrop Electronics Division Hawthorne, CA F04704-86-C-0198, FPIF/CPFF Award: April 16, 1987 Definitized: April 16, 1987	$183.4	$194.2	31

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$235.7	$224.1 2/	31	$251.4	$248.2 1/

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (11/30/88)	$-10.1	$+0.8
Net Change	$-10.1	$+0.8

Explanation of Change: This is the first time for this contract to be included in the SAR. The cost variance is due to approved indirect billing rates. The schedule variance is due to early delivery of material. No program or contract impact.

1/ Includes authorized undefinitized work. To prevent disclosure of our negotiating position, the authorized undefinitized work is valued at the contractor's estimate for purposes of this report.

2/ The contract ceiling price does not include an amount for the CPFF support portion of this contract.

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

Peculiar Support Equipment:
Martin Marietta, Denver, CO
F04704-85-C-0064, FPIF/CPFF
Award: May 7, 1985
Definitized: August 14, 1985

Initial Contract Price		
Target	Ceiling	Qty
$206.0	$233.0	N/A

Current Contract Price		
Target	Ceiling	Qty
$543.4	$549.7 2/	N/A

Estimated Price At Completion	
Contractor	Program Manager
$538.0	$533.5 1/

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+11.0	$-1.0
Cumulative Variances to Date (11/30/88)	$+11.7	$-1.1
Net Change	$+0.7	$-0.1

Explanation of Change: The cost variance change is due to lower than planned overhead costs. The schedule change is insignificant. No program or contract impact.

1/ Includes authorized undefinitized work. To prevent disclosure of our negotiating position, the authorized undefinitized work is valued at the contractor's estimate for purposes of this report.

/ The contract ceiling price does not include an amount for the CPFF support portion of his contract.

Assembly and Checkout:
Boeing, Seattle, WA
F04704-85-C-0053, FPIF/AF
Award: February 15, 1985
Definitized: February 15, 1985

Initial Contract Price		
Target	Ceiling	Qty
$47.3	$56.3	N/A

Current Contract Price		
Target	Ceiling	Qty
$155.5	$183.5	N/A

Estimated Price At Completion	
Contractor	Program Manager
$147.1	$148.9 1/

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+1.0	$+0.4
Cumulative Variances to Date (11/30/88)	$+4.9	$+0.1
Net Change	$+3.9	$-0.3

Explanation of Change: The cost variance change is due to lower than planned manpower, material costs, and travel expenses at F.E. Warren AFB. The change in schedule variance is insignificant. No program or contract impact.

1/ Includes authorized undefinitized work. To prevent disclosure of our negotiating position, the authorized undefinitized work is valued at the contractor's estimate for purposes of this report.

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

Basing Operational Support Equipment:	Initial Contract Price		
Boeing Aerospace Company	Target	Ceiling	Qty
Seattle, WA			
F04704-86-C-0202, FPIF/CPFF	$84.0	$91.4	N/A
Award: December 24, 1986			
Definitized: May 7, 1987			

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$184.4	$154.4 2/	N/A	$182.0	$179.6 1/

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (11/30/88)	$+3.4	$-0.3
Net Change	$+3.4	$-0.3

Explanation of Change: This is the first time for this contract to be included in the SAR. The cost variance change is due to higher than planned manpower to solve software and manufacturing problems. The schedule variance is due to completion of configuration items. No program or contract impact.

1/ Includes authorized undefinitized work. To prevent disclosure of our negotiating position, the authorized undefinitized work is valued at the contractor's estimate for purposes of this report.

2/ The contract ceiling price does not include an amount for the CPFF support portion of this contract.

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

a. Program Status --

(1) Percent Program Completed: 36.8% (7/19)

(2) Percent Program Cost Appropriated: 63.5% (14906.2/23492.1)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY83-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-FY01)	Total
RDT&E	6391.2	14.8	7.4	18.2	6431.6
Procurement	8286.8	1129.7	986.4	6429.4	16832.3
MILCON	228.2	0.0	0.0	0.0	228.2
Total	14906.2	1144.5	993.8	6447.6	23492.1

. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars) 1/

c. Annual Summary --

Fiscal Year	3/ Qty	Flyaway FY 82 Dollars Nonrec	Flyaway FY 82 Dollars Rec	Total Base Year $	Then-Year Dollars Program	Then-Year Dollars Obligated	Then-Year Dollars Expended	Escal %
Appropriation: RDT&E								
1983				1789.1	1912.6	1912.6	1877.3	4.9
1984				1766.4	1962.6	1945.0	1922.4	3.8
1985				1326.7	1520.4	1510.6	1462.6	3.4
1986				568.7	668.8	662.4	625.0	2.8
1987				207.7	252.3	248.6	134.5	2.7
1988				27.5	34.7	27.4	22.6	3.1
1989				30.5	39.8			4.0
1990				11.0	14.8			3.6
1991				5.3	7.4			3.3
1992				4.6	6.6			2.8
1993				4.0	5.8			2.3
1994				3.9	5.8			1.8
Subtotal	20			5745.4	6431.6	6306.6	6044.4	
Appropriation: Procurement								
1984	21	222.8	989.1	1721.4	2143.1	2053.3	1880.8	8.0
1985	21	7.8	751.8	1878.9	2399.3	2243.2	1861.8	3.4
1986	12		569.9	760.1	1012.5	895.0	597.3	2.8
1987	12		533.9	768.2	1061.6	799.7	178.0	2.7
1988	12		543.1	610.6	873.7	368.9	51.8	3.1
1989	12		497.2	539.7	796.6			4.0
1990	12		551.4	744.7	1129.7			3.6
1991	12		520.4	636.0	986.4			3.3
1992	12		418.4	438.1	693.0			2.8
1993	12		367.0	431.7	695.5			2.3
1994	12		348.2	366.3	600.8			1.8
1995	12		365.8	384.0	640.9			1.8
1996	12		349.7	367.8	624.9			1.8
1997	12		342.8	360.9	624.4			1.8
1998	12		336.5	354.6	624.4			1.8
1999	12		330.1	348.2	624.4			1.8
2000	12		324.1	342.1	624.4			1.8
2001	13		346.0	364.2	676.7			1.8
Subtotal	235	230.6	8485.4	11417.5	16832.3	6360.1	4569.7	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars) 1/

Appropriation: MILCON 2/

1983				14.9	16.7	12.1	12.0	4.9
1984				27.1	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	8.3	6.0	2.7
1988				4.3	5.6			3.1
1989				0.0	0.0			4.0
1990				0.0	0.0			3.6
1991				0.0	0.0			3.3
1992				0.0	0.0			2.8
1993				0.0	0.0			2.3
1994				0.0	0.0			1.8
1995				0.0	0.0			1.8
1996				0.0	0.0			1.8
1997				0.0	0.0			1.8
1998				0.0	0.0			1.8
1999				0.0	0.0			1.8
2000				0.0	0.0			1.8
Subtotal				192.2	228.2	139.4	131.1	
Total	255	230.6	8485.4	17355.1	23492.1	12806.1	10745.2	

1/ The total costs identify the $17.4B estimate (FY 82 dollars), which equates to $23.5B in then-year dollars, for the current Peacekeeper program which is based on the Report by the President's Commission on Strategic Forces, April 1983, and the President's letter, 19 April 1983, transmitting Strategic Forces Technical Assessment Review (31 March 1983), to the Congress. 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). This program includes missiles and missile initial spares for Rail Garrison Basing mode (see footnote 3). All other Rail Garrison costs are included in the Rail Garrison Basing mode SAR.

2/ Construction figure does not include $86.1M in FY 82 and prior year funds (then-year dollars associated with earlier basing modes).

3/ 235 production missiles equates to 100 deployment missiles, 120 operational test and evaluation missiles (12 Rail Garrison), and 15 aging and surveillance missiles.

17. Production Rate Data:

a. Annual Production Rates -- 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.

	Production Rates (Quantity/Year)			
Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum
1984	19.4	14.4	19.4	48.0
1985	28.2	24.0	21.0	48.0
1986	30.3	17.0	12.0	48.0
1987	48.0	14.0	12.0	48.0
1988	48.0	34.0	12.0	48.0
1989	48.0	48.0	12.0	
1990		48.0	12.0	
1991		48.0	12.0	
1992			12.0	
1993			12.0	
1994			12.0	
1995			12.0	
1996			12.0	
1997			12.0	
1998			12.0	
1999			12.0	
2000			12.0	
2001			13.0	

b. Cost Variance -- Dollars in Millions (NOTE: Maximum rates were calculated by computing average cost of missiles at maximum production rate of 48 per year and multiplying the remaining units to be purchased by the average cost and adding that to the cost to date.)

Item		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum
Prog Acq Cost	(BY $)	16160.2	1202.8	17355.1	3033.5	14321.6
	(TY $)	20907.9	2596.5	23492.1	4975.5	18516.6
PAUC	(BY $)	66.503	1.587	68.059	7.116	56.163
	(TY $)	86.041	6.133	92.126	13.332	72.614

c. Schedule Variance --

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum
Start Date (Mo/Yr) 1/	1/84	N/A	1/84	N/A	1/84
Duration (in Months)	113	132	245	186	59
End Date (Mo/Yr) 2/	5/93	N/A	5/2004	N/A	11/88

1/ First contract award date.

2/ Last missile delivery.

17. Production Rate Data (Cont'd):

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	17/17
Procurement	62/62

18. Operating and Support Costs:

a. N/A

b. 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)	23.9	45.2	53.4	TBD	122.5
Industrial Fund	.9	.9	.9	TBD	2.7
Total	24.8	46.1	54.3	TBD	125.2

AF-23 OTH-B

SAR-88-071

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SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: OVER-THE-HORIZON BACKSCATTER RADAR (OTH-B)

AS OF DATE: December 31, 1988

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89-0036-T
#14

1. Designation/Nomenclature (Popular Name): AN/FPS-118/OTH-B Radar

2. DOD Component: U.S. Air Force

3. Responsible Office and Telephone Number:
   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

CASD(PA) DFOISR 89-T-0285

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 Southeastern 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.

b. Significant Developments Since Last Report —

RPV tests were completed in March 1988; final test report due February 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.

The OTH-B Radar Program is expected to satisfy mission requirements.

c. Changes Since "As Of" Date — None

8. Threshold Breaches: There are no DCP (dated 18 January 1982) breaches. The Central IOC date has breached the milestone date established in the DAE Baseline (dated Feb 1988).

(b)(1)

(b)(1)

(b)(1)

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	$400.1
Procurement	710.9	1075.2	1075.2
East Coast	(199.0)	(184.3)	(184.3)
West Coast	(263.0)	(287.7)	(287.7)
Central	(184.8)	(248.2)	(248.2)
Alaskan	(—)	(267.1)	(267.1)
P3I *	(7.2)	(31.6)	(31.6)
Spares	(56.9)	(56.3)	(56.3)
Construction (MILCON)	107.1	78.8	78.8
Total FY82 Base Year $	1145.3	1554.1	1554.1
Escalation	274.1	432.6	432.6
Development (RDT&E)	(51.1)	(71.6)	(71.6)
Procurement	(191.3)	(336.0)	(336.0)
Construction (MILCON)	(31.7)	(25.0)	(25.0)
Total Then-Year $	$1419.4	$ 1986.7	$1986.7
b. Quantities—			
Development (RDT&E)	1	1	1
Procurement	7	9	9
Total	8	10	10

* 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: FY 1990-91 President's Budget.

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

		Current Est Dec 88 SAR	UCR Baseline Dec 87 SAR	UCR Baseline Dec 88 SAR
a.	Program Acquisition--			
	(1) Cost	1986.7	2459.2	1986.7
	(2) Quantity	10	12	10
	(3) Unit Cost *	198.670	204.933	198.670

		Current Year		Budget Year
		(FY 1989)	(FY 1989 APPN) **	(FY 1990)
b.	Current Procurement--			
	(1) Cost	168.7	168.7	212.4
	Less CY Adv Proc	0	0	0
	Plus PY Adv Proc	0	0	0
	Net Total	168.7	168.7	212.4
	(2) Quantity	1	1	1
	(3) Unit Cost *	168.700	168.700	212.400

* The cost of a specific sector is dependent upon the specific site locations

** Adjusted to reflect FY89 Appropriations 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	-61.4	-10.6	-82.8
Quantity	-	+540.4	+147.4	+687.8
Schedule	-	+50.1	+5.1	+55.2
Engineering	+54.5	+205.2	-	+259.7
Estimating	+50.2	+86.3	-107.3	+29.2
Other	-	-	-	-
Support	-	+90.7	-	+90.7
Subtotal	+93.9	+911.3	+34.6	+1039.8
Current Changes:				
Economic	-	- 6.9	- 0.7	- 7.6
Quantity	-	-274.9	-	-274.9
Schedule	-	-	+ 0.3	+ 0.3
Engineering	-	-66.6	-	-66.6
Estimating	- 0.6	+29.5	-69.2	-40.3
Other	-	-	-	-
Support	-	-83.4	-	-83.4
Subtotal	- 0.6	-402.3	-69.6	-472.5
Total Changes	+ 93.3	+509.0	-35.0	+ 567.3
Current Estimate	471.7	1411.2	103.8	1986.7

(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	-	+380.5	+107.0	+487.5
Schedule	-	+6.1	-	+6.1
Engineering	+37.5	+136.5	-	+174.0
Estimating	+36.0	+59.7	-85.3	+10.4
Other	-	-	-	-
Support	-	+58.6	-	+58.6
Subtotal	+73.5	+641.4	+21.7	+736.6
Current Changes:				
Quantity	-	-196.0	-	-196.0
Schedule	-	-	-	-
Engineering	-	-42.5	-	-42.5
Estimating	- 0.7	+20.6	-50.0	-30.1
Other	-	-	-	-
Support	-	-59.2	-	-59.2
Subtotal	- 0.7	-277.1	-50.0	-327.8
Total Changes	+72.8	+364.3	-28.3	+408.8
Current Estimate	400.1	1075.2	78.8	1554.1

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
	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
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
	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.
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

(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

13. Cost Variance Analysis (Cont'd):

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
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	0.0
Reductions due to reprogramming actions (Estimating)	-3.4	-4.3
Increase due to additional requirements for technical support (Estimating)	+2.8	+3.9
Adjustment for current and prior years escalation (Estimating)	-0.1	-0.2
(2) Procurement		
Revised economic escalation indices (Economic)	N/A	-6.9
Deletion of two CRS sectors (Quantity)	-196.0	-274.9
Nonprogrammatic pricing reduction (Estimating)	-1.5	-2.0
Deletion of P3I requirements (Engineering)	-42.5	-66.6
Revised cost estimates for CRS technical support (Estimating)	+20.9	+30.0
Adjustment for current and prior years escalation	+1.3	+1.6
(Estimating)	(+1.2)	(+1.5)
(Support)	(+0.1)	(+0.1)
Decreased initial spare requirements; includes reduction of two CRS sectors (Support)	-59.3	-83.5

13. Cost Variance Analysis (Cont'd):

(3) MILCON --

Revised economic escalation indices (Economic)	N/A	-0.7
Budget constraints caused rephasing of Alaskan Air Command (AAC) non-technical support facility from FY90 to FY91 (Schedule)	N/A	+0.3
Deletion of ARS power plant (Estimating)	-46.8	-64.6
Revised estimates, reductions and downscoping of facilities for the CRS (Estimating)	-3.3	-4.7
Adjustment for current and prior years escalation (Estimating)	+0.1	+0.1

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	-9.040	+5.805	+5.550	+19.310	-1.110	+0.730		+21.245	198.670

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

a. RDT&E: None

b. Procurement

(1) Sector 3:	Initial Contract Price Target	Ceiling	Qty
General Electric Co., Syracuse, NY F19628-82-C-0114, FPIF, Award: October 28, 1984 Definitized: February 15, 1985	$83.0	$88.1	1

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$86.3	$91.6	1	$93.8	$91.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances (As of 29 Nov 87)	$+7.8	$-5.7
Cumulative Variances to Date (As of 27 Nov 88)	$+3.3	$-0.1
Net Change	$-4.5	$+5.6

Explanation of Change: The current favorable cost variance reflects better than expected performance against a formally reprogrammed performance measurement baseline ($93.8M), which is presently above the contract ceiling price ($91.6M). Performance is not expected to improve enough to warrant reducing the estimated price at completion below contract ceiling price. The unfavorable schedule variance reflects delay in spare deliveries. (Note: The cumulative cost and schedule variances as of 29 Nov 87 reflect Sector 3 status before formal reprogramming. The cumulative cost and schedule variances as of 27 Nov 88, only reflect values since that time).

Impact: None. Actual cost to the contractor is expected to exceed the contract ceiling price, the limit of U.S. Government cost liability.

(2) 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
$183.0	$196.5	1	$183.0	$183.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances (As of 29 Nov 87)	$+0.7	$+1.3
Cumulative Variances to Date (As of 27 Nov 88)	$+0.6	$-3.2
Net Change	$-0.1	$-4.5

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

Explanation of Change: The favorable cumulative cost variance is due to favorable cost outcomes in site preparation efforts. The unfavorable schedule variance is attributable to prime mission equipment integration and management, radar control status and environmental assessment (RCA&EA), receive control and monitor software.

Impact: None

(3) 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 29 Nov 87)	$+0.8	$-0.7
Cumulative Variances to Date (As of 27 Nov 88)	$+2.5	$-2.6
Net Change	$+1.7	$-1.9

Explanation of Change: The favorable cost variances exist in program management, prime mission equipment integration and management, site integration and planning, and system engineering tasks. The unfavorable schedule variance reflects delays in elemental transmitter test acceptance, assembly of installation, assembly and checkout spares and transmit facility construction.

Impact: None

(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 29 Nov 87)	$ 0.0	$ 0.0
Cumulative Variances to Date (As of 27 Nov 88)	$+0.9	$-0.9
Net Change	$+0.9	$-0.9

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

Explanation of Change: The favorable cost variances exist in program management, prime mission equipment integration and management, site integration and planning, and system engineering tasks. The unfavorable schedule variance reflects delay in elemental transmitter test acceptance.

Impact: None

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

a. Program Status —

(1) Percent Program Completed: 61.54% (8yrs/13yrs)

(2) Percent Program Cost Appropriated: 63.23% 1256.1/1986.7

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	388.8	20.4	18.1	44.4	471.7
Procurement	808.3	212.4	220.8	169.7	1411.2
MILCON	59.0	5.0	39.8	0.0	103.8
Total	1256.1	237.8	278.7	214.1	1986.7

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: 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	93.7	3.8
1985				53.0	60.7	60.7	59.2	3.4
1986				50.5	59.4	59.4	51.6	2.8
1987				26.1	31.7	31.7	21.2	2.7
1988				22.3	28.1	21.2	11.2	3.1
1989				14.2	18.5	8.6	2.4	4.0
1990				15.1	20.4	N/A	N/A	3.6
1991				13.0	18.1	N/A	N/A	3.3
1992				10.2	14.5	N/A	N/A	2.8
1993				10.2	14.8	N/A	N/A	2.3
1994				10.2	15.1	N/A	N/A	1.8
Subtotal	1			400.1	471.7	372.0	333.2	

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

c. Annual Summary —

Fiscal Year	Qty	Flyaway FY82 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: Procurement								
1984	1		81.5	86.4	98.7	98.7	68.6	3.8
1985	1		102.9	109.1	128.6	125.6	119.3	3.4
1986	1		130.8	144.6	175.7	174.9	91.1	2.8
1987	1		84.8	89.7	112.9	100.4	42.8	2.7
1988	1		91.1	94.9	123.7	77.8	29.4	3.1
1989	1		118.0	125.2	168.7	1.7	0.0	4.0
1990	1		149.1	153.1	212.4	N/A	N/A	3.6
1991	1		153.8	155.4	220.8	N/A	N/A	3.3
1992	1		105.8	110.3	160.0	N/A	N/A	2.8
1993			1.1	1.1	1.6	N/A	N/A	2.3
1994				5.4	8.1	N/A	N/A	1.8
Subtotal	9		1018.9	1075.2	1411.2	579.1	351.2	
Appropriation: MILCON								
1983				1.1	1.2	1.2	1.2	4.9
1984				8.7	10.1	10.1	10.1	3.8
1985								3.4
1986				7.1	8.6	7.0	7.0	2.8
1987				11.4	14.3	12.4	12.0	2.7
1988				5.6	7.3	1.5	0.4	3.1
1989				13.1	17.5	N/A	N/A	4.0
1990				3.7	5.0	N/A	N/A	3.6
1991				28.1	39.8	N/A	N/A	3.3
1992								2.8
1993								2.3
1994								1.8
Subtotal				78.8	103.8	32.2	30.7	
Total	10		1018.9	1554.1	1986.7	983.3	715.1	

*Reflects Program's Office Records as of 27 Dec 88.

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. Not applicable.
b. Not applicable.
c. Contractor Support Costs -- Not applicable.

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SAR-88-012

(2)

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: Aircraft Carrier Inner Zone Anti-Submarine Warfare Helo (SH-60F)

CV HELO

AS OF DATE: December 31, 1988

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89 C 0513

1.(U) Designation and Nomenclature (Popular Name): Aircraft Carrier Inner Zone Anti-Submarine Warfare Helo (SH-60F)

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-[illegible]

~~AS AMENDED~~
OPEN PUBLICATION
~~MAR 02 1989~~

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.

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6. (U) Mission and Description: The CV Inner Zone Anti-Submarine (ASW) Helicopter provides Aircraft Carrier Battle Groups (CVBG) with quick reaction Inner Zone ASW detection (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 of Technical Evaluation (TECHEVAL) in November 1987, the SH-60F was certified ready to proceed to Operational Evaluation (OPEVAL). In January 1988 OPEVAL (OT-IIC) was completed by COMOPTEVFOR 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.

b. (U) Significant Developments Since Last Report -- 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. Significant improvements were noted in the human factors interface to the data management system, blade fold reliability and resolution of fuel system deficiencies. FOT&E has commenced utilizing the two Lot I aircraft and will include an AUTEC period and Fleet Carrier exercise. The Acquisition Plan for the SH-60F multi-year procurement contract for FY 1991-1994 is expected to be approved by May 1989.

8. (U) Threshold Breaches: There are currently no DAE baseline breaches or DCP (Rev 1, dated March 1, 1988) threshold breaches.

(b)(1)

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: DCP, "CV Inner Zone ASW Helicopter (SH-60F)", Rev 1, dated March 1, 1988. "CV Inner Zone ASW Helicopter (SH-60F); Milestone III Decision Memorandum" dated April 28, 1988. DAE Baseline signed April 28, 1988.

(b)(1)

(b)(1)

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

NOTES:

(U) All effectiveness probabilities assume an operable aircraft and operations in sea states through 5.

1/ (U) ASW configuration (Crew of 4, 2 Mk 50 torpedoes, one external fuel tank) 40% time in hover, sea level, 90°F day, no wind.

(b)(1)

3/ (U) ASW gross weight and configuration, maximum continuous power.

4/ (U) Folded, relative to A-7 airplane.

5/ (U) Referenced to 1 micropascal at 1 yard.

6/ (U) 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/ (U) 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 requried 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.

(U) Condition II. The same condition apply as for Condition I, except that flight crews shall stand by in the ready rooms.

(U) 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

(b)(1)

10/ (U) Sea level, tropical day, ASW configuration, ASW gross weight, transiting at maximum continuous power, no wind.

11/ (U) 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.

. (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. (U) Previous Change Explanations -- None.

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

e. (U) References --

Production Estimate: DCP, "CV Inner Zone ASW Helicopter (SH-60F)", Rev 1, dated March 1, 1988.

Approved Program: DCP, "CV Inner Zone ASW Helicopter (SH-60F)", Rev 1, dated March 1, 1988. "CV Inner Zone ASW Helicopter (SH-60F); Milestone III Decision Memorandum" dated April 28, 1988. DAE Baseline signed April 28, 1988.

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

a. Cost --

	Production Estimate	Approved Program	Current Estimate
Development (RDT&E,N)	$59.5	$59.6	$59.6
Procurement	2606.4	2587.9	2587.9
Airframe	(1668.5)	(1711.3)	(1711.3)
Engine	(156.4)	(157.7)	(157.7)
Avionics	(51.9)	(56.2)	(56.2)
Total Flyaway	(1876.8)	(1925.2)	(1925.2)
Other Wpn Sys Cost	(555.4)	(525.0)	(525.0)
Initial Spares	(174.2)	(137.7)	(137.7)
Construction (MILCON)	25.9	24.3	24.3
Total FY 88 Base-Year $	2691.8	2671.8	2671.8
Escalation	482.0	446.8	446.8
Development (RDT&E,N)	(-4.2)	(-3.8)	(-3.8)
Procurement	(484.4)	(448.9)	(448.9)
Construction (MILCON)	(1.8)	(1.7)	(1.7)
Total Then-Year $	$3173.8	$3118.6	$3118.6

b. Quantities --

	Production Estimate	Approved Program	Current Estimate
Development (RDT&E,N)	-	-	-
Procurement	175	175	175
Total	175	175	175

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: DCP, "CV Inner Zone ASW Helicopter (SH-60F)", Rev 1, dated March 1, 1988. "CV Inner Zone ASW Helicopter (SH-60F); Milestone III Decision Memorandum" dated April 28, 1988. FY 90/91 President's Budget.

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

	Current Year		Budget Year
	SAR Current Estimate Dec 88	UCR Baseline Estimate Dec 87	UCR Baseline Estimate Dec 88
a. Program Acquisition --			
(1) Cost	3118.6	3173.8	3118.6
(2) Quantity	175	175	175
(3) Unit Cost	17.8	18.1	17.8
b. Current Procurement --	(FY 1989) APPN ACT	(FY 1989) APPN ACT	(FY 1990)
(1) Cost	376.7	376.7	313.6
Less CY Adv Proc	-30.7	-30.7	-54.0
Plus PY Adv Proc	+27.0	+27.0	+30.7
Net Total	373.0	373.0	290.3
(2) Quantity	18	18	18
(3) Unit Cost	20.7	20.7	16.1

13. (U) 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	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current 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
Total Changes	+0.5	-54.0	-1.7	-55.2
Current Estimate	55.8	3036.8	26.0	3118.6

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

(FY 88 Constant (Base Year) Dollars in Millions)

	RDT&E,N	PROC	MILCON	TOTAL
Prodcution Estimate	59.5	2606.4	25.9	2691.8
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current 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
Total Changes	+0.1	-18.5	-1.6	-20.0
Current Estimate	59.6	2587.9	24.3	2671.8

b. Previous Change Explanations -- None.

c. Current Changes Explanations --	BY 88$	TY$
(1) RDT&E,N -		
Revised escalation indices. (Economic)	-	+0.3
Revised cost estimates for testing. (Estimating)	+0.1	+0.2
(2) Procurement -		
Revised escalation indices. (Economic)	-	-32.5
Revised procurement schedule. (Schedule)	+2.4	-4.3
Incorporation Helicopter Emergency Egress Lighting (HEELS), Global Positioning System (GPS), Sonobuoy Launcher and Flight Incident Recorder. (Engineering)	+33.7	+39.6
Positive variance attributed to increase in flyaway costs in FY-88 through FY-90 with no increase in total contract NTE. (Estimating)	+12.3	+12.2
Negative variance attributed to decrease in support areas in FY-88 through FY-90 contract NTEs. Reduction of spares funding included. (Support)	-66.9	-69.0
(3) MILCON -		
P-158 (Mod to Engine Maintenance Facility) not funded. (Estimating)	-1.6	-1.7

(U) 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	
17.6	-0.2	--	--	--	-0.5	--	+1.2	+0.5	18.1

b. Production Estimate to Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Curr Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
18.1	-0.2	--	--	+0.2	+0.1	--	-0.4	-0.3	17.8

c. References --

Production Estimate: DCP, "CV Inner Zone ASW Helicopter (SH-60F)", Rev 1, dated March 1, 1988.

Approved Program: DCP, "CV Inner Zone ASW Helicopter (SH-60F)", Rev 1, dated March 1, 1988. "CV Inner Zone ASW Helicopter (SH-60F); Milestone III Decision Memorandum" dated April 28, 1988. DAE Baseline signed April 28, 1988.

15. (U) 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, Lots I/II/FFP	$226.0	N/A	7

Award: February 28, 1985
Definitized: May 15, 1987

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$226.0	N/A	7	$226.5	$226.5

Airframe:	Initial Contract Price Target	Ceiling	Qty
Sikorsky Aircraft Division, Stratford CT, N00019-85-C-0148, Lot III	$235.6	N/A	18

Award: February 28, 1985
Definitized: September 29, 1988

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$235.6	N/A	18	$240.9	$240.9

Airframe:	Initial Contract Price Target	Ceiling	Qty
Sikorsky Aircraft Division, Stratford CT, N00019-85-C-0148, Lot IV	$17.2 *	N/A	18

To be definitized as Firm Fixed Price Contract
Award: February 28, 1985

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$20.8 *	N/A	N/A	$291.8	$291.8

Cost/Schedule Variance is not applicable to firm fixed price contracts.

* Reflects Advance Acquisition funds only.

c. MILCON -- Not Applicable.

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

a. Program Status --

(1) Percent Program Completed: 35.2% (6 yrs/17 yrs)
(2) Percent Program Cost Appropriated: 31.5% (984.9/3118.5)

(U) 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	-	-	-	55.8
Procurement	903.1	313.6	271.6	1,548.5	3,036.8
MILCON	26.0	-	-	-	26.0
Total	984.9	313.6	271.6	1,548.5	3,118.6

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
1986		12.1		12.1	11.6	11.6	11.2	2.8
987		6.8		6.8	6.7	6.7	5.0	2.7
Subtotal		59.6		59.6	55.8	55.8	50.4	
Appropriation: Procurement								
1986				29.8	30.5	30.5	29.2	2.8
1987	7	18.4	112.7	159.3	163.8	163.6	104.3	2.7
1988	18		210.0	312.7	332.1	328.1	21.9	3.1
1989	18	3.3	207.0	343.1	376.7	10.9	-	4.0
1990	18		195.5	276.3	313.6	-	-	3.6
1991	18	2.6	177.2	233.9	271.6	-	-	3.3
1992	12		120.6	147.2	174.6	-	-	2.8
1993	12		120.4	144.2	173.9	-	-	2.3
1994	12		118.6	148.1	181.9	-	-	1.8
1995	12		128.1	175.7	219.8	-	-	1.8
1996	17		174.3	226.3	288.0	-	-	1.8
1997	24		237.6	268.5	347.5	-	-	1.8
1998	7		77.8	90.4	119.0	-	-	1.8
1999				16.3	21.9	-	-	1.8
2000				16.1	21.9	-	-	1.8
Subtotal	175	24.3	1879.8	2587.9	3036.8	533.1	155.4	

. (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	2.9	3.1
1989		8.1		8.1	8.8	0.0	0.0	4.0
1990		-		-	-	-	-	-
Subtotal		24.3		24.3	26.0	17.2	2.9	
TOTAL				2671.8	3118.6			

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	18	60
1991	12	12	18	60
1992	12	12	12	60
1993	12	12	12	60
1994	12	12	12	60
1995	11	11	12	60
1996	24	24	17	0
1997	24	24	24	0
1998	7	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	-20.0	2671.8	6.9	2664.9
(TY $)	3173.8	-55.2	3118.6	86.8	3031.8
IC (BY $)	15.4	-0.1	15.3	0.1	15.2
(TY $)	18.1	-0.3	17.8	0.5	17.3

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

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	-50	99
End Date (mo/yr)	12/99	N/A	12/99	N/A	9/95

d. Deliveries --

	Deliveries to Date
RDT&E,N	N/A / N/A
Procurement	2 Planned / 2 Actual

e. Approved Design to Cost Goal -- This program has a built-in design-to-cost (DTC) feature in that competitive not-to-exceed prices have been obtained for five lots of production.

18. (U) 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. maintenance concept for both the SH-60F and the antecedent system is for organic pport 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.

Personnel costs are for all people assigned to the squadron required to operate and maintain 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.

. (U) Operating and Support Costs:

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	7.272	8.152
O&S Consumables	1.459	2.210
Direct Depot Maintenance	1.851	2.299
Sustaining Investment	.637	.787
Other Direct Costs		
Indirect Costs	.343	.352
Total	11.562	13.800

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 17, 1989 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 17, 1989 to reflect new escalation indices.

c. Contractor Support Services --

	(Then-Year Dollars in Millions)				
	FY 1989 & Prior*	FY 1990 Year	FY 1991 Year	Balance to Complete	Total
O&M,N	1.6	3.3	4.0	Not Avail	Not Avail
Industrial Fund	0.0	0.0	0.0	Not Avail	Not Avail
Total	1.6	3.3	4.0	Not Avail	Not Avail

* Includes FY 1988 and FY 1989 only. FY 1987 and prior years not available.

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A-25 SINCGARS

SAR-88-111

UNCLASSIFIED

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)
PROGRAM: SINGLE CHANNEL GROUND AND AIRBORNE RADIO SYSTEM (SINCGARS)

AS OF DATE: December 31, 1988

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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: 995-306[redacted]
Commercial: 201-544-30[redacted]

4. Program Elements/Procurement Line Items:

RDTE:	PE 63746A	Project D555	(Shared Funding)
	PE 64805A	Project D282	(Shared Funding)
PROCUREMENT:	APPN 2031	SSN AZ3500	
	APPN 2031	SSN AA0974	(Shared Funding)
	APPN 2035	SSN B00500	
	APPN 2035	SSN BA9520	(Shared Funding)
	APPN 2035	SSN B45500	(Shared Funding)
	APPN 2035	SSN B00508	
	APPN 2035	SSN T99500	(Shared Funding)
	APPN 2035	SSN Z16800	(Shared Funding)

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OASD(PA) DFOISR 88-T- 0629

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 ITT Aerospace/Optical Div., 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 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 February 12, 1987 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. The ITT production contract was rebaselined on November 20, 1987.

b. Significant Developments Since Last Report -- 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 Production Baseline was approved February 26, 1988. The ICOM Engineering Change Proposal (ECP) was incorporated into the ground production contract on May 26, 1988 for three hundred (300) pilot production and two thousand (2000) initial production units with delivery beginning in January 1990. On April 21, 1988, Option I for 720 airborne radios was exercised with delivery commencing July 1989. Award of the second

(continued)

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 additional 25,000 Reliability, Availability, Maintainability (RAM) hours of operation were accumulated on the FOT&E systems which had been installed on the DMZ in Korea. 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% LCL) against an 800 hour (80% LCL) contractual requirement. Formal Airborne FAT report has been accepted.

The SINCGARS is expected to satisfy mission requirements.

c. Changes Since the As of date: In preparation for a Milestone IIIB DAB in FY89, an ASARC was successfully completed on January 5, 1989. No significant issues were surfaced. As a result of the ASARC, the Undersecretary of the Army authorized SINCGARS to proceed, contingent on DAB approval. with the award of ground radio Option III to ITT.

8. Threshold Breaches:

There are currently no DCP (dated July 1984) breaches, or SDDM (dated February 1987) threshold breaches. The DAE Baseline dated February 1988 has been breached for a number of schedule milestones.

9. Schedule:

a. Milestones --

	Production Estimate	Approved Program	Current Estimate
Milestone 0 (ROC Approval)	Dec 74	NA	NA
ASARC I	Oct 75	NA	NA
Milestone I (DSARC I)	Feb 76	NA	NA
DA Program Review (DAPR)	Jun 77	NA	NA
Award AD Contracts	Apr 78	NA	NA
DAPR	Dec 81	NA	NA
Final Design Reviews	Apr 82	NA	NA
Milestone IIIA (ASARC III)	Sep 83	Sep 83	Sep 83
Complete DT/OT - I/II	Dec 83	NA	NA
Begin Limited DT/OT	Aug 82	NA	NA
Complete Limited DT/OT	Dec 82	NA	NA
Begin Maturity DT/OT	Jul 83	NA	NA
Complete Maturity DT/OT	Dec 83	NA	NA
Initial Production 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	Dec 87	Apr 88
Complete Ground (ITT) Follow-on Evaluation			
Operational Test: Start	N/A	Mar 88	Apr 88
Complete	N/A	May 88	May 88
Ground (ITT) Option 1 Delivery Begins	N/A	Jul 88	May 88
Initial Ground Second Source (General Dynamics) (GD) Award	N/A	Feb 88	Jul 88
Airborne First Article Test Complete	N/A	Mar 88	Sep 88
Airborne Production Delivery Begins	N/A	Jul 88	Nov 88
Integrated COMSEC (ICOM) EUTE	N/A	N/A	Nov 88
Airborne Option 2 Award	N/A	Dec 88	Feb 89
Milestone IIIB(DAB)-Full Rate Production	N/A	Sep 88	Apr 89
Ground (ITT) Option 3 Award	N/A	Jan 89	May 89
Ground (ITT) Option 2 Delivery Begins	N/A	Jun 89	Jun 89
Airborne Option 1 Delivery Begins	N/A	Feb 89	Jul 89
Airborne Option 3 Award	N/A	Dec 89	Feb 90
Ground (ITT) Option 4 Award	N/A	Dec 89	May 90
Airborne Option 2 Delivery Begins	N/A	Feb 90	May 90
Ground (ITT) Option 3 Delivery Begins	N/A	May 90	Jul 90
IOC (1st Div Equipped)	Oct 87	Jul 90	Dec 90
Ground (GD) Option 1 Award	N/A	Dec 89	Dec 90
ICOM IOTE	N/A	N/A	Apr 91
Airborne Option 3 Delivery Begins	N/A	Feb 91	May 91
Milestone IIIC (DAB) - Follow-on Competition	N/A	N/A	Jul 91
Ground (GD) First Article Test Complete	N/A	Aug 90	Aug 91
Ground (GD) Production Delivery Begins	N/A	Sep 90	Aug 91
Ground (ITT) Option 4 Delivery Begins	N/A	Jun 91	Aug 91
Ground (GD) Option 2 Award	N/A	Sep 90	Sep 91
Ground (GD) Option 1 Delivery Begins	N/A	Jan 91	Dec 91
Ground (GD) Option 2 Delivery Begins	N/A	Jan 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 JRMB. 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 - N/A

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 dated February 1988.

10. Technical/Operational Characteristics: 1/

a. Technical --	Prod Estimate	Approved Program Goal/Threshold	Demonstrated Performance 2/	Current Estimate
Frequency Band	30-87.975 MHz	30-87.975 MHz/ 30-87.975 MHz	30-87.975 MHz3/	30-87.975 MHz
Number of Channels	2320	2320/2320	2320 3/	2320
Channel Spacing	25 KHz	25 KHz/25KHz	25 KHz 3/	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 3/	28 Vdc
Communications Range:				
(Voice & Data @ 16 Kbps @ 10^{-1} Ber)				
Manpack	8 KM	8 KM/8 KM	8 KM 4/	8 KM
Vehicular	35 KM	35 KM/35 KM	35 KM 10/	35 KM
Airborne	TBD	35 KM/35 KM	60 KM 11/	35 KM
(Data @ 16 Kbps @ 10^{-3} Ber)				
Manpack	4.5 KM	4 KM/4 KM	2 KM 4/	4 KM
Vehicular	17.5 KM	17 KM/17 KM	27 KM 4/	17 KM
Airborne	N/A	N/A / N/A	N/A	N/A

Technical/Operational Characteristics: (Continued)

b. Operational --

Mean Time Between Failure (MTBF):				
Ground 6/ 7/				
Non-ICOM (less ECCM,DRA)	N/A	1250 Hrs/ 1250 Hrs	2838 Hrs 7/	1250 Hrs
ICOM	N/A	1250 Hrs/ 1250 Hrs	1/	1250 Hrs
Airborne (80% Confidence)	750 Hrs	800 Hrs/ 750 Hrs	944 5/	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 8/	15 Min
Intermediate Direct Support (IDS)				
Non-ICOM	N/A	60 Min/60 Min	52.2 Min	45 Min/60 Min 9/
ICOM	N/A	45 Min/45 Min	1/	45 Min
General Support (GS)	2 Hrs	N/A / N/A	1.78 Hrs 7/	2 Hrs

c. Previous Change Explanations --

Demonstrated performance of development models will be displayed until completion and receipt of final reports for FAT and FOE.

d. Current Change Explanations -- N/A.

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, February 1988.

Technical/Operational Characteristics: (Continued)

FOOTNOTES:

1/ Technical/operational characteristics parameters are not yet available for the integrated COMSEC radio.

2/ Data for specified technical and operational demonstrated performance on production models is available from First Article Tests and Follow-on Evaluation.

3/ First Article Test (FAT) models were used.

4/ Demonstrated in the Operational Assessment by ADEA at Ft. Lewis, WA, Sep 87.

5/ Airborne First Article Test Oct-Dec 1988, Ft. Wayne, IN.

6/ Since both Manpack and Vehicular have the same MTBF, they have been combined and designated as Ground.

7/ Demonstrated Production Reliability Acceptance Test (PRAT) results of Sep 88.

8/ Demonstrated in the Maintainability Demonstration (M-Demo) at Ft. Wayne, IN, Jun 87.

9/ 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.

10/ Follow-on Operational Test & Evaluation, Ground non-ICOM, May-Jun 1988, Ft. Sill, OK.

11/ Early User Test and Evaluation, Airborne non-ICOM, May-Jun 1988, Ft.Sill,OK.

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

a. Cost --	Production Estimate	Approved Program	Current 1/ Estimate
Development (RDT&E)	154.4 2/	205.5	205.5
Procurement	4013.3	3985.0	3985.0
Weapon System	(3609.5)	(3955.6)	(3955.6)
Flyaway	(3583.6)	(3912.0)	(3912.0)
Major System Equip	(3151.8)	(3712.4)	(3712.4)
Ancillary Equip	(431.8)	(199.6)	(199.6)
Other Weapon System	(25.9)	(43.6)	(43.6)
Initial Spares	(403.8)	(29.4)	(29.4)
Construction (MILCON)	0.0	0.0	0.0
Total FY 84 Base-Year $	4167.7	4190.5	4190.5
Escalation	1444.0	1641.1	1641.1
Development (RDT&E)	(-19.0)	(-3.6)	(-3.6)
Procurement	(1463.0)	(1644.7)	(1644.7)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Total Then-Year $	5611.7	5831.6	5831.6

1/ Current estimate reflects Army requirements only. Other service requirements have been included in the SINCGARS Baseline Cost Estimate, August 1988, and are reflected below:

	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

2/ Does not match initial SAR due to pre-base year amounts included as actuals, not base year dollars in initial SAR.

	Production Estimate	Approved Program	Current 1/ Estimate
b. Quantities --			
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: FY90-91 President's Budget.

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

		Current Estimate	UCR Baseline Current Year	UCR Baseline Budget Year
		(Dec 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
a.	Program Acquisition --			
	(1) Cost	5831.6	5204.9	5831.6
	(2) Quantity	364,925	291,647	364,925
	(3) Unit Cost	.0160	.0178	.0160
b.	Current Procurement --	(FY 1989)	(FY 1989 APPN)	(FY 1990)
	(1) Cost	254.4	254.4	350.0
	Less CY Adv Proc	0	0	0
	Plus PY Adv Proc	0	0	0
	Net Total	254.4	254.4	350.0
	(2) Quantity	14,800	14,800	15,900
	(3) Unit Cost	.0172	.0172	.0220

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	-.2	-434.4	-434.6
Quantity	+11.3	-49.3	-38.0
Schedule	--	+598.0	+598.0
Engineering	+16.3	--	+16.3
Estimating	+36.2	-47.6	-11.4
Other	--	--	--
Support	--	-537.1	-537.1
Subtotal	+63.6	-470.4	-406.8
Current Changes			
Economic	-1.5	-53.1	-54.6
Quantity	--	+1267.4	+1267.4
Schedule	+1.4	+101.3	+102.7
Engineering	--	--	--
Estimating	+3.0	-698.6	-695.6
Other	--	--	--
Support	--	+6.8	+6.8
Subtotal	+2.9	+623.8	+626.7
Total Changes	+66.5	+153.4	+219.9
Current Estimate	201.9	5629.7	5831.6

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	-33.3	-23.6
Schedule	--	+20.3	+20.3
Engineering	+13.8	--	+13.8
Estimating	+30.4	+51.8	+82.2
Other	--	--	--
Support	--	-395.5	-395.5
Subtotal	+53.9	-356.7	-302.8
Current Changes			
Quantity	--	+787.5	+787.5
Schedule	--	--	--
Engineering	--	--	--
Estimating	-2.8	-465.6	-468.4
Other	--	--	--
Support	--	+6.5	+6.5
Subtotal	-2.8	+328.4	+325.6
Total Changes	+51.1	-28.3	+22.8
Current Estimate	205.5	3985.0	4190.5

b. Previous Change Explanations --

RDT&E

Economic: Revised escalation indices.
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 IK development. Adjustment of prior year amounts to actuals. Increased effort for IK and Second Source Test Program Set (TPS) development.

PROC

Economic: Revised escalation indices.
Quantity: Reduction of 1,329 airborne radios.
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.

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.

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.

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)	--	+1.4
FY76-86 program adjusted to actuals (Estimating)	-6.3	-2.3
Additional effort for P3I studies and SINCGARS Remote Control Unit (SRCU) development (Estimating)	+3.5	+5.3
(2) PROCUREMENT		
Revised escalation indices (Economic)	--	-53.1
Production quantities moved to later years due to shortfall in FYDP period (Schedule)	--	+101.3
Additional radios required due to redefinition of Force Structure Requirement (Additional requirement for POMCUS and War Reserve)	+665.9	+1040.1
o Addition of 72,879 ground and 399 airborne receiver-transmitters (Quantity)	(+787.5)	(+1267.4)
o Estimating changes since baseline applicable to increased radios (Estimating)	(-121.6)	(-227.3)
Increased estimate for initial spares based on increased cost for spares components (Support)	+6.5	+6.8
FY 83-86 program adjusted to actuals (Estimating)	-9.2	-1.2
Reduced requirement for remote control unit (Estimating)	-42.6	-50.2
Revised estimate for ground radio based on prices in the second source contract (Estimating)	-292.2	-419.9

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	-.0013	-.0004	+.0019	.0000	-.0019	-.0015	.0000	-.0032	.0160

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
Definitized: N/A since scope of contract continues to change.

Initial Contract Price		
Target	Ceiling	Qty
$5.4	N/A	43

Current Contract Price 1/			Estimated Price at Completion 1/	
Target	Ceiling	Qty	Contractor	Program Manager
$66.9	N/A	39	$66.9	$66.9

	Cost Variance 2/	Schedule Variance 2/
vious Cum Variances	0	0
ulative Variances to Date (10/31/88)	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
Definitized: N/A since all negotiations were definitized at time of award.

Initial Contract Price		
Target	Ceiling	Qty
$53.8	N/A	650

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$267.2	N/A	12,100	$267.2	$267.2

SINCGARS (Airborne):

ITT Corp., A/OD, Ft. Wayne, IN, 3/
DAAB07-85-C-K561, FFP,
Award: 31 May 1985
Definitized: N/A since all negotiations were definitized at time of award.

Initial Contract Price		
Target	Ceiling	Qty
$19.5	N/A	150

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$41.0	N/A	870	$41.0	$41.0

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 : 51.7% (15 yrs/29 yrs)

(2) Percent Program Cost Appropriated: 13.6% ($791.8M/$5831.6M)

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	162.7 1/	11.9	1.4	25.9	201.9
Procurement	629.1 1/	350.0	347.5	4303.1	5629.7
APA	19.0	0	0	0	19.0
OPA	610.1	350.0	347.5	4303.1	5610.7
Total	791.8	361.9	348.9	4329.0	5831.6

1/ Adjusted to actuals. Includes below threshold reprogrammings.

Program Funding Summary: (Continued)

c. Annual Summary --

Fiscal Year	Qty 1/	Flyaway FY 84 Dollars		Total Base Year $	Total Then Year $			Escl Rate (%)
		Nonrec	Rec		Program 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			27.9	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			11.1	12.0	12.0	11.6	2.8
1987	0			13.2	14.8	14.8	12.4	2.7
1988	0			13.2	15.3	15.3	10.1	3.1
1989	34			7.8	9.3	.7	.1	4.0
1990	19			9.7	11.9			3.6
1991	0			1.1	1.4			3.3
1992	0			3.8	4.9			2.8
1993	0			7.2	9.6			2.3
1994	0			8.4	11.4			1.8
Subtotal	123			205.5	201.9	154.1	144.3	N/A

FOOTNOTE:

1/ RDT&E units cannot be identified to a specific fiscal year's funds and are therefore shown in the year of delivery.

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	8.0	17.1	19.0	19.0	8.7	3.4
Subtotal	150	5.5	8.0	17.1	19.0	19.0	8.7	

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.

10 Program Funding Summary: (Continued)

Fiscal Year	Qty	Flyaway FY 84 Dollars		Total Base Year $	Total Then Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: Procurement (OPA) 1/								
1983	175	1.3	16.3	18.7	19.4	19.4	17.4	4.9
1984	1325	3.5	54.4	61.3	66.1	66.1	60.6	3.8
1985	10268	4.7	115.4	124.4	138.5	138.5	63.2	3.4
1986	400	1.0	72.0	76.2	86.6	84.3	16.8	2.8
1987	0	0.0	4.5	11.0	12.9	5.3	4.7	2.7
1988	2/ 720	0.0	23.7	26.6	32.2	28.9	.9	3.1
1989	2/14800	0.5	197.5	203.6	254.4	.1		4.0
1990	3/16347	2.6	257.9	272.7	350.0			3.6
1991	23302	1.9	257.7	264.4	347.5			3.3
1992	19150	0.1	261.2	267.7	359.1			2.8
1993	19900	0.4	266.3	270.6	369.5			2.3
1994	20675	0.1	263.9	268.4	373.1			1.8
1995	18775	0.1	220.9	223.0	315.5			1.8
1996	26500	0.1	239.0	240.4	346.4			1.8
1997	26500	0.1	232.4	233.8	342.9			1.8
1998	26500	0.1	229.7	231.1	344.9			1.8
1999	26500	0.0	228.7	229.7	349.0			1.8
2000	26500	0.0	227.7	228.7	353.8			1.8
2001	26500	0.1	222.9	224.0	352.8			1.8
2002	26500	0.0	216.8	217.7	349.0			1.8
2003	33315	0.0	273.0	273.9	447.1			1.8
Subtotal	364652	16.6	3881.9	3967.9	5610.7	342.6	163.6	
Total Proc	364802	22.1	3889.9	3985.0	5629.7	361.6	172.3	
Total Program	364925	22.1	3889.9	4190.5	5831.6	515.7	316.6	

FOOTNOTES:

1/ Includes only those funds for KGV-10 (T99500) and BECS (Z16800) required to support the SINCGARS program.

2/ Includes airborne quantities not reflected in President's Budget for which dollars have been appropriated.

3/ The Army will procure the maximum number of supportable systems consistent with the dollars appropriated.

Production Rate Data:

a. Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year) - Airborne Radio			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1985 (APA)	N/A	1/ 600	1/ 600	1/ 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	1200	2400
1990 (OPA)	N/A	2400	1800	2400
1991 (OPA)	N/A	2400	1850	2400
1992 (OPA)	N/A	2/ 2400	2150	2400
1993 (OPA)	N/A	0	2400	2400
1994 (OPA)	N/A	0	2/ 2400	2400
1995 (OPA)	N/A	0	1/ 2400	2400

FOOTNOTES:

1/ Differs from procurement quantity due to funded delivery period of less than 12 months.

2/ Differs from procurement quantity due to funded delivery period of more than 12 months.

Production Rate Data: (Continued)

Fiscal Year	Production Rates (Quantity/Year) - Ground R/Ts 1/			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1983	N/A	2/ 1050	2/ 1050	1050
1984	N/A	2/ 2650	2/ 2650	2650
1985	N/A	3/ 8250	3/ 8250 4/(332)	8250
1986	N/A	2/16780	2/ 600	16780
1987	N/A	23430	0	23430
1988	N/A	21993	0	23430
1989	N/A	33000	16000 (2400)	33000
1990	N/A	33000	15837 (1290)	33000
1991	N/A	33000	22326 (874)	33000
1992	N/A	33000	27682 (10682)	33000
1993	N/A	33000	27005 (9505)	33000
1994	N/A	33000	26353 (8353)	33000
1995	N/A	0	26438 (8938)	33000
1996	N/A	0	26500	33000
1997	N/A	0	26500	33000
1998	N/A	0	26500	33000
1999	N/A	0	26500	33000
2000	N/A	0	26500	33000
2001	N/A	0	26500	33000
2002	N/A	0	26500	33000
2003	N/A	0	3/ 26500	33000

FOOTNOTES:

1/ Includes production quantities for other services.

2/ Differs from procurement quantity due to funded delivery period of less than 12 months.

3/ Differs from procurement quantity due to funded delivery period of more than 12 months.

4/ Numbers in parentheses show other service R/T quantities which are included in the Current Estimate.

Production Rate Data: (Continued)

b. Cost Variance -- Dollars in Millions

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	$ +22.8	$ 4190.5	0.0	$ 4190.5
(TY $)	5611.7	+219.9	5831.6	-39.0	5792.6
PAUC (BY $)	$ .0142	$ -.0027	$.0115	.0000	$ .0115
(TY $)	.0192	-.0032	.0160	-.0001	.0159

NOTE: For a production line of this type and for these quantities, the current contractor estimates that there is a range of 10,800 - 21,480 ground R/Ts per year for which the unit cost does not change based on production rate. A similar range exists for the second source ground producer and the airborne radio. Program cost changes due to schedule and quantity changes are addressed in the Cost Variance Analysis paragraph.

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	0 mo	05/85
Duration (in Months)	121	+16 mo	137	0 mo	137
End Date (Mo/Yr)	01/95	+21 mo	10/96	0 mo	10/96

Ground Radio	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	12/83	0 mo	12/83	0 mo	12/83
Duration (in Months)	150	+112 mo	262	-28 mo	234
End Date (Mo/Yr)	06/96	+112 mo	09/05	-28 mo	06/03

d. Deliveries (Plan/Actual) --
Planned deliveries reflect the rebaselined production contracts.

	To Date
RDT&E	70/70
Procurement	2,195/1866

e. Approved Design to Cost Goal: N/A

Operating and Support Costs:

a. Assumptions and Ground Rules -- N/A

b. Costs -- N/A

c. Contractor Support Costs --

(Then-Year Dollars in Millions)

	FY 1989 & PRIOR 1/	FY 1990	FY 1991	BALANCE TO COMPLETE	TOTAL
O & M	1.0	1.2	1.7		3.9

1/ Includes FY 88 - FY 89.

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SAR-88-046

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

PROGRAM: STANDARD Missile (SM-2 MR/ER)

AS OF DATE: December 31, 1988

0 STD MSL 2

INDEX

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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), 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 D. G. MacDougall, USN
ASSIGNED: October 1983
AUTOVON: 222-0663
COMMERCIAL: (202) 692-0663

4. Program Elements/Procurement Line Items:

Procurement: P.E. 0204229N, APPN 1507
STANDARD MR SM-2 ICN 2233
STANDARD ER SM-2 2234
2239

AS AMENDED

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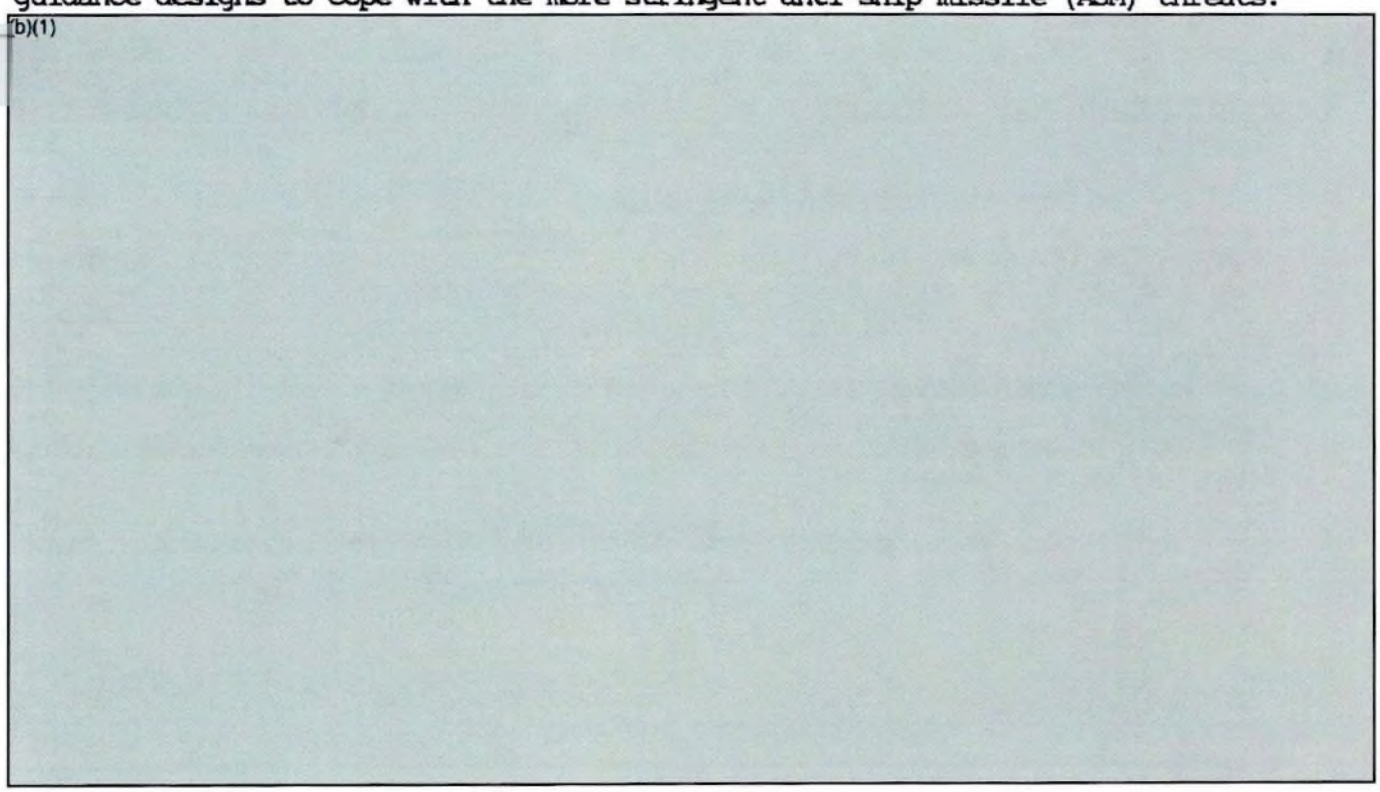
RDT&E: P.E. 0604366N
0603318N proj. S1632
0603321N proj. S1671 (shared funding)
0604365N

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) will be deployed on TARTAR New Threat Upgrade ships, AEGIS CG-47/51 Cruiser, and 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.

(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 problems encountered in the development of the new rocket motor have been solved as 35 successive successful motor firings were achieved during motor qualification. The successful TECHEVAL/OPEVAL of the extended range missile round contributed substantially to the validation of the medium range missile round since there is a high commonality between the two rounds. On this and the successful rocket motor qualification, 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 qualified were Raytheon- Guidance, Control, and Airframe, Micronics-Safety-Arming Device, ATI-MK 115 Warhead, Bendix-Target Detecting Device, ARC-MK 104 Dual Thrust Rocket Motor, and Hercules-MK 70 Booster.

b. Significant Developments Since Last Report -- Approval for production of the Block III was received 12 May 1988 by the Acquisition Review Board.

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

8. Threshold Breaches: There are no threshold breaches to AEGIS DCP #16 Rev 2, dated May 1978 or the DAE Baseline dated September 1987.

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 86~~
(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.

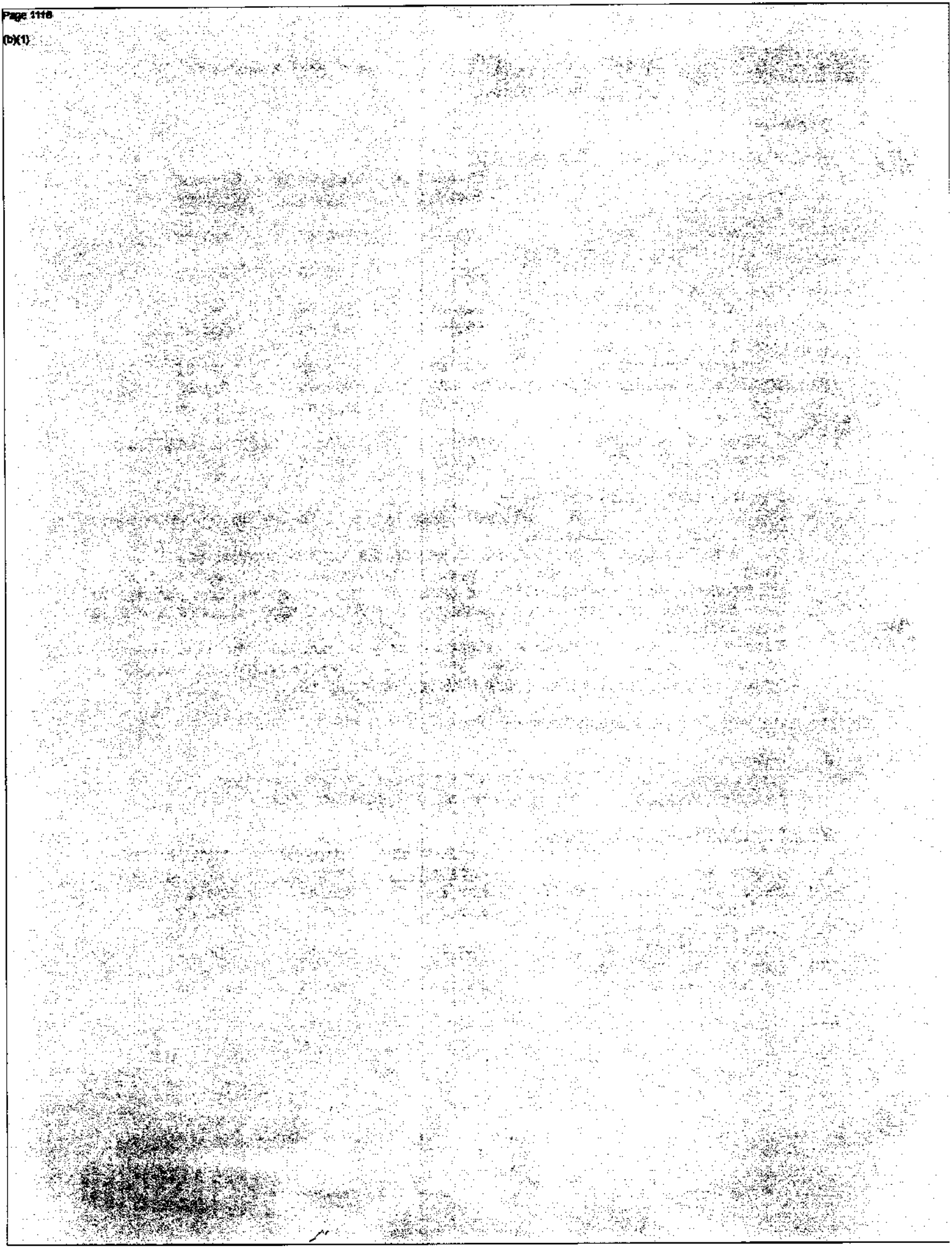
c. Current Change Explanations -- None.

d. References —
Production Estimate: Milestone IIIE NPDM of 17 December 1986.
Approved Program: DAE Baseline of 10 September 1987.

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

(b)(1)



(b)(1)

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(b)(1)

d. Current Change Explanations — Technical/Operational Characteristics for the SM-2 ER Block III/IIIA are incorporated.

e. References --
Development Estimate: NDCP of 10 May 1988.
January 1989 Congressional Data Sheets.
Approved Program: There are no DAF baseline elements for Blocks III, IIIA, and IV.

(b)(1)

[redacted]

IV.

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

b. Quantities —	Dev/Prod Estimate	Approved Program	Current Estimate
Development (RDT&E)	88	88	88
Procurement	10,778	14,677	14,677
TOTAL	10,866	14,765	14,765

c. Foreign Military Sales — None.

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 88) Current Estimate Dec 88 SAR	Current Year (FY 88) UCR Baseline Dec 87 SAR	Budget Year (FY 89) UCR Baseline Dec 88 SAR
a. Program Acquistion —			
(1) Cost	9913.3	8838.2	9913.3
(2) Quantity	14765	14765	14765
(3) Unit Cost	0.671	0.599	0.671
b. Current Procurement —	(FY 1989)	(Appropriated) (FY 1989)	(FY 1990)
(1) Cost	589.3	589.3	314.0
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	589.3	589.3	314.0
(2) Quantity	1310	1310	590
(3) Unit Cost	0.450	0.450	0.532

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	- 34.8	- 826.0	-	- 860.8
Quantity	-	+2398.5	-	+2398.5
Schedule	-	- 7.7	-	- 7.7
Engineering	+ 305.9	+ 70.4	-	+ 376.3
Estimating	+ 45.8	-1082.8	-	-1037.0
Other	-	-	-	-
Support	-	- 83.9	-	- 83.9
Subtotal	+ 316.9	+ 468.5	0.0	+ 785.4

13. Cost Variance Analysis (Cont'd):

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

	RDT&E	PROC	MILCON	TOTAL
Current Changes:				
Economic	- 1.1	- 26.0	-	- 27.1
Quantity	-	-	-	-
Schedule	-	+ 118.2	-	+ 118.2
Engineering	+ 59.2	+ 128.7	-	+ 187.9
Estimating	+ 75.8	+ 428.3	+ 54.3	+ 558.4
Other	-	-	-	-
Support	-	+ 237.7	-	+ 237.7
Subtotal	+ 133.9	+ 886.9	+ 54.3	+1075.1
Total Changes	+ 450.8	+1355.4	+ 54.3	+1860.5
Current Estimate	1152.4	8706.6	+ 54.3	9913.3

(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	-	- 107.6	-	- 107.6
Engineering	+ 263.1	+ 56.6	-	+ 319.7
Estimating	+ 20.4	- 858.0	-	- 837.6
Other	-	-	-	-
Support	-	- 88.5	-	- 88.5
Subtotal	+ 283.5	+ 851.2	0.0	+1134.7
Current Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	+ .9	-	+ .9
Engineering	+ 48.3	+ 101.4	-	+ 149.7
Estimating	+ 55.6	+ 306.8	42.4	+ 404.8
Other	-	-	-	-
Support	-	+ 166.0	-	+ 166.0
Subtotal	+ 103.9	+ 575.1	+ 42.4	+ 721.4
Total Changes	+ 387.4	+1426.3	+ 42.4	+1856.1
Current Estimate	1035.8	7349.4	42.4	8427.6

b. Previous Change Explanations —

(1) RDT&E

Economic: Revised escalation indicies.
Engineering: Increase reflects program restructuring caused by decision to pursue AEGIS missiles.

(2) Procurement

Economic: Revised escalation indicies.
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.
Estimating: Decreased associated with Gramm/Rudman budget cuts, NIF and DPSD reductions, and reduced hardware costs due to competition for all major components in FY 88 and out.
Support: Decrease due to annualization and realignment of support costs and cost savings on initial spares hardware components due to competition.

c. Current Change Explanations —

(1) RDT&E	(Dollars in Millions) Base Year	Then-Year
Revised escalation indicies. (Economic)	N/A	- 1.1
Increase in cost due to inclusion of Missile Homing Improvement Program (MHIP). (Engineering)	+ 48.3	+ 59.2
Increase in FY 87 - FY 90 funds to continue support of the development of SM-2 Blk III/IIIA and Blk IV and the addition of two program years as a continuing program. (Estimating)	+ 55.6	+ 75.8
(2) Procurement		
Revised escalation indicies. (Economic)	N/A	- 26.0
OSD Budget decision to shift 310 FY 89-91 missiles to FY 92-94 in order to procure more advanced missiles to meet new threats. (Schedule)	+ .9	+118.2
Revised estimates due to change in missile mix. (Estimating)	+408.2	+557.0

	(Dollars in Millions) Base Year	Then-Year
(2) Procurement (Cont'd)		
Support costs increased due to addition of program years and effort required to support introduction of new missile configurations. Shift in schedule to procure more lethal missiles also increased initial spare parts costs. (Support)	+166.0	+237.7
(3) MILCON		
MILCON funds added for construction of ENCAN/DECAN facilities, for construction of additional magazines and for improved facilities at the Naval Weapons Stations. (Estimating)	+ 42.4	+ 54.3

Correct previous procurement categorization error in 31 December 1987 SAR:

Engineering:		
Costs associated with configuration changes should be charged to engineering vice estimating. Missile Block change were required to upgrade missile performance against ending threats.	+101.4	+128.7
Estimating:		
Result of recalculation to account for engineering costs.	-101.4	-128.7

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

a. Initial SAR Estimate to Current Baseline Estimate -- N/A

b. Current Baseline Estimate to Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
0.741	-0.060	-0.033	+0.007	+0.038	-0.032	0.00	+0.010	-0.070	0.671

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

a. RDT&E —

	Initial Contract Price		
SM-2 Block IV Development	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

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

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$222.1	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			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$336.5	N/A	1194	$336.5	$336.5

Cost/Schedule Variances: CPR data not required on FFP contracts.

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	$332.5 330.5	N/A	1071

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$336.2	N/A	1071	N/A	N/A

Explanation of Change: The General Dynamics FFP contract was increased to cover the additional cost necessary to correct a problem with the dorsal fin design and composition. CPR data not required on FFP contracts.

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			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$289.7	$323.7	730	$290.2	$323.7

	Cost Variance	Schedule Variance
Previous Cumulative Variance:	-8.4	-10.9
Cumulative Variance To Date: (09/88)	-10.1	- 6.4
Net Change:	- 1.7	+ 4.5

15. Contract Information (Cont'd): (Then-Year Dollars in Millions)
Explanation of Change: Contract price change of $41.6M is due to modifications to the contract to incorporate engineering change proposals and to add telemetry units and fault isolation test equipment cost. Cost variance change of $1.7M due to unanticipated overruns in production materials. The program manager's assessment is at the ceiling price and is within approved funding.

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
$168.1	N/A	801	$168.1	$168.1

Cost/Schedule Variances: CPR data not required on FFP contracts.

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 Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$167.4	N/A	1594	$167.4	$167.4

Cost/Schedule Variances: CPR data not required on FFP contracts.
Contract N00024-88-C-5301 awarded to Raytheon Company is no longer one of the six largest contracts.

c. MILCON: None

16. Program Funding Summary: (Current Estimate in Millions of Dollars)
a. Program Status --
(1) Percent Program Completed: 70% or 14 out of 20 years
(2) Percent Program Cost Appropriated: 53.9% or 5,341.4/9,913.3

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

Appropriation	Current & Prior Yrs (FY76-89)	Budget Year (FY90)	Budget Year (FY91)	Balance FYDP (FY92-94)	To Complete Beyond FYDP (FY95)	Total
RDT&E	766.7	157.6	89.4	138.7	-	1152.4
Procurement	4554.5	314.0	556.3	2281.8	1000.0	8706.6
MILCON	20.2	13.5	0.0	20.6	-	54.3
TOTAL	5341.4	485.1	645.7	2441.1	1000.0	9913.3

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	88			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	96.5	60.2	3.1
1989				133.3	159.3	104.7	1.1	4.0
1990				127.5	157.6	-	-	3.6
1991				70.2	89.4	-	-	3.3
1992				49.0	64.0	-	-	2.8
1993				28.2	37.5	-	-	2.3
1994				27.4	37.2	-	-	1.8
Subtotal	88			1035.8	1152.4	709.9	555.9	
				Appropriation: MILCON				
1989				16.4	20.2	0.0	0.0	4.0
1990				10.6	13.5	-	-	3.6
1991				0.0	0.0	-	-	3.3
1992				8.9	11.8	-	-	2.8
1993				6.5	8.8	-	-	2.3
1994				0.0	0.0	-	-	1.8
Subtotal				42.4	54.3	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								
1976	22		53.9	92.5	48.4	48.4	48.4	6.59
1977	36		60.4	73.8	42.9	42.8	41.4	3.78
1978	40		61.3	74.3	48.2	48.1	48.1	6.8
1979	40		51.8	65.3	46.8	47.3	49.9	8.72
1980	85		63.0	81.9	64.6	64.7	64.7	11.8
1981	345		156.2	198.1	174.3	174.2	174.2	11.6
1982	495		229.7	286.8	273.9	274.0	266.6	14.3
1983	500		292.6	398.1	402.0	402.1	372.5	9.0
1984	490		312.8	385.5	405.1	403.2	359.8	8.0
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	478.3	573.5	507.0	49.7	3.1
1989	1310		430.5	475.6	589.3	60.3	0.0	4.0
1990	590		211.5	246.1	314.0	-	-	3.6
1991	900		394.6	425.6	556.3	-	-	3.3
1992	1049		486.3	535.0	713.7	-	-	2.8
1993	1073		512.6	573.9	779.9	-	-	2.3
1994	1083		502.8	569.9	788.2	-	-	1.8
To Complete	2060		623.3	710.2	1000.0	-	-	1.8
Subtotal	14677		6358.9	7349.4	8706.6	3911.8	2664.1	
Total	14765		6358.9	8427.6	9913.3	4621.7	3220.0	

17. Production Rate Data:

a. Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year) Development Estimate	Production Estimate	Current Estimate[1/]	Maximum[2/]
1982	35	35	375	375
1983	170	170	500	500
1984	490	490	490	490
1985	730	730	784	784
1986	1330	1330	1271	1271
1987	2160	2160	1194	1194
1988	1990	1990	1310	1310
1989	2495	2495	1310	1635
1990			590	1940
1991			900	2160
1992			1049	2160
1993			1073	2160
1994			1083	2160
To Complete			2060	2160

1/ Quantity shown is budget quantity; figures do not include lead time.

2/ FY 86 was first year of second source G,C&A production (30 qualification and 200 production units). FY 87 was a sole source procurement year. FY 88 was the first year of the G,C&A and All-Up Round assembly competitive contract. By FY 91, both contractors at maximum ecomonic rate based on previously projected quantities.

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	1856.1	8427.6	721.4	7706.2
	(TY $)	8052.8	1860.5	9913.3	1075.1	8838.2
PAUC	(BY $)	0.604	- 0.033	0.571	0.049	0.522
	(TY $)	0.741	- 0.070	0.671	0.072	0.599

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.	72 mos.	168 mos.	27 mos.	141 mos.
End Date (Mo/Yr)	7/91	N/A	7/97	N/A	3/95

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.	48 mos.	156 mos.	0	156 mos.
End Date (Mo/Yr)	7/91	N/A	7/95	N/A	7/95

d. Deliverables (Plan/Actual) --

	To Date
RDT&E	88/88
Procurement	3968/3968

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	0	0	0	0
Industrial Fund	0	0	0	0
Total	0	0	0	0

N-2 AN/BSY-1 (8)

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5 of 10
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SELECTED ACQUISITION REPORT (RCS DD-COMP (Q&A) 823)
PROGRAM: AN/BSY-1 Submarine Combat System (U)

AS OF DATE: December 31, 1988

INDEX

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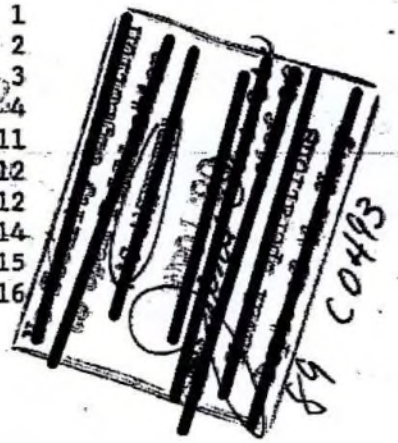
AS AMENDED

MAR (1) 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, D.C. 20362

CAPT Henry Schwartz
Assigned: Nov 1988
Area Code 202-746-0029
AUTOVON 286-0029

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 HF (High Frequency) Transmit
PE0603504 S0223 Submarine Active Detection Sonar (SADS)
PE0204281 S0239 MIDAS (Mine and Ice Detection and Avoidance Sonar)

5. (U) Related Programs: None

~~Classified By: OPNAVINST 5513.5B~~
~~Declassify On: OADR~~

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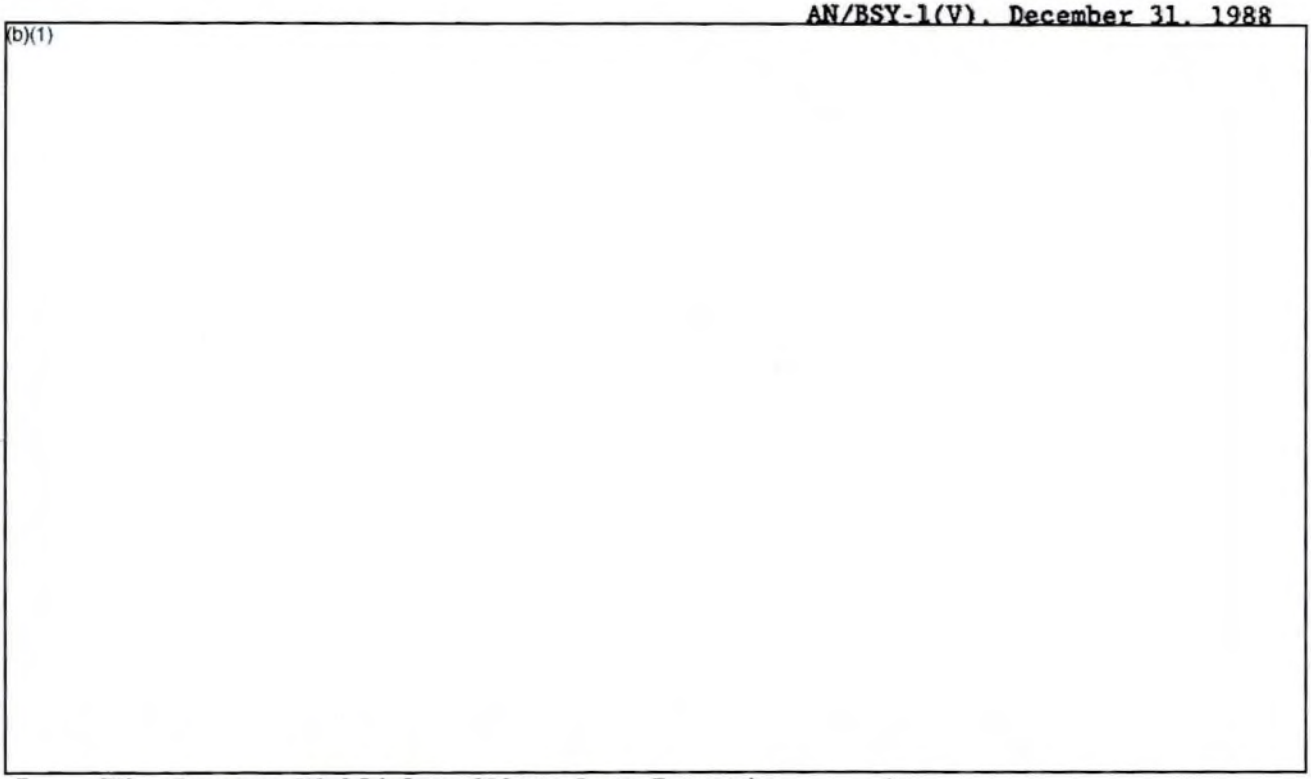

7. (U) Program Highlights (Since Last Report):

a. (U) 4 shipsets have been delivered to the first four ships. SSN 751 successfully completed builders trials with AN/BSY-1 system performance excellent.

b. (U) SSN-751 product baseline configuration upgrade underway during PSA (1/3/89 - 11/1/89).

c. (U) SSN 752 has completed sea trials and is currently conducting INSERV. System has performed exceptionally well. Ship to be delivered to the Navy January 1989.

d. (U) Changes since December 31, 1988 - None.

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP (dated November 1985) threshold breaches.

AN/BSY-1(V) is expected to satisfy all current mission requirements.

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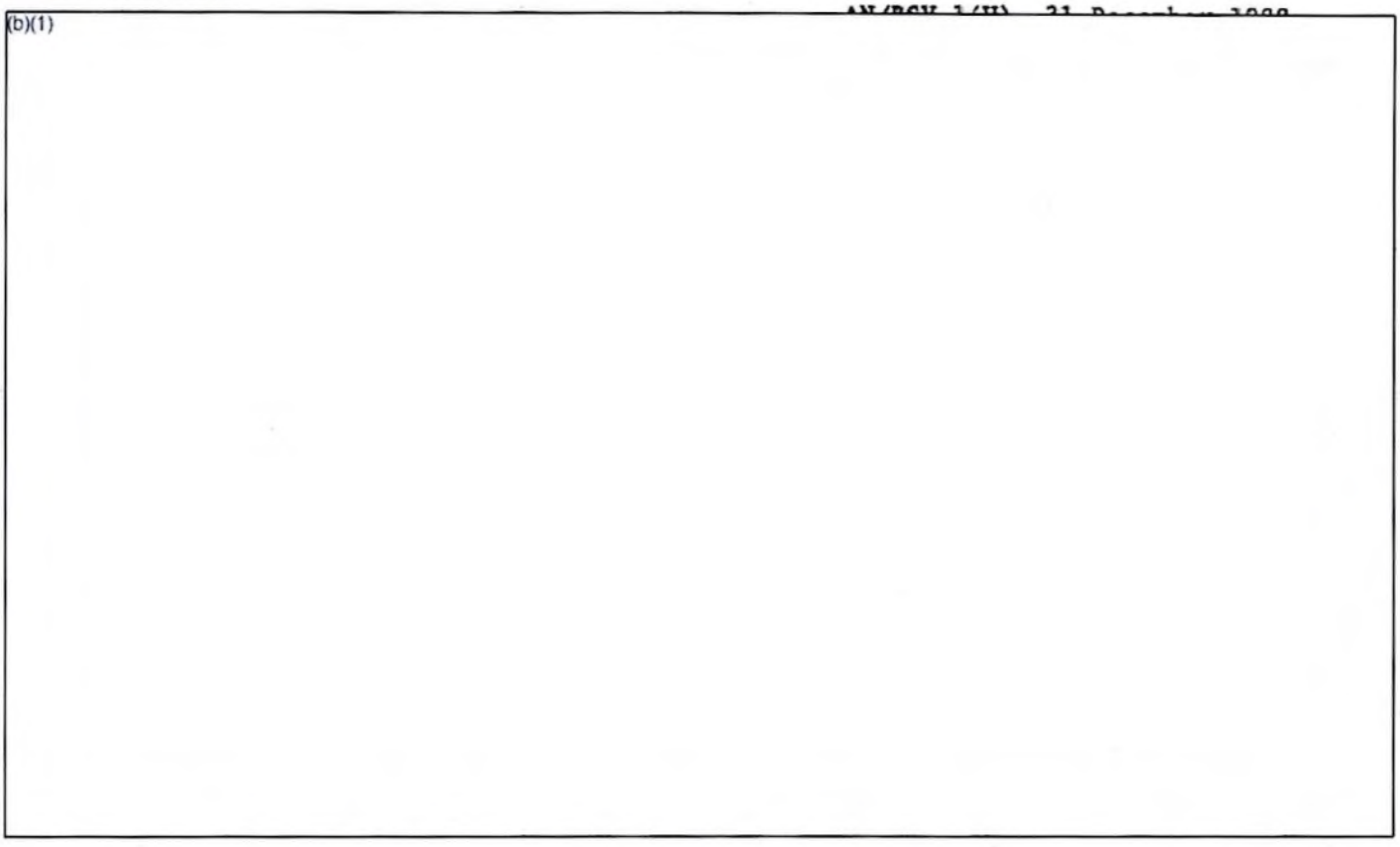

- o TEMP 908-1 Rev 3 for AN/BSY-1(V) dated June 87.
- o Approved Program: DAE Baseline, Feb 88.

(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 dtd June 1987. Variances between actual conditions and specified conditions will be factored into the comparison of these characteristics.

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

	DEVELOPMENT* ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
A. Cost - -			
Development (RDT&E)	2027.5	1135.3	1135.3
Procurement (OPN)	944.9	513.1	513.1
Construction (MILCON)			
Total FY84 Base-Year $	2972.4	1648.4	1648.4
Escalation			
Development (RDT&E)	319.4	70.8	70.8
Procurement (OPN)	535.8	157.0	157.0
Construction (MILCON)			
Total Then-Year $	3827.6	1876.2	1876.2

B. Quantities - - ** N/A
Development (RDT&E)
Procurement (OPN)
Total

C. Foreign Military Sales - - None

D. Nuclear Costs - - None

E. References - -
DEVELOPMENT ESTIMATE: SDDM, dated October 5, 1983, subject "Submarine Advanced Combat System (SUBACS) DSARC I/IIA Decision.

APPROVED PROGRAM: FY1990-91 President's Budget

* 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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	1876.2	1619.1	1876.2
(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 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

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
Estimate	2346.9	1480.7		3827.6
Previous Changes:				
Economic	-49.4	-36.0		-85.4
Quantity	-62.1	108.9		46.8
Schedule	15.5	9.5		25.0
Engineering	34.0	49.7		83.7
Estimating	-25.9	-1.7		-27.6
Other	-1050.9	-1586.7		-2637.6
Support		386.6		386.6
Subtotal	-1138.8	-1068.7		-2206.5
Current Changes:				0.0
Economic	-2.0	-2.8		-4.8
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating		261.9		261.9
Other				0.0
Support				0.0
Subtotal	-2.0	259.1		257.1
Total Changes	-1140.8	-810.6		-1951.4
Current Estimate	1206.1	670.1		1876.2

13 Cost Variance Analysis (Continued):

FY 1984 Constant Dollars (Base- Year) in Millions

	RDT&E	PROC	MILCON	TOTAL
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	-15.8		-27.3
Other	-966.5	-1051.5		-1918.0
Support		309.6		309.6
Subtotal	-992.2	-625.8		-1518.0
Current Changes:				
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating		194.0		194.0
Other				0.0
Support				0.0
Subtotal	0.0	194.0		194.0
Total Changes	-992.2	-431.8		-1324.0
Current Estimate	1135.3	513.1		1648.4

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 OPEVAL/TECHEVAL 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

13 Cost Variance Analysis (Continued): Previous Change Explanations - -

Procurement

Economic:	Revised Escalation Indices
Schedule:	Change of backfit equipment and earlier deliveries to meet accelerated shipbuilding schedule.
Quantity:	Addition of MSRA, Team Trainers and associated spares to support an increased number of operational systems.
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).
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) RDT&E Revised Jan 89 economic escalation rates (Economic)	N/A	-2.0
(2) Procurement Revised Jan 89 economic escalation rates (Economic)	N/A	-2.8
Restoration of Software Maintenance Facility(SMF); loss of 2 Team Trainers; additional funding for Wide Aperture Array(WAA) backfits; decrease in product improvement needs; and increase in Module Screening and Repair Activity(MSRA) requirements. (Estimating)	194.0	261.9

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

AN/BSY-1 FSD portion only*	Initial Contract Price Target	Ceiling	Quantity
IBM Corporation, Manassas, VA	$89.0	N/A	3

N00024-83-C-6083 CPIF (Cost Capped),
Award: Dec 2, 1982 (CC/A mod awarded Dec 22, 1983)
Definitized: Dec 2, 1982 (CC/A mod definitized Dec 22, 1983)

Current Contract Price Target	Ceiling	Quantity	Estimated Price at Completion Contractor	Program Manager
$1034.0	$1034.0	5	$1034.0	$1057.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-$33.5	-$37.8
Cumulative Variances To Date (12/10/88)	-$51.9	-$20.4
Net Change	-$18.4	$17.4

Explanation of Change: The CPR data reflected in this report does not indicate or project subetantial cost or schedule problems. IBM's costs are expected to exceed the contract ceiling, however any cost overruns are an IBM liability. Primary causes for the schedule variances were the rescheduling to the right of Support/Test Equipment and Test and Integration Spares and the use of AFMX Modules in the test bays causing closing to occur later than budget phasing. For the cost variance, additional effort was required to contend with late GFE/CFE. The Government (PMS 417, DCASPRO) is closely monitoring IBM's and its major subcontractors' technical, schedule, and cost performance.

SADS TG FSD	Initial Contract Price Target	Ceiling	Quantity
Raytheon Co., Portsmouth, RI	$54.2	N/A	3

N00024-81-C-6236, CPAF
Award: June 30, 1981
Definitized: June 30, 1981

Current Contract Price Target	Ceiling	Quantity	Estimated Price at Completion Contractor	Program Manager
$153.1	N/A	6	$153.1	$153.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-$17.2	-$2.2
Cumulative Variances To Date (12/10/88)	-$0.5	-$1.1
Net Change	$16.7	$1.1

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

Raytheon N00024-81-C-6236
Explanation of Change: Previous cumulative variances not meaningful due to the reprogramming of the contract baseline. At that time ACWP, BCWP and BCWS were set to equal each other, and the LRE was set to equal the CBB. The current cost variance is due to extra costs associated with structure borne noise tests and redesign. Schedule variances are attributed to Aperture Switching Assemble (ASA) redesign.

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			

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	N/A	N/A
Cumulative Variances To Date (11/29/88)	$6.5	-$1.2
Net Change	$6.5	-$1.2

Explanation of Change: Previous variances are not applicable since this is the first time this contract is being reported in the SAR. The favorable cost variance is due to time lags in billing and rescheduling of a portion of software development. Primary causes for the negative schedule variance are delays in the software development schedule and time lags in billing; therefore causing a delay in delivery of WLSOT from July 89 to Aug 89.

C. MILCON -- N/A

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

A. Program Status --
(1) Percent Program Completed : 55.6% (10/18 Years)

(2) Percent Program Cost Appropriated: 70% ($1316.4/$1876.2)

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

B. Appropriation Summary - -

Appropriation	Prior Years (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-97)	Total
	(Then-Year Dollars in Millions)				
RDT&E	1179.4	24.7	2.0		1206.1
Procurement	137.0	98.5	89.0	345.6	670.1
MILCON					
Total	1316.4	123.2	91.0	345.6	1876.2

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				251.0	237.5	200.4	199.1	
1984				126.8	129.2	129.2	128.6	3.8
1985				174.4	183.1	183.1	182.1	3.4
1986				184.4	199.4	199.4	189.4	2.8
1987				188.6	209.9	208.5	196.7	2.7
1988				115.5	133.0	130.9	71.1	3.1
1989				73.0	87.3	80.7		4.0
1990				20.0	24.7	0.0		3.6
1991				1.6	2.0	0.0		3.3
SUB-TOTAL				1135.3	1206.1	1132.2	967.0	
APPROPRIATION: OPN								
1986				0.5	0.6	0.6		2.8
1987				58.9	68.4	67.8	18.9	2.7
1988				48.9	58.7	56.5	3.9	3.1
1989				7.5	9.3	2.1		4.0
1990				77.1	98.5			3.6
1991				68.1	89.0			3.3
1992				58.9	78.7			2.8
1993				72.5	98.6			2.3
1994				99.4	137.7			1.8
1995				7.5	10.6			1.8
1996				7.0	10.0			1.8
1997				6.8	10.0			1.8
SUB-TOTAL				513.1	670.1	127.0	22.8	

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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 --

(Then-Year Dollars in Millions)

	FY1989 & Prior	FY1990 Year	FY1991 Year	(1) Balance To Complete	(2) Total
O&M,N	6.6	11.4	11.9		29.9
Industrial Fund	N/A	N/A	N/A	N/A	N/A
Total	6.6	11.4	11.9	N/A	29.9

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A-27 TOW 2

~~SECRET~~

SAR-88-109

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

PROGRAM: TOW 2

AS OF DATE: December 31, 1988

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1.(U) Designation and Nomenclature (Popular Name): M220E4, Heavy Anti-tank/Assault Weapon System (TOW 2)

2.(U) DoD Component: U.S. Army

3.(U) Responsible Office and Telephone Number:

TOW Project Office
U.S. Army Missile Command
Redstone Arsenal, AL 35898

PM: COL Thomas M. Devanney
Assigned: July 1, 1987
AV 746-7194; Comm (205)876-7194

4.(U) Program Elements:

RDT&E: PE 23802 PROJECT D336
PROCUREMENT: APPN 2032, SSN C59300, C61700, CA0253, CA0258
APPN 2035, SSN BL5295, K42500 (Both Sunk)

5.(U) Related Programs:

None

[redacted]

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[redacted]

DECLASSIFY ON: [redacted]

SAR-88-0633

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6.(U) 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.

7.(U) Program Highlights:

a. (U) 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 to counter the applique armor threat which was initiated in December, 1984. 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 FY 86 buy. TOW 2B fly-over shoot-down mission version R&D contract was awarded 1 Sep 87.

b. (U) Significant Developments Since Last Report -- 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/UAS-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.

The TOW 2 system is expected to satisfy the mission requirements.

c. (U) Changes since "As Of" date -- None.

8.(U) Threshold Breaches: There are currently no DAE baseline breaches.

(b)(1)

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

c. (U) Current Change Explanations -
(Ch-1) SAR value no longer applicable and these values will be eliminated in the next SAR.
(Ch-2) To correct previous SAR data.
(Ch-3) Not previously reported.

d. (U) References - (1) (U) Production Estimate: IPR approved by HQDA message, DAMA-WSM-S, dated 9 Oct 81.

(2) (U) Approved Program: DAE Baseline dated February 26, 1988.

10. Technical/Operational Characteristics:

a. (U) Technical	Production Estimate	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
1. (U) Weight (lbs)				
(a) TOW 2				
(1) Missile Weight Only	N/A	N/A/N/A	48	48
(2) Msl Weight (encased)	63.4	63.4/63.4	63.4	63.4
(3) Launcher Weight	216	216/216	216	216
(4) System Ready to Fire	276	276/276	279.4	279.4
(b) TOW 2A				
(1) Missile Weight Only	N/A	N/A/N/A	49.8	49.8
(2) Msl Weight (Tactical)	N/A	63.4/63.4	64.5	64.5
(3) Launcher Weight	N/A	216/216	216	216
(4) System Ready to Fire	N/A	276/276	280.5	280.5
(c) TOW 2B				
(1) Missile Weight Only	N/A	N/A/N/A	N/A	49.8
(2) Msl Weight (Tactical)	N/A	63.4/63.4	N/A	64.5
(3) Launcher Weight	N/A	216/216	N/A	216
(4) System Ready to Fire	N/A	276/276	N/A	280.5
b. (U) Operational:				
1. (U) Range (meters).				
(a) TOW 2				
Minimum	65	65/65	65	65
Maximum	3750	3750/3750	3750	3750

[redacted]chnical/Operational Characteristics (Cont'd) :

		Production Estimate	Approved Program Goal/Threshold	Demonstrated Performance	Current Estimate
(b)	TOW 2A				
	Minimum	N/A	65/65	65	65
	Maximum	N/A	3750/3750	3750	3750
(c)	TOW 2B				
	Minimum	N/A	*65/400	N/A	200
	Maximum	N/A	3750/3750	N/A	3750
2. (U)	System Reliability (%)				
(a)	TOW 2 missile w/launcher	91.6	94/94	95	95
(b)	TOW 2A missile w/launcher	N/A	94/94	95	95
(c)	TOW 2B missile w/launcher	N/A	94/94	N/A	95

(b)(1)

[redacted]

(b)(1)

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

	Production Estimate	Approved Program	Current Estimate
a. (U) Cost --			
Development (RDT&E)	107.0	196.3	196.3
Procurement	2,195.1	2624.8	2624.8
Heat Missile	(1,299.3)	(1618.3)	(1618.3)
Launcher	(7.0)	(-0-)	(-0-)
AN/TAS 4/4A Night Sight	(363.2)	(236.8)	(236.8)
Ground Supt Retrofit	(325.8)	(605.1)	(605.1)
Night Sight Retrofit	(26.1)	(13.3)	(13.3)
Total Flyaway	(2,021.4)	(2473.5)	(2473.5)
Training Missile	(28.1)	(-0-)	(-0-)
Other Ground Supt. Equip.	(75.2)	(45.0)	(45.0)
Total Other Wpn Sys	(103.3)	(45.0)	(45.0)
SURGE	(48.9)	(33.4)	(33.4)
Initial Spares	(21.5)	(72.9)	(72.9)
Total: FY84 Base-Year $	2,302.1	2821.1	2821.1
Escalation	321.7	393.4	393.4
Development (RDT&E)	(-15.7)	(1.9)	(1.9)
Procurement	(337.4)	(391.5)	(391.5)
Construction	(0)	(0)	(0)
Total Then Year $	2,623.8	3214.5	3214.5
b. (U) Quantities --			
Development (RDT&E)	113	113	113
Procurement	141,224	174,532	174,532
Total	141,337	174,645	174,645

c. (U) Foreign Military Sales -- Sales of TOW 2 and TOW 2A to date consist of over 10,000 TOW 2 missiles, value $100 million and over 500 launchers, value 62 million. In addition, 11,442 TOW 2 missiles, value $81 million and 160 launchers, value 20 million have been procurred with Special Defense Acquisition (SDAF) funds. Countries committed to TOW 2 upgrade consist of: Canada, Denmark, Germany, Netherlands, Norway, Sweden, Turkey, Portugal, Pakistan, Tunisia, and Finland. Ratio of missiles to launchers sales is high since majority of FMS cutomers are electing to purchase modification kits rather than complete launchers.

d. Nuclear Costs -- None.

e. References --

Production Estimate: IPR approved by HQDA message, DAMA-WSM-S, dated 9 Oct 81.

Approved Program: FY1990-91 President's Budget.

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 Acquisiton	(Dec 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) (U) Cost	3214.5	2394.2	3214.5
(2) (U) Quantity	174,645	125,969	174,645
(3) (U) Unit Cost	.018	.019	.018
b. (U) Current Procurement	(FY89)	(FY89 APPN)	(FY90)
(1) (U) Cost	186.5	186.5	177.0
Less CY Adv Proc	0	0	0
Plus PY Adv Proc	-0-	-0-	.0
Net Total	186.5	186.5	177.0
(2) (U) Quantity	12,000	12,000	9,455
(3) (U) Unit Cost	.015	.015	.018

13.(U) Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Baseline Estimate (PdE)	$91.3	$2532.5	-0-	2623.8
Previous Changes:				
Economic	- 2.5	-148.3	-	-150.8
Quantity	-	-202.3	-	-202.3
Schedule	-	+102.4	-	+102.4
Engineering	+54.4	+182.1	-	+236.5
Estimating	-	-194.3	-	-194.3
Other	-	-	-	-
Support	-	- 21.1	-	- 21.1
Subtotal	+51.9	-281.5	-0-	-229.6
Current Changes:				
Economic	-.2	+ .9	-	+ .7
Quantity	-	+715.0	-	+715.0
Schedule	-	-	-	-
Engineering	+55.2	+ 34.6	-	+ 89.8
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	+ 14.8	-	+ 14.8
Subtotal	+55.0	+765.3	-0-	+820.3
Total Changes	+106.9	+483.8	-0-	+590.7
Current Estimate	198.2	3016.3	-0-	3214.5

(FY 1984 Constant (Base-Year Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	$107.0	2195.1	-0-	2302.1
Previous Changes:				
Quantity	-	-140.8	-	-140.8
Schedule	-	+ 33.8	-	+ 33.8
Engineering	+45.5	+136.4	-	+181.9
Estimating	-	-130.0	-	-130.0
Other	-	-	-	-
Support	-	- 31.5	-	- 31.5
Subtotal	+45.5	-132.1	-0-	- 86.6
Current Changes:				
Quantity	-	+524.2	-	+524.2
Schedule	-	-	-	-
Engineering	+43.8	+ 27.1	-	+ 70.9
Estimating	-	-	-	-
Other	-	-	-	-
Support		+ 10.5	-	+ 10.5
Subtotal	+43.8	+561.8	-0-	+605.6
Total Changes	+89.3	+429.7	-0-	+519.0
Current Estimate	196.3	2624.8	-0-	2821.1

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

b. (U) Previous Change Explanations --

(1) (U) RDT&E

Economic: revised escalation indices
Engineering: enhancement to TOW2 warhead

(2) (U) Procurement

Economic: revised escalation indices
Quantity: reduction of TOW 2 missile quantity
Schedule: stretch-out of missile procurements
Engineering: funding of approved PIP's, enhancement to TOW 2 warhead
Estimating: changes in Night Sight acquisition strategy
Support: increase in GSE requirement

c. (U) Current Change Explanations -- (Dollars in Millions)

(1) (U) RDT&E	Base-Year	Then-Year
Revised Jan 89 economic escalation indices (Economic)	N/A	- .2
Approved for TOW 2 Retrofit, Flight Motor, TOW Sight Improvement, Warhead Test Qualifications (Engineering)	+43.8	+55.2
(2) Procurement		
Revised Jan 89 economic escalation indices (Economic)	N/A	+ .9
Missile quantity increases (Quantity)	+524.2	+715.0
Spares funding adjustment on FY90-91 President's Budget and add Depot Maintenance Plant Equipment (DMPE) (Support)	+10.5	+14.8
Implementation of TOW Retrofit program (Engineering)	+27.1	+34.6

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

Initial SAR Estimate (Pde) to Current Estimate --

PAUC Initial SAR Estimate(Pde)	Changes								PAUC (PROD ESTIMATE)
	ECON	QTY	SCH	ENGR	EST	SPT	OTHER	TOTAL	
.019	-.001	-.001	+.001	+.001	-.001	-0-	-0-	-.001	.018

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

a. (U) 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
$35.5	N/A	N/A

Estimated Price at Completion

Contractor	Program Manager	
$35.4	$35.4	1/

b. (U) Procurement -

TOW Missiles (FY88)
Hughes Aircraft Co., Tucson, AZ
DAAH01-88-C-0292, FFP
Award: 12 Aug 88
To be Definitized: Feb 89

Initial Contract Price

Target NTE	Ceiling	Qty	
$126.2	N/A	15,977	2/

Current Contract Price

Target NTE	Ceiling	Qty	
$126.2	N/A	23,365	3/

Estimated Price at Completion

Contractor	Program Manager	
$126.2	$126.2	4/

1/ (U) This has not exceeded the threshold required for reporting variance

2/ (U) Includes USMC 3118 - SDAF 3412 and FMS 1295 (TOW 2A) NTE applicable only to initial qty of 15,977

3/ (U) Includes option quantities of 3548 (USA), 236 (USMC) and 3608 (FMS - TOW 2, ITOW and Practice).

4/ (U) Variances are not reported on Firm Fixed Price contracts

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

c. TOW 2 Bradley Fighting Vehicle Subsystem (FY88) 1/

Hughes Aircraft Co., El Segundo, CA
DAAH01-87-C-0582, FFP
Award: 22 Apr 88
Definitized: 22 Apr 88

Initial Contract Price

Target	Ceiling	Qty
$123.0	N/A	437

Current Contract Price

Target	Ceiling	Qty
$123.0	N/A	437

Estimated Price at Completion

Contractor	Program Manager
$123.0	$123.0 2/

d. Night Vision Sets (AN/UAS-12C)

Kollsman Instrument Co., Nashua, NH
DAAH01-84-C-0726, FFP
Award: 21 Sep 84
Definitized: 20 Mar 85

Initial Contract Price

Target	Ceiling	Qty
$55.5	N/A	828

Current Contract Price

Target	Ceiling	Qty
$ 55.5	N/A	828

Estimated Price at Completion

Contractor	Program Manager
$55.5	$ 55.5 2/

1/ (U) This contract also appears in the Bradley SAR.
2/ (U) Variances are not reported on firm fixed price contracts

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

a. (U) Program Status --

(1) (U) Percent Program Completed: 70.6% (12 yrs/17 yrs)

(2) (U) Percent Program Cost Appropriated: 61.8% ($1985.4/3214.5)

b. (U) Appropriation Summary --

Appropriation	Current & Prior Yrs (FY78-89)	(Then-Year Dollars in Millions) Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-94)	TOTAL
RDT&E	150.5	20.3	10.2	17.2	198.2
Procurement	1834.9	177.0	225.6	778.8	3016.3
MILCON	--	--	--	--	--
TOTAL	1985.4	197.3	235.8	796.0	3214.5

Fiscal Year	Qty	Flyaway Dollars (FY84 Dollars) Nonrec	Flyaway Dollars (FY84 Dollars) Rec	Total Base Year$	Total Then-Year $ Program	Obligated	Expended	Escl Rate (%)
APPROPRIATION: RDT&E								
1978				8.1	5.3	5.3	5.3	11.06
1979	113			14.4	10.3	10.3	10.3	12.61
1980				32.5	25.7	25.7	25.7	11.42
1981				25.8	22.5	22.5	22.5	7.58
1982				6.5	6.1	6.1	6.1	7.60
1983				2.2	2.2	2.2	2.2	4.90
1984				4.7	4.8	4.8	4.8	3.80
1985				11.3	11.9	11.9	11.9	3.40
1986				9.7	10.5	10.5	10.5	2.80
1987				5.6	6.3	6.3	6.3	2.70
1988				17.5	20.2	16.2	11.7	3.10
1989				20.6	24.7	15.4	0	4.00
1990				16.4	20.3	0	0	3.60
1991				8.0	10.2	0	0	3.30
1992				6.8	8.9	0	0	2.80
1993				3.1	4.1	0	0	2.30
1994				3.1	4.2	0	0	1.80
Subtotal	113			196.3	198.2	137.2	117.3	

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

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: PROCUREMENT (MIPA: ACT II & ACT III)								
1981	3875		151.9	151.9	120.6	120.6	120.6	11.90-
1982	10008		207.2	228.1	207.1	207.1	207.1	14.30
1983	12000		191.2	194.7	192.6	192.6	192.6	9.00
1984	18000		196.4	217.2	229.6	221.0	217.5	8.00
1985	12000		184.3	221.6	243.4	240.7	238.6	3.40
1986	12000		144.1	171.7	193.2	192.9	177.4	2.80
1987	9350		110.8	115.0	134.0	108.4	81.5	2.70
1988	12000		146.6	154.0	186.7	73.1	25.5	3.10
1989	12000	1/	141.5	149.2	186.5	-0-	-0-	4.00
1990	9455		133.6	137.8	177.0	-0-	-0-	3.60
1991	13284		168.9	171.6	225.5	-0-	-0-	3.30
1992	16802		192.3	196.4	263.4	-0-	-0-	2.80
1993	16854		193.1	200.2	273.4	-0-	-0-	2.30
1994	16904		170.3	174.0	242.0	-0-	-0-	1.80
Subtotal	174532		2332.2	2483.5	2875.0	1356.4	1260.8	
APPROPRIATION: OPA								
1981			30.5	30.5	27.8	27.8	27.8	11.90
1982			33.0	33.0	32.3	32.3	32.3	7.60
1983			44.1	44.1	45.3	45.3	45.3	4.90
1984			33.7	33.7	35.9	35.9	33.4	4.30
Subtotal			141.3	141.3	141.3	141.3	138.8	
Total	174645		2473.5	2821.1	3214.5	1634.9	1516.9	

1/ The Army will procure the maximum number of supportable systems consistent with the dollars appropriated.

17.(U) Production Rate Data:

a. Annual Production Rate -- 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.

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1981	N/A	3,875	3,875	3,875
1982	N/A	10,008	10,008	10,008
1983	N/A	12,000	12,000	12,000
1984	N/A	18,000	18,000	18,000
1985	N/A	18,000	12,000	12,000
1986	N/A	18,000	24,000 1/	12,000
1987	N/A	15,500	18,700	9,350
1988	N/A	21,029	12,000	12,000
1989	N/A	24,812	12,000	12,000
1990	N/A	-0-	9,455	30,000
1991	N/A	-0-	13,284	30,000
1992	N/A	-0-	16,802	30,000
1993	N/A	-0-	16,854	4,649
1994	N/A	-0-	16,904	

1/ (U) Plant shut-down in Aug 84 resulted in stockpiled assets which were accepted with the resumption of production exceeding the normal maximum rate.

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 $)	2302.1	+ 519.0	2821.1	+ 599.1	2222.0
	(TY $)	2623.8	+ 590.7	3214.5	+ 682.7	2531.8
PAUC	(BY $)	0.016	-0-	0.016	+ 0.004	0.012
	(TY $)	0.019	- 0.001	0.018	+ 0.004	0.014

17. (U) Production Rate Data (Cont):

c. (U) Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	4/82	N/A	4/82	N/A	4/82
Duration (in Mos)	95	+48	143	+25	118
End Date (Mo/Yr)	3/90	N/A	3/94	N/A	2/92

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

	To Date
RDT&E	113/113
Procurement	89,233/77,233

e. (U) Approved Design-to-Cost Goal -- None.

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules -- N/A

b. (U) Costs -- N/A

c. (U) Contractor Support Costs --

(Then-year Dollars in Millions)

	FY1989 1/ & PRIOR	FY1990 YEAR	FY1991 YEAR	BALANCE TO COMPLETE	TOTAL
O&M	5.0	4.6	10.9	TBD	20.5

1/ Includes FY88-89

T45TS

UNCLASSIFIED

Navy

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A) 823)
PROGRAM: T45TS

AS OF DATE: December 31, 1988



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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	Capt. B. C. Marshall, USN
PMA-273, Rm. 852, JP-1	Assigned: June 14, 1985
Washington, D.C. 20361-1273	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 0027
ICN 0028

[redacted]

5. **Related Programs:** PE 0603216N Navy Aircrew Common Ejection Seat

[redacted]

OASD(PA) DFOISR 88-T-0564

6. 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 861-49). 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.

7. Program Highlights (Cont'd):

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, Douglas Aircraft Corporation, 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. 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 firm-fixed price contract option was definitized in December 1987 at $420.8 million (TY$).

b. Significant Developments Since Last Report -- 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 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. Corrections are currently being evaluated by the Navy and prime contractor. 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. Based on initial technical evaluation of DT/OT deficiency corrections, T45TS is expected to satisfy all mission requirements.

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

8. Threshold Breaches: Latest DCP approved 21 December 1987. Current DAE Baseline dated 17 February 88. This SAR documents one schedule breach. The date of the Milestone IIIA Approval of Low Rate Initial Production has been shifted from September 1988 to May 1989 to assure installation and flight test of corrections to discrepancies discovered in DT-IIA/OT-IIA.

9. **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	Dec 87	Apr 88 (Ch-1)
Milestone IIIA Approval Low Rate Initial Production (DAB/NPDM)	--	Sep 88	May 89 (Ch-2)
Milestone IIIB Approval Low Rate Initial Production (DAB/NPDM)	--	Sep 89	Feb 90 (Ch-3/4)
Complete Navy Technical Evaluation (NTE)	Jan 90	Oct 89	Mar 90 (Ch-4)
Complete OPEVAL	Jun 90	Mar 90	Aug 90 (Ch-4)
Initial Operational Capability (IOC)	May 91	Sep 90	Feb 91 (Ch-4)
Milestone III Authorized Full Production (AFP) (DAB)	--	Oct 90	Mar 91 (Ch-4)

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. Prior approved program date for first flight based on an optimistic internal schedule. First flight was delayed three months due to slow release of engineering drawings and union work slowdown. First flight of Y-1 prototype was contractually required on 31 March 1988.

c. Current Change Explanations --

(Ch-1) First flight delayed two weeks due to contractor's late delivery of flight test article (Y-1).

(Ch-2) Milestone IIIA decision delayed until DT/OT II aircraft performance deficiencies are corrected.

(Ch-3) Milestone IIIB redefined as Approval for Low Rate Initial Production (second limited production lot).

(Ch-4) Milestone IIIB, TECHEVAL, OPEVAL, IOC and AFP decision slipped due to late delivery of the flight test articles, delayed flight test schedule and to allow for correction of DT/OT-II deficiencies.

d. References --

Planning Estimate: Draft SCP of January, 1984.

Approved Program: DAE Baseline dated 17 Feb 1988; based on NDCP promulgated by OSD on 21 Dec 1987.

10. Technical/Operational Characteristics:

a. Technical --	Planning Estimate	Approved Program	Demonstrated Performance	Current Estimate
Wing Span (ft)	30.81	30.81	N/A	30.81
Length (ft)	39.26	39.26	N/A	39.26
Height (ft)	13.42	13.42	N/A	13.42
Wing Area (Sq. ft.)	179.64	179.64	N/A	179.64
Flight Design Weight (lbs)	12,420	12,758	N/A	12,758

10. Technical/Operational Characteristics (Continued):

	Planning Estimate	Approved Program	Demonstrated Performance	Current Estimate **
b. Operational --				
Pilot Training Rate (Annual)	600	600	N/A	600
Aircraft				
(1) Utilization Rate (Hr/Yr)	720	720	N/A	720
(2) Max Range (NM)	1,000	1,000	N/A	825 (Ch-1)
(3) Speed				
(a) Max Level Flt (Mach)	.80	.85	.84 *	.85
(b) Approach (Kts)	115-125	125	120 *	125
(4) Sustained G's @ 15,000 ft.	3.0	3.4	3.4 *	3.4
(5) Mean Flight Hours Between Failure (MFHBF)	3.2	3.2	2.3 *	3.2
(6) Direct Maintenance Man Hours per Flight Hour (DMMH/FH)	10.0	10.0	8.6 *	10.0
(7) Mission Capability (%)	85%	85%	100% *	85%
Simulator Availability (% Sched)				
(1) Instrument Flight Trainer (IFT)	96%	95%	N/A	95%
(2) Operational Flight Trainer (OFT)	95%	95%	N/A	95%
Academics				
(1) Computer Aided Instruction (CAI) System Availability (% Sched)	98%	95%	N/A	95%
Training Integration System (TIS)				
(1) Availability (% Sched)	99%	95%	N/A	95%

c. 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. The TIS availability estimate was reduced from 99% to 95% because of DTC considerations. The CAI availability estimate has now been established as 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.

* Limited initial DT/OT testing results.
(5) Running six months average MFHBF (June-Dec 88) of 2.3, better than FSED specification requirement of 2.0.
(6) Running six month average maintenance man hours 8.6, better than FSED specification requirement of 10.0.
(7) During formal OT-IIA testing ten of ten scheduled flights were flown in four days.

** Current estimates are for system at maturity.

10. Technical/Operational Characteristics (Continued):

d. Current Change Explanations

(Ch-1) 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 n.m.. Maximum range is not a specification requirement.

e. References --

Planning Estimate: Draft SCP of January, 1984

Approved Program: DAE Baseline dated 17 Feb 1988; based on NDCP promulgated by OSD on December 21, 1987.

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

a. Cost --	Planning Estimate	Approved Program	Current Estimate
Development (RDT&E)	1150.3	537.6	537.6
Procurement	2604.3	3428.6	3428.6
Airframe/CFE	(1259.1)	(2073.2)	(2073.2)
Engine/Accessories (GFE)	(363.6)	(0.0)	(0.0)
Electronics (GFE/CFE)	(136.6)	(178.1)	(178.1)
Change Allowance (ECO)	(42.9)	(53.3)	(53.3)
Other GFE	(17.7)	(61.4)	(61.4)
Nonrecurring	(35.4)	(113.7)	(113.7)
Ancillary Equipment	(0.0)	(0.0)	(0.0)
Total Flyaway	(1855.3)	(2479.7)	(2479.7)
Other Wpn Sys Cost	(577.5)	(735.7)	(735.7)
Initial Spares	(171.5)	(213.2)	(213.2)
Construction (MILCON)	--	35.0	35.0
Total FY 84 Base-Year $	3754.6	4001.2	4001.2
Escalation	1707.4	1155.9	1155.9
Development (RDT&E)	(192.6)	(62.0)	(62.0)
Procurement	(1514.8)	(1083.8)	(1083.8)
Construction (MILCON)	(--)	(10.1)	(10.1)
Total Then-Year $	5462.0	5157.1	5157.1

b. Quantities --

Development (RDT&E)	4	2	2
Procurement	300	300	300
Total	304	302	302

11. **Program Acquisition Cost (Cont'd):**

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Planning Estimate: Draft SCP of January, 1984

Approved Program: FY 1990-91 President's budget.

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

	Current Year		Budget Year
	Current Est Dec 88 SAR	UCR Baseline (Dec 87 SAR)	UCR Baseline Dec 88 SAR
a. Program Acquisition --			
(1) Cost	5157.1	4829.3	5157.1
(2) Quantity	302	302	302
(3) Unit Cost	17.1	16.0	17.1
b. Current Procurement --	(FY 1989)	(FY 1989)	(FY 1990)
(1) Cost	428.7	428.7	446.3
Less CY Adv Proc	(40.6)	(40.6)	(48.1)
Plus PY Adv Proc	31.1	31.1	40.6
Net Total	419.2	419.2	438.8
(2) Quantity	24	24	24
(3) Unit Cost	17.5	17.5	18.3

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	-23.7	-691.6	+0.2	-715.1
Quantity	-23.8	-	-	-23.8
Schedule	-619.6	+16.0	-	-603.6
Engineering	-11.8	+360.8	-	+349.0
Estimating	+26.8	-73.2	+20.8	-25.6
Other	-	-	-	-
Support	-99.5	+485.9	-	+386.4
Subtotal	-751.6	+97.9	+21.0	-632.7
Current Changes:				
Economic	-0.7	-51.1	-0.1	-51.9
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+9.0	+515.9	+24.2	+549.1
Other	-	-	-	-
Support	-	-169.4	-	-169.4
Subtotal	+8.3	+295.4	+24.1	+327.8
Total Changes	-743.3	+393.3	+45.1	-304.9
Current Estimate	599.6	4512.4	45.1	5157.1

(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	-	-	-497.4
Engineering	-18.4	+272.1	-	+253.7
Estimating	+23.6	-31.9	+16.9	+8.6
Other	-	-	-	-
Support	-104.6	+329.8	-	+225.2
Subtotal	-621.5	+570.0	+16.9	-34.6
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+8.8	+384.0	+18.1	+410.9
Other	-	-	-	-
Support	-	-129.7	-	-129.7
Subtotal	+8.8	+254.3	+18.1	+281.2
Total Changes	-612.7	+824.3	+35.0	+246.6
Current Estimate	537.6	3428.6	35.0	4001.2

13. 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
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.
Estimating:	change in dollar/pound exchange rate, addition of SAHRS as GFE
Support:	more refined estimate of ILS requirements

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Dec 88 economic escalation rates. (Economic)	N/A	-0.7
Reprogramming adjustments to account for historical foreign exchange rate variances. (Estimating)	+ 8.8	+9.0
(2) Procurement		
Revised Dec 88 economic escalation rates. (Economic)	N/A	-51.1
Estimating adjustments based on change in revised $/£ exchange rate and revised engine estimate. (Estimating)	+384.0	+515.9
Revised estimate of ILS requirements for aircraft and ground training systems. (Support)	-129.7	-169.4

13. Cost Variance Analysis- (Cont'd):

(3) MILCON		
Revised Dec 88 economic escalation rates. (Economic)	N/A	-0.1
Revised estimate of T45TS system specific MILCON (Estimating)	+18.1	+24.2

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

a. Initial SAR Estimate (PE) to Current Baseline Estimate --N/A

PAUC (Planning Est)	Changes								PAUC (Current) (Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
17.967	-2.540	+.040	-1.999	+1.156	+1.733	--	+.719	-.891	17.076

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
$525.8	N/A	2

Estimated Price At Completion	
Contractor	Program Manager
$525.8	$525.8

Cost/Schedule Variances:

Addition of Foreign Exchange Rate/Economic Price Adjustments consistent with contract provisions

15. **Contract Information (Cont'd):** (Then-year Dollars in Millions)

b. Procurement -- N/A (Then Year Dollars in Millions)

T-45 Training System:	Target	Ceiling	Qty
Douglas Aircraft Co., Long Beach, CA, N00019-84-C-0240, FFP Award: December, 1987	$420.8	N/A	12

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

c. MILCON -- N/A

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

a. Program Status --

(1) Percent Program Completed: 62.5% (10 yrs/16 yrs)

(2) Percent Program Cost Appropriated: 28.2% ($1453.7/$5157.1)

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	558.5	26.5	14.6	--	599.6
Procurement	886.0	446.3	643.7	2536.4	4512.4
MILCON	9.2	11.8	--	24.1	45.1
Total	1453.7	484.6	658.3	2560.5	5157.1

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

c. Annual Summary --

Fiscal Year	Qty	FY 84 Base-Year Dollars			Total Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Program	Obli-gated	Ex-pended	
		Nonrec	Rec					
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				128.0	142.5 2/	142.5	142.5	2.7
1988				82.1	94.6	94.6	83.2	3.1
1989				74.3	88.8			4.0
1990				21.4	26.5			3.6
1991				11.5	14.6			3.3
Subtotal	2			537.6	599.6	469.7	458.3	
Appropriation: Procurement								
1987				54.6	65.1	65.1	65.1	2.7
1988	12	40.4	175.5	328.0	392.2	390.5	40.7	3.1
1989	24	9.2	239.1	346.7	428.7			4.0
1990	24	9.2	209.9	350.5	446.3			3.6
1991	48	7.7	363.7	493.5	643.7			3.3
1992	48	5.8	354.2	485.6	646.7			2.8
1993	48	6.4	346.3	475.4	645.0			2.3
1994	48	20.8	340.5	468.9	647.5			1.8
1995	48	14.2	336.8	425.4	597.2			1.8
Subtotal	300	113.7	2366.0	3428.6	4512.4	455.6	105.8	

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.

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

Fiscal Year	Qty	FY 84 Base-Year Dollars			Total Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Program	Obli-gated	Ex-pended	
		Nonrec	Rec					
Appropriation: MILCON								
1988				7.7	9.2			3.1
1989				--	--			4.0
1990				9.3	11.8			3.6
1991				--	--			3.3
1992				13.1	17.4			2.8
1993				4.9	6.7			2.3
Subtotal				35.0	45.1			
Total	302			4001.2	5157.1			

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 is 36 months for each production buy.)

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1988	4	N/A	12	24
1989	8	N/A	24	24
1990	8	N/A	24	24
1991	16	N/A	48	48
1992	16	N/A	48	48
1993	16	N/A	48	48
1994	16	N/A	48	48
1995	16	N/A	48	48

17. Production Rate Data (Cont'd):

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	4001.2	-0-	4000.1
(TY $)	N/A	N/A	5157.1	-0-	5157.1
PAUC (BY $)	N/A	N/A	13.2	-0-	13.2
(TY $)	N/A	N/A	17.1	-0-	17.1

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	118	-0-	118
End Date (Mo/Yr)	N/A	N/A	9/97	N/A	9/97

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	2/2
Procurement	0/0

e. Approved Design-To-Cost Goal -- N/A

18. Operating and Support Costs:

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

AA ASAS

88-115

~~CONFIDENTIAL~~ ASAS/ENSCE, December 31, 1988

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)
PROGRAM: ASAS/ENSCE

AS OF DATE: 31 Dec 1988

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1. (U) Designation and Nomenclature (Popular Name): Army "All Source Analysis System (ASAS) and Air Force "Enemy Situation Correlation Element (ENSCE)."

2. (U) DoD Component: Department of the Army as Executive Agent for Joint Army/Air Force Program.

3. (U) Responsible Office and Telephone Number:

Joint Tactical Fusion Program Office (JTFPO)
1500 Planning Research Drive
McLean, Virginia, 22102-5099
PM BG (P) William E. Harmon
Assigned: 26 November 1984
Commercial: (703) 556-2930

All Source Analysis System (ASAS)/Enemy Situation Correlation Element (ENSCE)
1500 Planning Research Drive
McLean, Virginia, 22102-5099
PM COL Joseph Ganino
Assigned: 6 July 1984
Commercial: (703) 556-2950

4. (U) Program Elements/Procurement Line Items:
RDT&E PE64321 PROJ D926, B19, B20
PE64321F (Air Force)

PROCUREMENT: SSN KA4400 APPN 2035
AF 3080 - Cost Element 1683790 (Communications Electronic Spares.)

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OASD(PA) DEPSEC 88-0630

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

MILCON: NA.

5. (U) Related Programs: Tactical ESM Systems, Tactical Cryptologic Program, and Digital Topographic Support System (DTSS) and Quick Reaction Multi-color Printer (QRMP), and Integrated Meteorological Systems. 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. (U) Mission and Description:

(b)(1)

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

b. (U) The Joint Tactical Fusion Program Management Office 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 that 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 from ISO-20 foot shelters into smaller shelters more appropriate to the battlefield environment. During FY 85 the ASAS/ENSCE program developed the AIM Brassboard (ABB) which possesses near-term limited processing capability. The portable ASAS/ENSCE workstation replaced the previous Man Machine Interface as the primary user interface to the system, which gave increased flexibility to the ASAS/ENSCE system. 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. These modules were delivered to III Corps/2nd Armored Division, Ft Hood, Texas, in October 1986. Field Trials for these modules were conducted during November and December 1986. The Army Material Systems Analysis Activity (AMSAA) and the US Operational Test and Evaluation Agency (USAOTEA) were observers for both of these events. USAOTEA prepared an independent evaluation of the field trials.

(U) A Memorandum for Record (MFR) was signed on September 4, 1986, by Dr. J.R. Sculley, Assistant Secretary of the Army (Research, Development, and Acquisition) approving a directed limited procurement (urgent) of Limited Capability Configurations (LCC's) through NASA/JPL on behalf of the Army. This Directed Acquisition allows procurement of these LCC's. Modules used in the LCC were tested and evaluated during field trials/user's tests at Fort Hood, TX.

(U) PACAF/USAFE ASAS/ENSCE Software Critical Design Review was completed at USAFE. The CDR for the portable workstation module was held in September 1986. The R1 software release IPR was successfully completed, as were Functional and Physical Configuration Audits (FCA/PCA).

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

(U) 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. Five PAWS supported the REFORGER 87 Exercise and the ULCHI FOCUS LENS Exercise in Korea. In November, 1987, the Joint Oversight Group (JOG) approved an acquisition strategy of LCC's to be fielded at Ft Hood, TX, in FY89.

b. (U) Significant Developments Since Last Report -- Design changes were implemented in the PAWS which incorporated user requirements and human factors improvements identified during field demonstrations and exercises. In February, Transportability, Environmental Health, and Operator/Organization Maintenance Safety Releases were granted for the PAWS design, an in May the PAWS completed its CECOM provisioning conference. Five PAWS were deployed to provide support to REFORGER 88 participants (V and VII Corps and 649th Engineering Battalion), and provided reliable collection operations for approximately 1500 hours. In June 1988, a Software Requirements Review (SRR) for R2/3 software was held at JPL. During 1988 components of the Intelligence Correlation Element (ICE) successfully underwent a Systems Integration Requirements Review (SIRR) and a System Verification Test (SVT). The PACAF/USAFE All-Source Subsystem (PUAS), a software module of ICE, SVT was held during July-October, followed by an SIRR on 7 October 1988.

(U) ASAS/ENSCE is expected to satisfy the mission requirement.

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

8. (U) Threshold Breaches: None.

9. (U) Schedule:

a. (U) Milestones --	Dev Estimate	Approved Program	Current Estimate
ASAS Acquisition Strategy	Nov82	N/A	Nov82
OSD/Congressional Approval of Acquisition Strategy	Feb83	N/A	Feb83
Implementing Contractor Award	Mar83	N/A	Mar83
Functional Capabilities Document Complete	Dec83	N/A	Dec83
Preliminary Design Review (Architecture)	Feb84	N/A	Feb84
Joint Oversight Group (ASARC Authority)	Mar84	N/A	Mar84

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

a. (U) Milestones --	Dev Estimate	Approved Program	Current Estimate
Request for Proposals	May84	N/A	May84
JTFP Letter of Instruction	Jul84	N/A	Jul84
Award Baseline System Contracts (Development)	Dec84	N/A	Dec84
Preliminary Design Review (Development)	Nov85	N/A	Nov85
ABB Testing	Aug85	N/A	Aug85
AIM/FSIC Testing (Field Trials)	Jul86	N/A	Jul86
IDP/CPI Testing	Nov87	N/A	N/A
Software Release 1	Nov87	N/A	Jan89
Software Release 2	Sep88	N/A	Dec90
Software Release 3	Nov88	N/A	Feb91

b. (U) Previous change Explanations --

Development and procurement of IDP & CPI modules deferred until Block Upgrade timeframe due to budget constraints as a result of Congressional and Army reductions.

SAR submission "As of 31 Dec 86" stated that software release dates would change upon approval of "Plan G". with software release dates as stated above.

c. (U) Current Change Explanations -- NONE

d. (U) References - Letter of Instruction for Joint Tactical Fusion Program (JTFP) Special Task Force (STF), 5 Jul 1984; Chief of Staff, Army Letter, 10 Nov 1982, Subj: All Source Analysis System (ASAS) Acquisition Strategy; Functional Capabilities Document (FCD), 7 Dec 1983.

(U) Development Estimate: January, 1987 FYDP.

(U) Approved Program: There is no approved DAE Baseline.

10. (U) Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
(b)(1)				

Milestone no longer valid; development and procurement of these modules deferred until Block Upgrade timeframe

c. (U) Current Change Explanations -- NONE

d. (U) References - Letter of Instruction for Joint Tactical Fusion Program (JTFP) Special Task Force (STF), 5 Jul 1984; Chief of Staff, Army Letter, 10 Nov 1982, Subj: All Source Analysis System (ASAS) Acquisition Strategy; Functional Capabilities Document (FCD), 7 Dec 1983.

(U) Approved Program: There is no approved DAE Baseline.

* NRT -- Near-Real-Time

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

a. (U) Cost	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	998.8	1237.3	1237.3
Procurement	771.0	572.8	572.8
Construction (MILCON)	0.0	0.0	0.0
Total FY 86 BY	1769.9	1810.1	1810.1
Escalation	240.0	272.8	272.8
Development (RDT&E)	(79.9)	(140.8)	(140.8)
Procurement	(160.1)	(132.0)	(132.0)
Construction (MILCON)	0.0	0.0	0.0
Total Then-Year Millions	2009.9	2082.9	2082.9

b. (U) Quantities -- TBD

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None.

e. (U) References --

(U) Development Estimate: January, 1987 FYDP.

(U) Approved Program: FY90/91 President's Budget.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions) (NOTE: 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 consist of two or more systems of different configurations; therefore, a unit of measure cannot be defined for the ASAS/ENSCE.)

		Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a.	Program Acquisition --	(Dec 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
	(1) Cost	2082.9	2084.0	2082.9
	(2) Quantity	TBD	TBD	TBD
	(3) Unit Cost	TBD	TBD	TBD
b.	Current Procurement --	(FY89)	(FY 1989 APPN)	(FY1990)
	(1) Cost			
	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	TBD	TBD	TBD
	(3) Unit Cost	TBD	TBD	TBD

13. (U) Cost Variance Analysis

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1078.7	931.2	0.0	2009.9
Previous Changes:				
Economic	+1.9	+ 10.5	0.0	+12.4
Quantity				
Schedule				
Engineering				
Estimating	+0.5	+61.2	0.0	+61.7
Other				
Support				
Subtotal	+2.4	+71.7	0.0	+74.1
Current Changes:				
Economic	-3.6	-3.4	0.0	-7.0
Quantity				
Schedule				
Engineering				
Estimating	+300.6	-294.7	0.0	+5.9
Other				
Support				
Subtotal	+297.0	-298.1	0.0	-1.1
Total Changes	+299.4	-226.4	0.0	+73.1
Current Estimate	1378.1	704.8	0.0	2082.9

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

a. (U) Summary -- FY86 Constant Dollars (Base Yr) in Millions.(Cont'd)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	998.8	771.1	0.0	1769.8
Previous Changes: Quantity Schedule Engineering Estimating Other Support	+0.2	+48.3	0.0	+48.5
Subtotal	+0.2	+48.3	0.0	+48.5
Current Changes: Quantity Schedule Engineering Estimating Other Support	+238.3	-246.6	0.0	-8.3
Subtotal	+238.3	-246.6	0.0	-8.3
Total Changes	+238.5	-198.3	0.0	+40.2
Current Estimate	1237.3	572.8	0.0	1810.1

b. (U) Previous Change Explanations --

RDT&E

Economic: Revised Feb 88 escalation rates.

Estimating: Revised program estimate Dollar amounts now reflect FY 89 Amended Budget submission.

Procurement

Economic: Revised Feb 88 escalation rates.

Estimating: Revised Program estimate Dollar amounts now reflect FY 89 Amended Budget Submission.

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

c. (U) Current Change Explanations --

(1) (U) RDT&E	(Dollars in Millions) Base Year	Then Year
Revised Jan 89 escalation rates. (Economic)	N/A	-3.6
Addition of 2 years in FYDP (FY93/94) (Estimating)	+238.4	+300.6
(2) (U) Procurement		
Revised Jan 89 escalation rates. (Economic)	N/A	-3.4
Reflects funding reductions as result of 7 Dec 87 Chief of Staff, Army meeting. (Estimating)	-246.6	-294.7

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

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

PAUC Initial SAR Est)	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC (Dev (Est)
TBD	0	0	0	0	0	0	0	0	

b. (U) Current Baseline Estimate to Current Estimate -- TBD

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

a. RDT&E -- The National Science Foundation has listed JPL as a Federally Funded Research and Development Center (FFRDC) under the cognizance of the National Aeronautics and Space Administration.	Initial Target	Contract Ceiling	Price Quantity
	TBD	TBD	TBD

JPL is the prime integrator for the ASAS/ENSCE system. JPL's role for the ASAS/ENSCE baseline system includes a significant number of project management functions normally attributed to a government program office such as technical integration and management functions associated with system development, to include architectural design, RFP completion, competitive contracting for prototypes (JPL would let major contracts during phase), acceptance testing, conduct of government reviews), and associated contract management of industrial contractors.

15. (U) Contract Information (Cont'd):

Although JPL is the prime integrator, JTF 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 engineering and technical assistance to the JTFPMO.

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 --

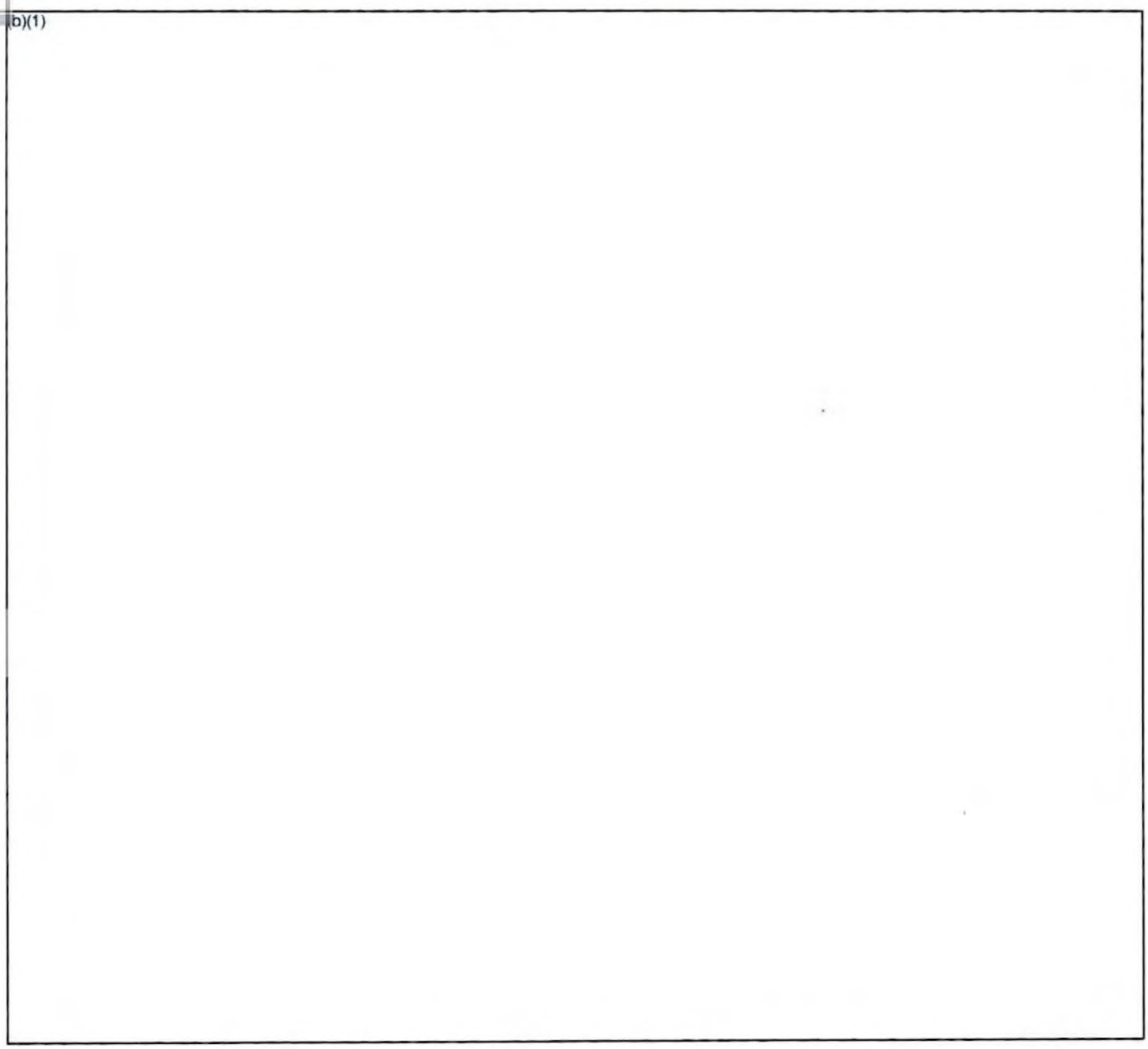
(1) Percent Program Completed: 58% (7 yrs/12 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 46%

(b)(1)

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

(b)(1)



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

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

(b)(1)

(b)(1)

A-20 MLRS-TGW

SAR-88-103

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: MLRS TGW
(RDT&E ONLY)

AS OF DATE: December 31, 1988

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1. (U) Designation/Nomenclature (Popular Name): Multiple Launch Rocket System Terminal Guidance Warhead (MLRS TGW)

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

3. (U) Responsible Office and Telephone Number:

MLRS Project Office
Program Management Division
Redstone Arsenal, AL 35898-5700

PM: COL William F. Hecker
Assigned: 21 September 1987
AUTOVON: 746-1195
Commercial: 205-876-1195

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

RDT&E: PE 63303 Project D216 (RDT&E - only SAR)
Procurement: TBD
MILCON: TBD

5. (U) Related Programs: Basic MLRS, XM447 fuze, Scatterable Mine Warhead, Battery Computer System, TACFIRE, Field Artillery Meteorological Data System, Bradley Fighting Vehicles, test set AN/MSM-105, Sense and Destroy Armor, Army Tactical Missile System.

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6. (U) Mission and Description:

(b)(1)

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, AT2 fuse, and fire control. A modified self propelled launcher loader being produced for the basic MLRS program will be able to fire the MLRS TGW rounds.

c. (U) Changes 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, will be responsible for integration of the TGW into the Basic MLRS. LTV Aerospace and MDTT will be associate prime contractors for development of the total MLRS TGW weapon system.

7. (U) Program Highlights (Continued):

(3) (U) On 23 October 1986, the Joint Steering Committee (JSC) approved the contractor's recommended configuration of three TGSMs. As a result of a 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.

(4) (U) In accordance with the FY87 DOD Authorization Act, SARs for pre-milestone II programs may reflect costs limited to the development program. Accordingly, the cost included in this report reflect the MLRS TGW development program only.

b. (U) Significant Developments Since Last Report --

(1) (U) Completed brassboard seeker captive flight tests. These tests were conducted in several European and U.S. locations during three climatic seasons. European clutter data included highly reflective snow conditions. The brassboard seeker was updated to include doppler beam sharpening capability. These tests included data collection activity against a variety of fixed and moving targets; passive and active countermeasures testing recommended by Vulnerability Assessment Laboratory (VAL); and both target acquisition and tracking tests. The data from these tests are being analyzed, preliminary results are encouraging.

(2) (U) All testing planned during CDS was completed to include demonstration of tandem warhead against the contract target, hardware-in-the-loop (HWIL), warhead dispensing dummy submunitions sledtest, and flight test of a rocket that dispensed dummy submunitions. There was also two programmable submunitions dropped from high speed aircraft; the first 100 percent successful and the second achieved all critical objectives before experiencing a malfunction.

(3) (U) MLRS TGW is expected to satisfy mission requirements.

c. (U) Changes Since "as of" Date -- The TGW Program Review for the ASARC Principals concluded on 6 January 1989. The Army will recommend to the Conventional Systems Committee (CSC) that TGW transition from CDS into the revised SDS phase. DCP, Jan 89.

8. (U) Threshold Breaches: There are currently no SCP (dated July 1984) breaches, or Secretary of Defense Memorandum (dated 14 November 1984) threshold breaches.

(b)(1)

9. (U) Schedule (Continued):

d. (U) References —

Planning Estimate: SCP for MLRS TGW, July 1984

Approved Program: No DAE Baseline has been approved for this program.

10. (U) Technical/Operational Characteristics:

	Planning Est	Approved Prog Goal/Threshold	Demo Perf	Current Est
(b)(1)				
Reliability				
Rocket 2/	.93	N/A	TBD	.93
TGSM 3/	.90	N/A	TBD	.90
Availability 4/	85	N/A	TBD	85
(b)(1)				

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/ (U) TGSM reliability is defined as the probability that a TGSM will complete preflight checks and when dispensed, will orient, stabilize and fly to the vicinity of the target (given target acquisition) and detonation given a target impact.

4/ (U) 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.

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

c. (U) Previous Change Explanations -- None

d. (U) Current Change Explanations -- Values based on Decision Coordinating Paper, Jan 89.

e. (U) References --

Planning Estimate: Decision Coordinating Paper (DCP), Jan 89

Approved Program: No DAE Baseline has been approved for this program.

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars) 1/

	Planning Estimate	Approved Program	Current Estimate
a. (U) Cost --			
Development (RDT&E) 2/	190.7	352.1	352.1
Procurement	TBD	TBD	TBD
Flyaway	(-)	(-)	(-)
Peculiar Support Equip	(-)	(-)	(-)
Other Weapon Sys Cost	(-)	(-)	(-)
Initial Spares	(-)	(-)	(-)
Construction (MILCON)	TBD	TBD	TBD
Total FY84 Base Year $	190.7	352.1	352.1
Escalation	20.5	76.5	76.5
Development (RDT&E)	(20.5)	(76.5)	(76.5)
Procurement			
Construction (MILCON)			
Total Then-Year $	211.2	428.6	428.6

b. (U) Quantities -- N/A

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References --

Planning Estimate: FY1985 President's Budget.

Approved Estimate: FY1990-91 President's Budget.

1/ The program acquisition cost shown reflects only the U.S. share of MLRS TGW.

2/ Total international development program cost is $927.2M (FY84 dollars).

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

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.

13. (U) Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	211.2	TBD	TBD	211.2
Previous Changes:				
Economic	-11.0			-11.0
Quantity				
Schedule	+22.3			+22.3
Engineering	+ 1.5			+ 1.5
Estimating	+90.6			+90.6
Other				
Support				
SUBTOTAL	+103.4	0.0	0.0	+103.4
Current Changes:				
Economic	- 1.3			- 1.3
Quantity				
Schedule	+95.6			+95.6
Engineering				
Estimating	+19.7			+19.7
Other				
Support				
SUBTOTAL	+114.0	0.0	0.0	+114.0
TOTAL CHANGES	+217.4	0.0	0.0	+217.4
Current Estimate	428.6	TBD	TBD	428.6

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

(FY 1984 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	190.7	TBD	TBD	190.7
Previous Changes:				
Quantity				
Schedule	+14.3			+14.3
Engineering	+ 1.3			+ 1.3
Estimating	+59.5			+59.5
Other				
Support				
SUBTOTAL	+ 75.1	0.0	0.0	+75.1
Current Changes:				
Quantity				
Schedule	+71.1			+71.1
Engineering				
Estimating	+15.2			+15.2
Other				
Support				
SUBTOTAL	+ 86.3	0.0	0.0	+ 86.3
TOTAL CHANGES	+161.4	0.0	0.0	+161.4
Current Estimate	352.1	TBD	TBD	352.1

b. (U) Previous Change Explanations --

RDT&E

Economic: Revised escalation indices through December 1987.

Schedule: 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.

Engineering: TGSM configuration change and revised threat.

Estimating: Refinement of costs resulting from ASARC/DSARC I decision and directed U.S. requirements. Adjustments in development program to offset 3-month schedule slip. Cost growth associated with IEU bubble storage memory.

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

Procurement - - N/A

MILCON - - N/A

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised December 1988 escalation rates (ECONOMIC)	N/A	-1.3
Cost growth associated with the CDS/SDS validation programs (ESTIMATING)	+15.2	+19.7
Schedule slip of the completion of the total TGW development effort. Originally scheduled for completion in early FY93. Currently planned completion is end of FY94 (SCHEDULE)	+71.1	+95.6

(2) Procurement - N/A

(3) MILCON - N/A

14. (U) Program Acquisition Unit Cost History: N/A

15. (U) Contract Information:

a. (U) RDT&E —

TGW Component Demonstration	Initial Contract Price Target	Ceiling	Qty
MDTT, Inc., Orlando, FL DAAH01-85-C-A004, CPIF Award: November 1984 Definitized: November 1984	$ 99.9	N/A	N/A

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$186.7	N/A	N/A	$ 200.1	$ 200.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -2.6	$ -7.2
Cumulative Variances To Date (10/31/88)	-11.0	-5.0
Net Change	$ -8.4	$ +2.2

Explanation of Change: Variances are due to design problems encountered in achieving required seeker technical performance and manufacturing difficulties experienced with prototype hardware that affected schedule completion of component development. The contracting PM's estimate is based on completion of CDS in February 1989 and reflects the Government's liability of $200M at a cost up to $217M in accordance with contract cost risk sharing arrangement.

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

a. (U) Program Status —

(1) (U) Percent Program Completed: 67% (10 years/15 years)
(2) (U) Percent Program Cost Appropriated: 39.7% ($170.0/$428.6)

b. (U) Appropriation Summary —

Appropriation	Prior Yrs (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-95)	TOTAL
RDT&E	170.0	47.2	47.2	164.2	428.6
TOTAL	170.0	47.2	47.2	164.2	428.6

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

c. (U) Annual Summary --

Fiscal Year	Qty	FY 84 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Program	Obligated	Expended	
	Rkt	Nonrec	Rec					
Appropriation: RDT&E								
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	15.4	15.4	3.8
1985				23.1	24.4	24.4	24.3	3.4
1986				25.0	27.1	27.1	26.2	2.8
1987				35.3	39.3	39.2	35.0	2.7
1988				20.4	23.6	23.5	16.3	3.1
1989				30.1	36.0	1.5	0.1	4.0
1990				38.2	47.2			3.6
1991				37.1	47.2			3.3
1992				46.8	61.1			2.8
1993				38.8	51.7			2.3
1994				37.9	51.4			1.8
Total				352.1	428.6	135.2	121.4	

17. (U) Production Rate Data: N/A

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules -- N/A

b. (U) Cost -- N/A

c. (U) Contractor Support -- N/A

A-17 LHX

SAR-88-106

UNCLASSIFIED

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
RDT&E - ONLY SAR

PROGRAM: LIGHT HELICOPTER PROGRAM (LHX)

AS OF DATE: December 31, 1988

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1. Designation and Nomenclature (Popular Name): Light Helicopter Program (LHX)

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 K. 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

MILCON: TBD

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DEPARTMENT OF DEFENSE

OASD(PA) DFOISR 88-T-6636

5. Related Programs: Air-to-Air Stinger Missile System; Anti-tank Missile system; Army Aviation Modernization Program including AH-64 and UH-60; Airborne Adverse Weather Weapon System.

6. Mission and Description: The LHX 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. LHX 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. LHX 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. LHX improvements include light weight 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. LHX will be integrated into the force structure to complement the heavy 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 LHX at the Army Aviation Systems Program Review in March 1982. Advanced development effort was initiated 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 Firm Fixed Price (FFP) Risk Reduction contracts to address those areas of the program determined as higher than medium risk. In December 1983, the LHX Justification for Major System New Start (JMSNS) was approved by the Office of the Secretary of Defense (OSD). On 19 July 1985, competitive FFP Full Scale Development (FSD) contracts were awarded for development of a 1200 shaft horsepower class, advanced technology engine, designated as the T800. On 19 August 1985, the LHX Letter of Agreement (LOA) was approved by the Department of the Army (DA). On 13 April 1987, the LHX Army System Acquisition Review Council (ASARC I) was conducted. On 23 April 1987, the LHX 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 (SDDM) was issued for the LHX program that supported the need for the Army to upgrade the aviation capabilities for the light attack role and authorized continuance of LHX 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.

7. Program Highlights (cont'd):

Both study teams recommended a new development conventional helicopter as the most cost and operationally effective airframe alternative for the LHX. On 16 May 1988, the LHX ASARC was conducted in preparation for Milestone I with the OSD Defense Acquisition Board. On 17 May 1988, the Conventional Systems Committee also approved the LHX program as presented in the ASARC and recommended go-ahead for DAB presentation. The DAB met on 9 June 1988, for the LHX Milestone Decision I Review and gave approval for LHX to proceed with the Demonstration/Validation (Dem/Val) phase of the program. An Acquisition Decision Memorandum (ADM) was signed by the Deputy Secretary of Defense (DEPSECDEF) on 17 June 1988, providing approval for LHX program baseline, with major emphasis on developing and integrating LHX Mission Equipment Package (MEP) technology. On 17 June 1988, the Defense Resource Board fully funded the LHX program as presented in the Army Aviation Modernization Plan (AAMP).

b. Significant Developments Since Last Report --

On 28 October 1988, the contractor team of LHTEC was announced the winner of the competitive T800 engine program. On 1 November 1988, contractor teams of Boeing/Sikorsky and McDonnell/Bell began competitive LHX Dem/Val effort under letter contracts. A proposal evaluation board is currently in session to definitize those contracts and will be completed by 28 February 1989. On 22 November 1988, a contract was successfully negotiated with the Joint Venture (the contractor team of Martin Marietta and Westinghouse) to study integration of Airborne Adverse Weather Weapon System (AAWWS) on the LHX.

The LHX system is expected to satisfy the mission requirement.

c. Changes Since "As of Date" -- N/A

8. Threshold Breaches: There are currently no Defense Aquisition Executive Baseline (DAE) (15 Jun 88), or System Concept Paper (SCP) (7 Apr 88), threshold 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 (Ch-1)
(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 (Ch-1)
Milestone IIIA (LRIP)	Jan 94	Nov 94	Nov 94

9. Schedule (cont'd):

	Planning Estimate	Approved Program	Current Estimate
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	Nov 96

b. Previous Change Explanations --

DAE approved program baseline dated 15 June 1988. Milestone I ADM, dated 17 June 88.

c. Current Changes Explanations --

(Ch-1) To align current estimate with approved program baseline.

d. References --

Planning Estimate: AMC Approved Acquisition Strategy (16 December 1985).

Approved Program: DAE approved program baseline on 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 Weight (PMGW) (lbs):	8,500	N/A/N/A	N/A	N/A
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'/95°F. at structural design gross weight	500	500/250	N/A	500
Cruise Speed at PMGW, 4,000'/ 95°F. (Max Continuous Power):				
(a) SCAT (knots):	170	N/A/N/A	N/A	N/A
(b) UTAS (knots):	160	N/A/N/A	N/A	N/A

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

	Planning Estimate	Approved Program Goal/ Threshold	Demon-strated Perf	Current Estimate
Dash Speed, knots 4,000'/95F	N/A	170/160	N/A	180
Single Engine Operation, Knots of CRP, 100FPM Rate of Climb	N/A	40/80	N/A	N/A
Crashworthiness (Vertical Impact Velocity, FPS)	N/A	38/30	N/A	38
EMI/EMP Protection (Volt/M)	N/A	200/100	N/A	N/A
Engine Size, Intermediate Rated Power at Sea Level Standard	N/A	1200/1140	N/A	1200
Reliability				
Mean Time Between Essential Maintenance Action (MTBEMA) (hours)	4.5	5.1/4.5	N/A	4.5
Mean Time Between Mission Affecting Failure (MTBMAF) (hours)	8.4	9.5/8.5	N/A	8.5
Operational Availability (Peacetime)	.86	N/A/N/A	N/A	.86
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
b. Operational --				
Payload (Primary Mission)				
SCAT (Expendable Ordnance)				
HELLFIRE Missiles:	4	N/A/N/A	N/A	N/A
Internal MSL Cap.	N/A	6/4	N/A	6
External MSL Cap.	N/A	4/2	N/A	4
STINGER Missiles:	2	N/A/N/A	N/A	4
Gun Ammo, rds.	TBD	500/300	N/A	500
UTAS (Ordnance/Troops)				
STINGER Missiles:	2	N/A/N/A	N/A	N/A
Troops:	6	N/A/N/A	N/A	N/A
Refuel/Rearm (No. Pers./ time, min)	N/A	3/15/4/30	N/A	N/A
Air Transportability in C-5 time to load/unload, hrs)	N/A	1.0/2.0	N/A	1.0
Air Transportability in C-141B (No. of Aircraft/Hours Load-Unload):				
SCAT	4/1.5	N/A/N/A	N/A	N/A
UTAS	3/1.5	N/A/N/A	N/A	N/A
Self-Deployable (NM):	1260	1260/1120	N/A	1260

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

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 Reliability, Availability, and Maintainability (RAM) data analysis.

PMGW weapon load increased from 4 to 6 missiles to reflect results of LHX Milestone I Cost and Operational Effectiveness Analyses (COEA).

In accordance with the DAE approved program baseline dated 15 June 1988, empty weight and gross weight is being tracked in lieu of SCAT PMGW.

d. Current Change Explanations -- N/A

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 on 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	2807.1	2807.1
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	2807.1	2807.1
Escalation	376.8	801.6	801.6
Development (RDT&E)	(376.8)	(801.6)	(801.6)
Procurement	(-0-)	(-0-)	(-0-)
Construction (MILCON)	(-0-)	(-0-)	(-0-)
Total Then-Year $	2133.0	3608.7	3608.7
b. Quantities -- (Development Prototypes)	N/A	6	6

c. Foreign Military Sales -- TBD

d. Nuclear Cost -- None

e. References --

Approved Program: FY 1990-91 President's Budget.

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	PROG	MILCON	TOTAL
Planning Estimate	2133.0	----	----	2133.0
Previous Changes:				
Economic	-17.0	----	----	-17.0
Quantity	----	----	----	----
Schedule	----	----	----	----
Engineering	----	----	----	----
Estimating	+1527.1	----	----	+1527.1
Other	----	----	----	----
Support	----	----	----	----
Subtotal	+1510.1	----	----	+1510.1
Current Changes:				
Economic	-11.4	----	----	-11.4
Quantity	----	----	----	----
Schedule	----	----	----	----
Engineering	----	----	----	----
Estimating	-23.0	----	----	-23.0
Other	-----	----	----	-----
Support	----	----	----	----
Subtotal	-34.4	----	----	-34.4
Total Changes:	+1475.7	----	----	+1475.7
Current Estimate:	+3608.7	----	----	+3608.7

(FY 1984 Constant (Base-Year) Dollars in Millions)

	RDTE	PROG	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	----	----	----	----
Other	----	----	----	----
Support	----	----	----	----
Subtotal	----	----	----	----
Total Changes	+1050.9	----	----	+1050.9
Current Estimate	+2807.1	----	----	+2807.1

13. Cost Variance Analysis (cont'd):

b. Previous Change Explanations --

RDT&E

Economic: Revised December 1986 rates

Revised February 1988 economic escalation rates

Estimating: Acquisition 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.

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Economic escalation rates, dated 22 December 1988 (Economic).	-0-	-11.4
Revised Annual funding amounts in FY90-91 President's Budget caused year to year differences having impacts in then year dollars but did not alter total program scope of work. (Estimating)	-0-	-23.0
	-0-	-34.4

(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

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 (Date of contract award)
Type: FFP with CPIF option

Initial Contract Price		
Target	Ceiling	Quantity
207.8 1/	TBD 2/	0 3/

Current Contract Price		
Target	Ceiling	Quantity
207.8 1/	TBD	0 3/

Estimated Price at Completion	
Contractor	Program Manager
207.8	207.8

Previous Cumulative Variances	Cost Variance	Schedule Variance
N/A	N/A	N/A

Air Vehicle

McDonnell Douglas Helicopter Co.
Bell Hellicopter Textron Inc./
McDonnell Aircraft Company
Mesa, AZ 85205-9797,
DAAJ09-89-C-A001
Award: October 28, 1988
Definitized: February 28, 1989
Type: CPFF

Initial Contract Price		
Target	Ceiling	Quantity
158.0	158.0	TBD 4/

Current Contract Price		
Target	Ceiling	Quantity
158.0	158.0	TBD 4/

Estimated Price at Completion	
Contractor	Program Manager
158.0	158.0

Previous Cumulative Variances	Cost Variance	Schedule Variance
N/A	N/A	N/A

Boeing Sikorsky
Joint Program Office
Philadelphia PA, 19142
DAAJ01-89-C-A002
Award: October 28, 1988
Definitized: February 28, 1989
Type: CPFF

Initial Contract Price		
Target	Ceiling	Quantity
158.0	158.0	TBD 4/

Contract Information (cont'd):

Current Target	Contract Ceiling	Price Quantity	Estimate Price at Completion Contractor	Program Manager
158.0	158.0	TBD 4/	158.0	158.0

Previous Cumulative Variances	Cost Variance	Schedule Variance
N/A	N/A	N/A

Footnotes:

1/ Target price to be renegotiated at exercise of options.

2/ Ceiling price to be negotiated for CPIF option.

3/ The engine contract with LHTEC contains an option for 32 engines which may be excercised at a later date.

4/ The winning team will deliver 6 aircraft prototypes.

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

a. Program Status --

(1) Percent Program Completed: 46.2% (6 yrs./13) (Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 17.9% (644.3/3608.7) (Funds Appropriated to Date in Millions/Total Program Funding in Millions)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs. (FY 84-89)	Budget Year (FY 90)	Budget Year (FY 91)	Balance Complete (FY 92-96)	Total
RDTE	623.5	292.4	499.6	2193.2	3608.7
PROC	-0-	-0-	-0-	TBD	TBD
MILCON	-0-	-0-	TBD	TBD	TBD
TOTAL	623.5	292.4	499.6	2193.2	3608.7

6. 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	132.4	2.7
1988				110.2	127.2	127.0	92.5	3.1
1989				150.0	179.4	95.1	1.1	4.0
1990				236.5	292.4			3.6
1991				392.3	499.6			3.3
1992				401.5	524.1			2.8
1993	2			418.1	557.1			2.3
1994	4			319.8	433.7			1.8
1995				301.4	416.2			1.8
1996				186.5	262.1			1.8
TOTAL	6			2807.1	3608.7	538.9	404.1	

17. Production Rate Data:

a. Annual Production Rates — N/A

b. Cost Variance - Dollars in Millions — N/A

c. Schedule Variance — N/A

d. Deliveries (Plan/Actual) —

	To Date
RDT&E	0/0
Procurement	0/0

18. Operating and Support Costs:

a. Assumptions and Ground Rules — N/A

b. Operating and Support Costs — N/A

c. Contractor Support Costs — N/A

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A-21 MSE

SAR-88-102

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

PROGRAM: Mobile Subscriber Equipment (MSE)

AS OF DATE: December 31, 1988

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1. Designation and Nomenclature (Popular Name):

Mobile Subscriber Equipment (MSE)

2. DoD Component: U. S. Army

3. Responsible Office and Telephone Number:

PM MSE
Ft. Monmouth, N. J. 07703-5210

Colonel John R. Power
Assigned: January 23, 1986
AV 995-2524; COMM (201) 544-2524

4. Program Elements/Procurement Line Items:

RDT&E: None
PROCUREMENT: APPN 2035 SSN BB 1610
MILCON: 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 Battle doctrine.

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6. Mission and Description (Cont'd): The MSE system will field the total force of an equivalent of 5 corps and 28 divisions. The major items 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 "backbone" 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 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 October 1976, 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 with actions necesry to obtain the MSE system in a HQ DA (DCSRDA) Message dated 6 Aug. 82. 1 Nov. 82, guidance was received from the Under Secretary 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.

b. Significant Developments Since Last Report -- 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.

The MSE system is expected to satisfy the mission requirement.

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

8. Threshold Breaches: There are no DAE Baseline breaches. The MSE program is documented in the MSE Operational/Capabilities Document (MSEOCD), 24 May 84.

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/IOC	May 88	May 88	May 88
User Follow-On Test & Eval (Start)	May 88	Aug 88	Aug 88(Ch 1)
User Follow-On Test & Eval (Completed)	Aug 88	Oct 88	Oct 88(Ch 1)
Contract Award Option Year 3	Sep 88	Dec 88	Dec 88(Ch 2)
First Delivered Unit Option Year 1	Sep 88	Dec 88	Dec 88(Ch 2)
Contract Award Option Year 4	Mar 89	Mar 89	Mar 89(Ch 2)
First Delivered Unit Option Year 2	Mar 89	Jun 89	Jun 89(Ch 2)
Field Verification of 90% GOS (Start)	N/A	Jan 90	Jan 90(Ch 2)
Field Verification of 90% GOS (Complete)	N/A	Feb 90	Feb 90(Ch 2)
Operational Evaluation of Call Completion	N/A	Mar 90	Mar 90(Ch 2)
Contract Award Option Year 5	Mar 90	Mar 90	Mar 90(Ch 2)
First Delivered Unit Option Year 3	Mar 90	Mar 90	Mar 90(Ch 2)
Contract Award Option Year 6	Mar 91	Mar 91	Mar 91(Ch 2)
First Delivered Unit Option Year 4	Aug 91	Aug 91	Aug 91(Ch 2)
First Delivered Unit Option Year 5	Sep 92	Sep 92	Sep 92(Ch 2)
First Delivered Unit Option Year 6	TBD	TBD	TBD (Ch 2)

b. Previous Change Explanations --Redefinition of milestone terms. First Unit Equipped/IOC date is May 88 the date that the system handoff took place.

c. Current Change Explanations -- (Ch 1) 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.

(Ch 2) Added milestones to reflect the milestones in the DAE approved Program Baseline.

d. References --

Production Estimate: MSE Operational Capabilities Document (MSEOCD) 24 May 84 and MSE Program Baseline document July 87.
Approved Program: DAE Program Baseline approved 16 Feb 88.

10. Technical/Operational Characteristics:

	Pdn Est	Approved Program Goal/Threshold 1/	Demonstrated 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 Temperature2/	-40°to120°F	-40°to120°F/ -35°to110°F	-40°to 120°F	-40°to 120°F
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 Temperature2/	-40°to120°F	-40°to120°F/ -35°to110°F	-40°to 120°F3/	-40°to 120°F
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 Temperature2/	-40°to120°F	-40°to120°F/ -35°to110°F	-40°to 120°F	-40°to 120°F
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 Temperature2/	-40°to120°F	-40°to120°F/ -35°to110°F	-40°to 120°F	-40°to 120°F
Mobile Subscriber Affiliation Capacity (Per Radio Access Unit)	N/A	50/40	50	50

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.

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

	Pdn Est	Approved Program Goal/Threshold	Demonstrated Perf	Cur Est
a. Technical (Cont'd) -- MSE Radio Equipment				
UHF				
Frequency				
Band I	225-400Mhz	225-400Mhz/ 225-400Mhz	225-400Mhz	225-400Mhz
Band III	1350-1850Mhz	1350-1850Mhz/ 1350-1850Mhz	1350-1850Mhz	1350-1850Mhz
Output Power				
Band I	10 watts	N/A/N/A	10 watts	10watts
Band III	5 watts	N/A/N/A	5watts1/	5watts
Data Rates	256,512,1024Kbps	N/A/N/A	256,512, 1024Kbps	256,512 1024Kbs
Operating Temperature2/	-40°to120°F	-40°to120°F/ -35°to110°F	-40° to 120°F	-40° to 120°F
VHF				
Frequency	30-88Mhz	30-88Mhz/ 30-88Mhz	30-88Mhz	30-88Mhz
Output Power	14-18 watts	N/A/N/A	14-88 watts	14-18watts
Data Rates	16Kbps	N/A/N/A	16Kbps	16Kbps
Operating Temperature	-40°to120°F	N/A/N/A	-40° to 120°F	-40° to 120°F
b. Operational --				
Set-up	30 Min	30 Min/45 Min	35 Min	30 Min
Tear Down (Ch 1)	30 Min	30 Min/45 Min	<45 Min	<45 Min
Max Vehicle Curb Weight (Ch 2)	8660 lbs	N/A/N/A	8800lbs	8800lbs
Max MSE Radio Operating Ranges				
VHF	15 Km	N/A/N/A	15 Km	15 Km
UHF	40 Km	N/A/N/A	40 Km	40 Km
Grade of Service (20% Off-Hook Factor)	N/A	90%/90%	3/	90%

c. Previous Change Explanations --

Max Vehicle Curb Weight was changed due to the installation of an airlift cross member & vehicle modificaton. Added the demonstrated performance data.

1/ Portion of initial quantity below 5 watts. The design fix is still being developed.
2/ Ambient Temperature External to the Assemblage.
3/ To be demonstrated in Mar 90.

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

d. Current Change Explanations --

(Ch 1) Separated Set-up and tear down into separate lines and added the actual demo performance.

(Ch 2) Max vehicle curb weight from 8600 to 8660 due to typo errors.

e. References --
Production Estimate: MSE System Specification, dated 8 July 1985.
Approved Program: DAE Program Baseline approved 16 Feb 88.

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	4,033.1	4,030.4
Subscriber Terminals	(157.4)	(143.7)	(144.5)
Mobile Subscriber Access	(548.2)	(463.5)	(463.5)
Wire Subscriber Access	(1,198.2)	(1,051.2)	(1,050.8)
Area Coverage	(1,587.4)	(1,411.2)	(1,410.2)
System Control Center	(116.4)	(104.0)	(104.0)
Initial Spare Parts	(160.4)	(137.3)	(137.3)
Warranty	(166.3)	(149.0)	(149.2)
Contractor Fielding	(166.3)	(150.2)	(144.5)
Other Weapon Sys. Cost	(327.9)	(423.0)	(426.4)
Construction (MILCON)	-	-	-
Total FY86 Base-Year $	$4,428.5	$4,033.1	$4,030.4
Escalation --	705.5	610.4	613.1
Development (RDT&E)	-	-	-
Procurement	(705.5)	(610.4)	(613.1)
Construction (MILCON)	-	-	-
TOTAL Then-Year $	$5,134.0	$4,643.5	$4,643.5
b. Quantities --			
Development (RDT&E)	-	-	-
Procurement	48	50	50
Total	48	50 1/	50

1/ The quantity of 50 units identified above represents twenty-eight division signal bns, twenty corps signal bns and two training sets for a total of $4.6435B. All user equipment located in the division/corps areas has been included in the total program acquisition cost.

11. Program Acquisition Cost (Cont'd)

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Production Estimate: MSE basic contract dated 19 Dec. 1985.

Approved Program: FY90-91 President's Budget.

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

	Current Est	UCR Baseline	UCR Baseline
a. Program Acquisition	(Dec 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	$4,643.5	$4,652.3	$4,643.5
(2) Quantity	50	50	50
(3) Unit Cost	92.9	93.0	92.9

	Current Year		Budget Year
b. Current Procurement--	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	991.1	991.1	984.7
Less CY Adv Proc	N/A	N/A	N/A
Plus PY Adv Proc	N/A	N/A	N/A
Net Total	991.1	991.1	984.7
(2) Quantity	12	12	11
(3) Unit Cost	82.6	82.6	89.5

13. 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	-	-26.8	-	-26.8
Quantity	-	+360.0	-	+360.0
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-814.9	-	-814.9
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-481.7	-	-481.7
Current Changes:	-	-	-	-
Economic	-	-10.5	-	-10.5
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	+1.7	-	+1.7
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-8.8	-	-8.8
Total Changes	-	-490.5	-	-490.5
Current Estimate	-	$4,643.5	-	$4,643.5

13. 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:				
Quantity	-	+293.4	-	+293.4
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-682.0	-	-682.0
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-388.6	-	-388.6
Current Changes:	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-9.5	-	-9.5
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-9.5	-	-9.5
Total Changes	-	-398.1	-	-398.1
Current Estimate	-	$4,030.4	-	$4,030.4

b. Previous Change Explanations --
Economic: revised escalation indices
Quantity: addition of 2 units in FY 91
Estimating: change due to revision of force structure requirements and a reprogramming action

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
Economic	N/A	-10.5
Reduction due to "Purchases Inflation" revision.		
Estimating	-9.5	+1.7
Reprogramming action	(+1.5)	(+1.7)
Revised 22 Dec 88 economic escalation rates.	(-11.0)	N/A

The changes to the constant dollars are due to the new inflation indices and a reprogramming action. Since the MSE Contract is a firm fixed forward priced contract, the then-year dollars remain fixed and the constant dollars change because of the new indices. The change to current dollars are due to "Purchases Inflation" revision and the reprogramming action.

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 (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
107.0	-0.8	3.5	--	--	-16.8	--	--	-14.1	92.9

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 \AB07-86-C-K022, FFP, ward: 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	$4,381.6	50	$4,381.6	$4,381.6

Requirements Contract (IKs Only)	Target	Ceiling	Qty
GTE Corp., Taunton, MA DAAB07-86-C-K023, FFP, (Delivery Order 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.

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

a. Program Status --

(1) Percent Program Completed: 71.4% (5 yrs/7 yrs)

(2) Percent Program Cost Appropriated: 71.4% ($3,313.2/$4,643.5)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY85-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete	Total
RDT&E	-	-	-	-	-
Procurement	$3,313.2	$984.7	$345.6	-	$4,643.5
MILCON	-	-	-	-	-
Total	$3,313.2	$984.7	$345.6	-	$4,643.5

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY86 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec 1/	Rec		Program	Obligated	Expended	
Appropriation: RDT&E - N/A								
Appropriation: Procurement								
1985	1		60.5	61.4	63.3	63.3	56.4	2.8
1986	1		301.6	313.6	335.3	335.3	222.1	2.7
1987	11		792.6	821.6	903.7	900.9	368.7	3.1
1988	12		864.3	895.3	1019.8	935.8	0.1	4.0
1989	12		810.6	843.4	991.1			3.6
1990	11		778.8	815.5	984.7			3.3
1991	2		267.7	279.6	345.6			2.8
Total	50		3876.1	4030.4	4643.5	2235.3	647.3	
Appropriation: MILCON - N/A								

1/ The MSE contract is a price contract. Nonrecurring costs are not separately identified.

17. 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 fpr costing military personnel services. For the non-standard 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 the OSAMM using reliability data furnished by the contractor and unit price data from CECOM. The non C-E equipment costs for vehicles, generators and trailers were 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.

8. Operating and Support Costs (Cont'd):

b. Costs -- (FY 86 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per MSE System 1/
Personnel	13.7
Replenishment Spares	1.0
Depot Maintenance	1.2
POL	0.2
TOTAL	16.1

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

	FY 89 2/ & Prior	FY 90 YEAR	FY 91 YEAR	Balance to Complete	TOTAL
O&M	15.2	24.6	33.4	0	73.2

1/ The Average Annual O&S cost per MSE system is based on a quantity of 50 units which represents twenty-eight 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 FY 88 and FY 89.

~~CONFIDENTIAL~~

SAR-88-044

1138 SSN-21

[redacted]

SELECTED ACQUISITION REPORT (RCS:DD-COMP(A&A)823)
PROGRAM: SSN 21 CLASS SUBMARINE

AS OF DATE: 31 December 1988

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1. [U] Designation/Nomenclature: High Speed Nuclear Attack Submarine/SSN 21 Class

2. [U] DoD Component: Department of the Navy

3. [U] Responsible Office and Telephone Number:
SSN 21 Program Office
PMS350
PM: RADM(Sel) M.S. Firebaugh
Assigned: January 1984
Telephone: (202) 692-7200/1

~~AS AMENDED~~
~~MAR 08 1989~~ 22
[redacted]

4. [U] Program Elements/Procurement Line Items:
RDT&E:
PE 0603570N, Project S1914 S6W Nuclear Propulsion Plant
PE 0604561N, Project S1946 SSN 21 Development *
PE 0604567N, Project S1803-007 Ship Contract Design

PROCUREMENT:
PE 0204281N, NEW-DESIGN SSN

MILCON: PE 0204896N; P424, P999
PE 0804731N; P398
PE 0204796N; P860, P863
PE 0702096N; P866
O&MN: N/A

* Consolidated 11 Projects.

[redacted]

[redacted]
[redacted]
[redacted]

5. [U] Principal 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. 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. The SSN 21 program was reviewed in 1984 by the Acquisition Review Board in October, and by SECNAV in December. In addition, a Logistics Review Group Audit was conducted in December 1984 and established certification that the SSN 21 ILS Plan was ready for entry into Full Scale Engineering Development. The preliminary design phase for the SSN 21 Class attack submarine was completed in May 1985, with the subsequent Department of Navy Preliminary Design Report approved in August. 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. A major developmental testing event occurred in October 1987 when the Large Scale Vehicle (1/4 scale submersible) was successfully transported from its construction site in San Antonio, Texas to its operational site in Idaho and launched in Lake Pend Oreille. Use of this vehicle for acoustic testing commenced in mid-1988. The Contract Design contracts with Tenneco-Newport News Shipbuilding and Drydock Subsidiary (NNS) and General Dynamics - Electric Boat Division (EB) were completed. A detail design contract with NNS as lead design yard was signed in April 1987.

b. 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 Submarine Survivability. DT-III is scheduled for FY94-95. OT-III (Operational Test-III) and OT-IV are scheduled for FY95/FY96. 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. This SAR reflects the approved program and is rebaselined to FY1988 constant dollars.

c. Changes Since As Of Date -- The lead ship of the class was awarded January 9, 1989 to Electric Boat Division of General Dynamics.

8. [U] Threshold Breaches: There are currently no UCP (dated 11 May 1988), ADM (ADM (dated 16 August 1988), or DAE Baseline (dated August 1988) threshold breaches.

9. [U] Schedule:

a. Milestones --

	Development Estimate	Approved Program	Current/ Production Estimate
Program Initiated	Jul 82	Jul 82	Jul 82
Milestone I (DSARC I)	Dec 83	Dec 83	Dec 83
Milestone II (DSARC II)	May 85	May 85	Jun 85
FSD Contract Award	Jun 85	Jun 85	Jul 85
Milestone IIB (JRMBI)	Oct 86	Oct 86	Oct 86
Milestone III	Jun 88	Jun 88	Jun 88
First Production Contract Award	Nov 88	Nov 88	Jan 89 (CH-1)
DAB Review	Mar 90	Mar 90	Mar 90
Delivery (First Ship)	Nov 94	Nov 94	May 95 (CH-2)
IOC (First Ship)	Nov 94	Nov 94	May 95 (CH-2)
First HY-130 Hull Ship	NA	FY94	FY94

b. Previous Changes Explanation --

DSARC II changed from May 85 to Jun 85. As a result, the FSD Contract Award was postponed from Jun 85 to Jul 85.

c. Development Estimate to Production Estimate Variances Explanation -- See previous changes in addition to below.

(CH-1) Contract Award estimate revised from Nov 88 to Jan 89 due to administrative delays.

(CH-2) Lead Ship Delivery date revised from Nov 94 to May 95 to enhance competition and reduce construction cost risk. This is less than a 180 day change.

d. References --

DEVELOPMENT ESTIMATE: DCP, "SEAWOLF (SSN 21) CLASS SUBMARINE", dated June 11, 1986.

PRODUCTION ESTIMATE: DCP, "SEAWOLF (SSN 21) CLASS SUBMARINE", dated May 11, 1988.

APPROVED PROGRAM: DCP, "SEAWOLF (SSN1) CLASS SUBMARINE", dated May 11, 1988; Milestone III Acquisition Decision Memorandum

(b)(1)

(b)(1)

(b)(1)

11. [U] Program Acquisition Cost

(Current Estimate in Millions of Dollars)

	Development Estimate	Approved Program	Current/Production Estimate
a. Cost --			
Development (RDT&E)	1724.6	2165.9	2165.9
Procurement (EC & OF/PD)	1425.0	12910.8	12910.8
Basic Ship Cost	(883.6)	(7091.3)	(7091.3)
GFE	(494.2)	(5222.0)	(5222.0)
Other	(2.8)	(97.3)	(97.3)
OF/PD	(44.4)	(500.2)	(500.2)
Construction (MILCON)	0	83.6	83.6
Total FY85 Base-Year $	3149.6	15160.3	15160.3
*Adj From FY85 to FY88$	226.6	869.2	869.2
Total FY88 Base Year	3376.2	16029.5	16029.5
Escalation	498.8	2853.8	2853.8
Development	(35.4)	(89.5)	(89.5)
Procurement	(463.4)	(2747.6)	(2747.6)
Construction (MILCON)	0	(16.7)	(16.7)
Total Then-Year $	3875.0	18883.3	18883.3**
b. Quantities --			
Development (RDT&E)	0	0	0
Procurement	1	12	12
Total	1	12	12

* Conversion factors 1.0885 for RDT&E and MILCON, 1.0519 for SCN apply.
** Due to a misapplication of inflation indices, the amounts budgeted for this program are overstated as follows:

FY89	FY90	FY91
+45.0M	+49.2M	+87.9M

Excludes advance procurement beyond FY 1994.

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c. Foreign Military Sales - None

d. Nuclear Costs -- Not Available

e. References --

PRODUCTION ESTIMATE/APPROVED PROGRAM: FY1990/91 President's Budget.

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

	Current Year		Budget Year
	Current Estimate (Dec 88 SAR)	UCR Baseline (Dec 87 SAR)	UCR Baseline (Dec 88 SAR)
a. Program Acquisition --			
(1) Cost	18883.3	9252.7	18883.3
(2) Quantity	12	5	12
(3) Unit Cost	1573.6	1850.5	1573.6
b. Current Procurement --	(FY1989)	(FY 1989 APPN)	(FY1990)
(1) Cost	1533.0	1533.0	866.0
Less CY Adv Proc	393.0	393.0	NA
Plus PY Adv Proc	632.6	632.6	NA
Net Total	1772.6	1772.6	NA
(2) Quantity	1	1	NA
(3) Unit Cost	1772.6	1772.6	NA

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13. [U] Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1912.6	1962.4	0.0	3875.0
Previous Changes:				
Economic	-44.8	-253.0	-	-297.8
Quantity	-	+5080.8	-	+5080.8
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+314.3	+42.7	-	+357.0
Other	-	-	-	-
Support (OF/PD)	-	+237.7	-	+237.7
Subtotal	269.5	5108.2	0.0	5377.7
Current Changes:				
Economic	+11.1	+3.8	-	+14.9
Quantity	-	+8670.0	-	+8670.0
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+253.9	+195.1	+107.7	+556.7
Other	-	-	-	-
Support (OF/PD)	-	+389.0	-	+389.0
Subtotal	265.0	9257.9	107.7	9630.6
Total Changes	534.5	14366.1	107.7	15008.3
Current/Prod. Estimate	2447.1	16328.5	107.7	18883.3

(FY1985 Constant (Base-Year) Dollars in Millions)
(Except as otherwise noted)

	RDT&E	PROC	MILCON	TOTAL
Develop. Estimate	1724.6	1425.0	0.0	3149.6
Previous Changes				
Quantity	-	+3935.4	-	+3935.4
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+237.8	+143.0	-	+380.8
Other	-	-	-	-
Support (OF/PD)	-	+165.4	-	+165.4
Subtotal	237.8	4243.8	-	4481.6
Current Changes:				
Quantity	-	6796.4	-	6796.4
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+203.5	157.8	+83.6	444.9
Other	-	-	-	-
Support (OF/PD)	-	287.8	-	287.8
Subtotal	203.5	7242.0	83.6	7529.1
Total Changes	441.3	11485.8	83.6	12010.7
Current/Production Est.	2165.9	12910.8	83.6	15160.3
Adjust from FY85 to FY88$	191.7	670.1	7.4	869.2
Current/Production Est (FY88$)	2357.6	13580.9	91.0	16029.5
Conversion Factors	1.0885	1.0519	1.0885	N/A

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b. Previous Change Explanation —

(1) RDT&E

Economic —
- Revised Jan 86,87 Economic Escalation Rates

Estimating —
- Congressional Adjustments
- Transfer of Arctic Warfare PE 63522-S1739 out of SSN21 Program
- Addition of FY91,92 RDT&E Requirements
- Revised Program Requirements

(2) Procurement

Economic —
- Revised Jan 86,87 Economic Escalation Rates

Quantity —
- Addition of 4 submarines

Estimating —
- Refinement of estimates to reflect Later Contract/ Pricing Data

Support —
- Additional Outfitting/Post Delivery for Quantity Add

c. Current Change Explanation —

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Jan 88 Economic Escalation Rates (Economic)	N/A	+11.1
Congressional Adjustments (Estimating)	-0.6	-0.6
Addition of FY1993/94 RDT&E Requirements for the SSN21 Program (Estimating)	+227.8	+295.9
Revised Program Requirements (Estimating)	-23.7	-41.4

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c. Current Change Explanation -- Continued

	(Dollars in Millions) Base-Year	Then-Year
(2) Procurement		
Revised Jan 88 Economic Escalation Rates (Economic)	N/A	3.8
Addition of 7 submarines (Quantity)	6796.4	8670.0
Refinement of Estimates to Reflect Later Contract/Pricing Data (Estimating)	11.3	13.0
Impact of Misapplication of Inflation (Estimating)	146.5	182.1
Additional Outfitting/Post Delivery for Quantity Add (Support)	287.8	389.0
(3) MILCON		
Added MILCON Appropriation to Estimate (Estimating)	83.6	107.7

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

a. Development Estimate to Production Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Prod Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
3875.0	-23.6	-2406.1	0	0	+76.1	0	+52.2	-2301.4	1573.6

b. Production Estimate to Update Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1573.6	0	0	0	0	0	0	0	0	1573.6

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

RDT&E

Improved Performance Machinery Program
General Dynamics/EB Division, 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			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
234.0	N/A	N/A	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.

Procurement

SSN 21 Propulsion Plant Design*
Westinghouse Electric Corporation, Pittsburgh, PA/General Electric Corporation, Schenectady, NY
N00024-79-C-4026, CPFF/N00024-79-C-4027, CPFF
Award: October 13, 1978
Definitized: October 13, 1978

Initial Contract Price		
Target	Ceiling	Qty
7.0	N/A	N/A

* Division of propulsion plant design contract work between Westinghouse and G.E. is determined annually by the Navy. For reporting purposes, the entire propulsion plant design effort is being treated as one contract. This is a combination of the two contracts versus only N00024-79-C-4026 reported on the previous SAR.

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
239.3	N/A	N/A	239.3	239.3

	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.

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

SSN 21 Nuclear Components
General Electric Corporation, Schenectady, NY
N00024-87-C-4001, CPFF
Award: November 7, 1986
Definitized: November 7, 1986

Initial Contract Price		
Target	Ceiling	Qty
88.0	N/A	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	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.

SSN 21 Nuclear Components
Westinghouse Electric Corp., 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			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
156.7	N/A	N/A	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.

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

SSN21 Detail Design
Newport News Shipbuilding
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			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
355.3	N/A	N/A	381.5	400.0

(Includes Option for $16.8M in LLTM)

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-2.2	-6.1
Cumulative Variances to Date*	-24.2	-12.0
Net Change**	-22.0	-5.9

* From latest Cost Performance Report covering period through Oct 1988.
** The change from previous report is incorporated into the Program Manager Estimate at completion.

SSN21 Engine Room Design and Components
Electric Boat Division of General Dynamics Corp., Groton, CT
N00024-87-C-4086, CPFF
Award: March 12, 1987
Definitized: March 12, 1987

Initial Contract Price		
Target	Ceiling	Qty
44.7	N/A	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
226.5	N/A	N/A	227.0	227.0

	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.

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

a. Program Status --

(1) Percent Program Completed: 37.5% (6/16)

(2) Percent Program Cost Appropriated: 19.6% (3696.8/18883.3)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY84-89)	Budget Year (FY90)	Budget Year (FY91)	To Complete	Total
RDT&E	1531.2	224.4	210.7	480.8	2447.1
Procurement	2165.6	866.0	3161.9	10135.0	16328.5
MILCON	-	-	22.8	84.9	107.7
Total	3696.8	1090.4	3395.4	10700.7	18883.3

c. Annual Summary --

Fiscal Year	Qty	FY88 Base-Year Dollars Nonrec	Rec	Total	Then-Year Dollars Total Program	Obligated	Expended	Escl Rate (%)
Appropriation: RDT&E								
1984	0		120.6	120.6	109.2	109.2	109.2	3.8
1985	0		279.0	279.0	261.5	261.5	258.2	3.4
1986	0		383.3	383.3	368.1	368.1	365.3	2.8
1987	0		307.7	307.7	304.3	304.3	285.2	2.7
1988	0		250.7	250.7	256.5	251.0	169.0	3.1
1989	0		218.1	218.1	231.6	110.4	0.2	4.0
1990	0		204.4	204.4	224.4	NA	NA	3.6
1991	0		186.3	186.3	210.7	NA	NA	3.3
1992	0		159.5	159.5	184.9	NA	NA	2.8
1993	0		130.5	130.5	154.4	NA	NA	2.3
1994	0		117.5	117.5	141.5	NA	NA	1.8
Subtotal	0		2357.6	2357.6	2447.1	1404.5	1187.1	NA

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Fiscal Year	Qty	FY88 Base-Year Dollars Nonrec	Rec	Total	Then-Year Dollars Total Program	Obligated	Expended	Escl Rate (%)
			Appropriation: Procurement					
1987	0	352.2	352.2	375.0	374.9	186.1		1.5
1988	0	234.4	234.4	257.6	256.6	34.3		2.6
1989	1	1355.4	1355.4	1533.0	661.7	0.0		4.0
1990	0	746.0	746.0	866.0	NA	NA		3.6
1991	2	2668.2	2668.2	3161.9	NA	NA		3.3
1992	3	2805.5	2805.5	3386.5	NA	NA		2.8
1993	3	2521.2	2521.2	3099.0	NA	NA		2.3
1994	3	2460.3	2460.3	3078.6	NA	NA		1.8
1995	0	128.7	128.7	163.9	NA	NA		1.8
1996	0	132.3	132.3	171.6	NA	NA		1.8
1997	0	100.0	100.0	132.0	NA	NA		1.8
1998	0	60.3	60.3	81.0	NA	NA		1.8
1999	0	15.9	15.9	21.7	NA	NA		1.8
2000	0	0.5	0.5	0.7	NA	NA		1.8
Subtotal	12	13580.9	13580.9	16328.5	1293.2	220.4		N/A
			Appropriation: MILCON					
1991	0	19.7	19.7	22.8	NA	NA		3.3
1992	0	56.7	56.7	67.0	NA	NA		2.8
1993	0	0.0	0.0	0.0	NA	NA		2.3
1994	0	14.6	14.6	17.9	NA	NA		1.8
Subtotal	0	91.0	91.0	107.7	0.0	0.0		N/A
Total	12	16029.5	16029.5	18883.3	2697.7	1407.5		N/A

17. Production Rate Data: N/A

18. a. - NA
    b. - NA
    c. - NA. The SEAWOLF Program has no O&M or Industrial Fund contractor support costs.

SAR-88-047

N-12 TAO FLEET OILER



UNCLASSIFIED

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: T-AO 187 CLASS FLEET OILER

AS OF DATE: December 31, 1988

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MAR 02 1989

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

PM: CAPT W. C. Pfister
Assigned: 10/30/84
Autovon: 222-3507
Commercial: (202) 692-3507

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

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WHS/DIOR(PA) DFOISR 89-T-0568

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: December 31, 1988

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 DCP# S0859 on 7 December 1981 followed by the production contract award in November 1982. Production started on the first ship in April 1984 with a delivery of December 1986. The first four ships (T-AO 187, 188, 189, and 190) of the initial contract have been delivered. The T-AO 193 delivered in August 1988.

b. Significant Developments since Last Report - The T-AO 198 contract was awarded to Avondale Shipyards in June 1988; the option for follow on ships (T-AO 200, 202, 204) was exercised on 10/06/88. Congress directed a buyout of the T-AO program in 1989 vice 1991.

c. Changes Since "As of" Date - N/A

8. **Decision Coordinating Paper (DCP) Threshold Breaches:** None. There are currently no DAE baseline breaches or NDCP (dtd 12/81) breaches.

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: December 31, 1988

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 for T-AO 188	N/A	Jan 83	Jan 83	
Exercised Option for 189/90	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	
T-AO 193 Awarded (Lead Source)	N/A	Jun 85	Jun 85	
Launch - 1st Ship	Aug 85	Oct 85	Oct 85	(Ch-1)
Exercised Option for 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 for 196/197	N/A	Feb 87	Feb 87	
Initial Operating Capability	Nov 86	N/A	Feb 87	
Last Delivery (T-AO 204)	Aug 93	Aug 93	Jan 94	(Ch-2)

b. **Previous Change Explanations - -**

Technical problems associated with main reduction gears and lack of required on-board repair parts.

c. **Current Change Explanations - -**

(Ch-1) Launch slipped 2 months due to reduction gear/on-board repair parts shortage.

(Ch-2) Due to the buyout of the T-AO program in 1989 vice 1991, delivery of the last T-AO has been moved up to January 1994 from March 1994.

d. **References - -**

Production Estimate: NDCP S0859 approved 7 December 1981.

Approved Program: DAE Baseline approved 17 February 1988.

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: December 31, 1988

10. **Technical/Operational Characteristics:**

	Product. Estimate	Approved Program Goals/ Thresholds	Demon-strated Perfor-mance	Current Estimate
a. **Technical - -**				
Length Overall	677' 5"	677' 5"	677' 8"	677' 8"
Beam Max.	97' 5"	97' 5"	97' 5"	97' 5"
Draft Navig.	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	80,000	80,000

c. **Previous Change Explanation - -** N/A

d. **Current Change Explanation - -** N/A

e. **References - -**

Production Estimate: NDCP S0859 approved 7 December 1981.

Approved Program: DAE Baseline approved 17 February 1988.

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: December 31, 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	2367.0
Total Sailaway	(2518.4)	(2299.5)	(2299.5)
Other Costs	-	-	-
Initial Spares	-	-	-
Total FY84 Base-Year $	2607.7	2382.3	2382.3
Escalation	583.0	287.6	287.6
Development (RDT&E)	(+ 0.4)	(- 0.6)	(- 0.6)
Procurement	(+582.6)	(+288.2)	(+288.2)
Total Then-Year $	3190.7	2669.9	2669.9
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: FY 90/91 President's Budget.

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

	Current Year		Budget Year
a. Program Acquisition	Current Est (DEC 1988 SAR)	UCR Baseline (DEC 1987 SAR)	UCR Baseline (DEC 1988 SAR)
(1) Cost	2669.9	2716.0	2669.9
(2) Quantity	18	18	18
(3) Unit Cost	148.3	150.9	148.3

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: December 31, 1988

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

b. Current Procurement	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	701.2	701.2	11.9
Less CY Adv Proc	-	-	-
Less PY Adv Proc	-	-	-
Net Total	701.2	701.2	11.9
(2) Quantity	5	5	-
(3) Unit Cost	140.2	140.2	N/A

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: December 31, 1988

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	-	-	-
Engineering	-	-	-
Estimating	- 1.4	- 497.1	- 498.5
Other	-	-	-
Support	-	-	-
SUBTOTAL	- 1.4	- 473.3	- 474.7
Current Changes:			
Economic	-	-	-
Quantity	-	-	-
Schedule	-	- 65.9	- 65.9
Engineering	-	-	-
Estimating	- 0.1	+ 54.4	+ 54.3
Other	-	-	-
Support	-	- 34.5	- 34.5
SUBTOTAL	- 0.1	- 46.0	- 46.1
TOTAL CHANGES	- 1.5	- 519.3	- 520.8
CURRENT ESTIMATE	14.7	2655.2	2669.9

13. **Cost Variance Analysis:** (Cont.)

(FY 1984 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	TOTAL
Production Estimate	15.8	2591.9	2607.7
Previous Changes:			
Quantity	-	+ 166.4	+ 166.4
Schedule	-	-	-
Engineering	-	-	-
Estimating	- 1.2	- 381.6	- 382.8
Other	-	-	-
Support	-	-	-
SUBTOTAL	- 1.2	- 215.2	- 216.4
Current Changes:			
Quantity	-	-	-
Schedule	-	- 13.9	- 13.9
Engineering	+ 0.7	-	+ 0.7
Estimating	-	+ 11.5	+ 11.5
Other	-	-	-
Support	-	- 7.3	- 7.3
SUBTOTAL	+ 0.7	- 9.7	- 9.0
TOTAL CHANGES	- 0.5	- 224.9	- 225.4
CURRENT ESTIMATE	15.3	+ 2367.0	+ 2382.3

b. Previous Change Explanation - -

(1) **RDT&E**
Estimating: twin Skeg alternative canceled; contract design requirements reduced accordingly.

(2) **PROCUREMENT**
Economic: revised inflation indices.
Quantity: one additional ship added to the program in FY91.
Estimating: repricing based on prior year shipbuilding experience.

(3) MILCON N/A N/A

13. **Cost Variance Analysis:** (Cont.)

c. **Current Change Explanation - -** (Dollars in Millions)

(1) **RDT&E**	**BASE-YEAR**	**THEN-YEAR**
Prior Year budget adjustment (Estimating)	-	- 0.1
Higher RDT&E effort costs. (Engineering)	+ 0.7	N/A
(2) **PROCUREMENT**		
Addition of 3 ships in FY-89 and deletion of FY-90/91 ships to reflect consolidation of program. (Schedule)	- 13.9	- 65.9
Decrease in Outfitting (OF) material and Post-delivery (PD) allowance. Also prior year asset recoupment. (Support)	- 7.3	- 34.5
Increase reflects FY-89 special appropriation line to cover overrun to FY-85 ships. (Estimating)	+ 11.5	+ 54.4
(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 Product. Estimate	Changes (Then Year Dollars in Millions)								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
187.7	-8.5	-0.6	-3.7	-	-24.7	-1.9	-	-39.4	148.3

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: December 31, 1988

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

Procurement

Note: N00024-83-C-2012 (T-AO 187 through 190) will no longer be reported as the ships have been delivered.

Pennsylvania Shipbuilding, Co.
Chester, PA N00024-85-C-2115 (FFP)
Award: May 6, 1985
Definitized: May 6, 1985
T-AO 191, 192

Initial Contract Price		
Target	Ceiling	Qty
222.5	262.9	2

Current Contract Price		
Target	Ceiling	Qty
331.4	331.4	2

Estimated Price At Completion	
Contractor	Program Manager
331.4	331.4

	Cost Variance	Schedule Variance
Previous Cumulative Variance	- 52.4	- 2.7
Cumulative Variance to Date	- 7.2	- 7.4
Net Change	+ 45.2	- 4.7

Explanation of Change: Penn Ship's unfavorable cost and schedule variances are due to higher than anticipated overhead costs and lower than expected production efficiency. The 31 DEC 87 cumulative variances reflected the status of four ships under construction; the variances to date reflect the two ships (T-AO 191 and 192) now under construction (see footnote below).

Note: Penn Shipyard and Avondale negotiated a transfer agreement for the FY 1986 and 87 ships (T-AO 194 and 196) on 6/15/88. The renegotiated contract for the remaining two ships was a Firm Fixed Price.

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

Avondale Shipyard, Inc.
New Orleans, LA N00024-85-C-2131 (FPI w/esc)
Award: June 28, 1985
Definitized: June 28, 1985
T-AO 193, 194, 195, 196, 197

Initial Contract Price		
Target	Ceiling	Qty
221.5	247.1	2

Current Contract Price		
Target	Ceiling	Qty
511.8	561.9	5

Estimated Price At Completion	
Contractor	Program Manager
511.3	511.3

	Cost Variance	Schedule Variance
Previous Cumulative Variance	- 1.0	- 1.1
Cumulative Variance to Date	- 2.1	- 17.7
Net Change	- 1.1	- 16.6

Explanation of Change: Avondale's unfavorable cost and schedule variances are due to higher than anticipated overhead costs and lower than expected production efficiency.

Note: The basic contract (for T-AO 193, 195, and 197) is a Fixed Price Incentive (FPI) contract with escalation. The Target Price increase reflects the additional two ships (T-AO 194 and 196) under a Firm Fixed Price (FFP) of $216.0M.

Avondale Shipyard, Inc.
New Orleans, LA N00024-88-C-2050 (FP with esc)
Award: June 28, 1988
Definitized: June 28, 1988
T-AO 198, 200, 202, 204

Initial Contract Price		
Target	Ceiling	Qty
97.6	97.6	1

Current Contract Price		
Target	Ceiling	Qty
390.4	390.4	4

Estimated Price At Completion	
Contractor	Program Manager
390.4	390.4

	Cost Variance	Schedule Variance
Previous Cumulative Variance	N/A	N/A
Cumulative Variance to Date	N/A	N/A
Net Change		

Explanation of Change: N/A

Note: Start of construction for T-AO 198 is scheduled for 3/06/89. Contract for T-AO 200, 202, and 204 awarded 10/06/88.

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: December 31, 1988

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

a. Program Status - -

(1) Percent Program Completed: 61.5% (8 Yrs/13 Yrs)

(2) Percent Program Cost Appropriated: 98.2% ($2621.6/$2669.9)

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

Appropriation	Current $ Prior Yrs. (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-94)	Total
RDT&E	14.7	-0-	-0-	-0-	14.7
Procurement	2606.9	11.9	7.5	28.9	2655.2
Total	2621.6	11.9	7.5	28.9	2669.9

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: December 31, 1988

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	Oblig-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	-	-	-	-	-	-	-	3.1
1989	-	-	-	-	-	-	-	4.0
1990	-	-	-	-	-	-	-	3.6
1991	-	-	-	-	-	-	-	3.3
1992	-	-	-	-	-	-	-	2.8
Subtotal	-	-	-	15.3	14.7	14.7	14.7	

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: December 31, 1988

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	Obligation	Expended	
Appropriation: Procurement								
1982	1	-	-	175.1	177.4	172.5	167.5	7.5
1983	1	-	-	137.4	141.4	138.6	133.9	3.8
1984	2	-	-	267.3	280.8	276.7	260.6	3.6
1985	3	-	-	456.5	489.6	422.4	396.2	2.1
1986	2	-	-	261.6	289.1	234.6	155.1	1.0
1987	2	-	-	231.5	264.7	234.2	97.1	1.5
1988	2	-	-	222.6	262.7	125.1	1.4	2.6
1989	5	-	-	577.4	701.2	595.6	-	4.0
1990	-	-	-	9.6	11.9	-	-	3.6
1991	-	-	-	5.9	7.5	-	-	3.3
1992	-	-	-	14.1	18.3	-	-	2.8
1993	-	-	-	7.3	9.6	-	-	2.3
1994	-	-	-	0.7	1.0	-	-	1.8
Subtotal	18	-	-	2367.0	2655.2	2199.7	1211.8	-
Total	18	-	-	2382.3	2669.9	2214.5	1226.6	-

17. **Production Rate Data:** N/A

18. **Operating and Support Cost:** N/A

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SAR-88-076

AF-28 SRAM II

AGM-131A, December 31, 1988

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

PROGRAM: SHORT RANGE ATTACK MISSILE (SRAM) II

As of Date: December 31, 1988

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1. (U) **Designation and Nomenclature (Popular Name):** AGM-131A/Short Range Attack Missile (SRAM) II.

CLEARED FOR OPEN PUBLICATION AS AMENDED FEB 13 1989 DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

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

~~Classified by: SRAM II SCG, 25 Mar 86~~

~~"[illegible] DATA" [illegible] Atomic Energy Act, 1954.~~

SAF/PAS

89-0036-T

#4

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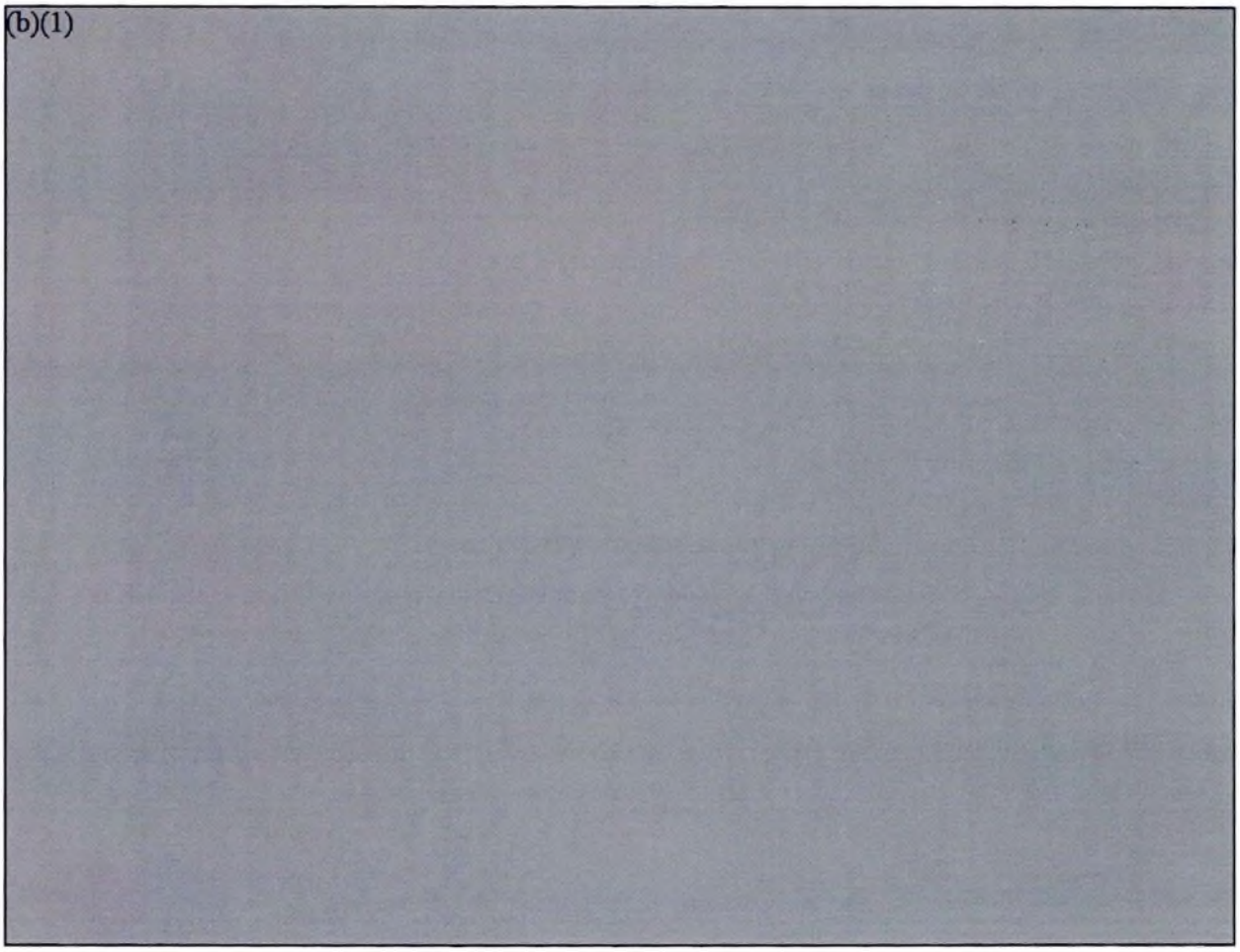
OASD(PA) DFOISR 89-T-0278

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 mobile targets. Primary carrier aircraft will be the B-1B and B-2. SRAM II will use existing propulsion, guidance and airframe technology to meet Strategic Air Command's (SAC) requirement in the shortest possible time. By taking advantage of existing technology, significant performance improvements are possible without introducing unacceptable technical risk. 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.

(b)(1)



(b)(1);(b)(3):42 USC §2168(a) (1)(C)--(FRD)

[redacted]

(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 versus 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.

b. (U) Significant Developments Since Last Report -- Major subsystem Preliminary Design Reviews (PDRs) are complete. The Critical Design Reviews (CDRs) are in progress for each subsystem with the total Air Vehicle CDR scheduled for mid 89. The decision was also made to continue the ADA operational flight software development and the ADA compiler was selected. 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 December 1988. The larger diameter reduces the potential number of missiles carried on the B-1B multi-purpose launcher from twelve to ten.

(U) A Milestone I decision in September 88 recommended that System Definition studies be conducted on a modified version of the SRAM II, designated SRAM T, to fulfill the Tactical Air Forces' requirement for a tactical air-to-surface missile. These study efforts were initiated in December 88 and are scheduled for completion in the fall of 89.

~~"FORMERLY RESTRICTED DATA"~~
~~[illegible] Atomic Energy Act, [illegible]~~

(U) The SRAM II system is expected to satisfy the mission requirement.

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

8. (U) **Threshold Breaches:** There are currently no DAE baseline breaches, no SCP (dated 1 February 1985) breaches, nor DCP breaches. The SCP was submitted to OSD on 9 July 1985. A "for coordination" draft Decision Coordinating Paper (DCP) (dated 2 June 1987) was submitted to OSD prior to the Milestone II DAB.

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 (Ch 1)	May 89
First Live Launch	Sep 90/ Sep 90 (Ch 1)	Sep 90
Milestone IIIA (DAB) Low Rate Production	Jul 91/ Jul 91	Jul 91
Milestone IIIB (DAB)	Oct 92/ Oct 92	Oct 92
IOC (50 missiles)	Apr 93/ Apr 93	Apr 93

b. (U) Previous Change Explanations --

None

c. (U) Current Change Explanations --

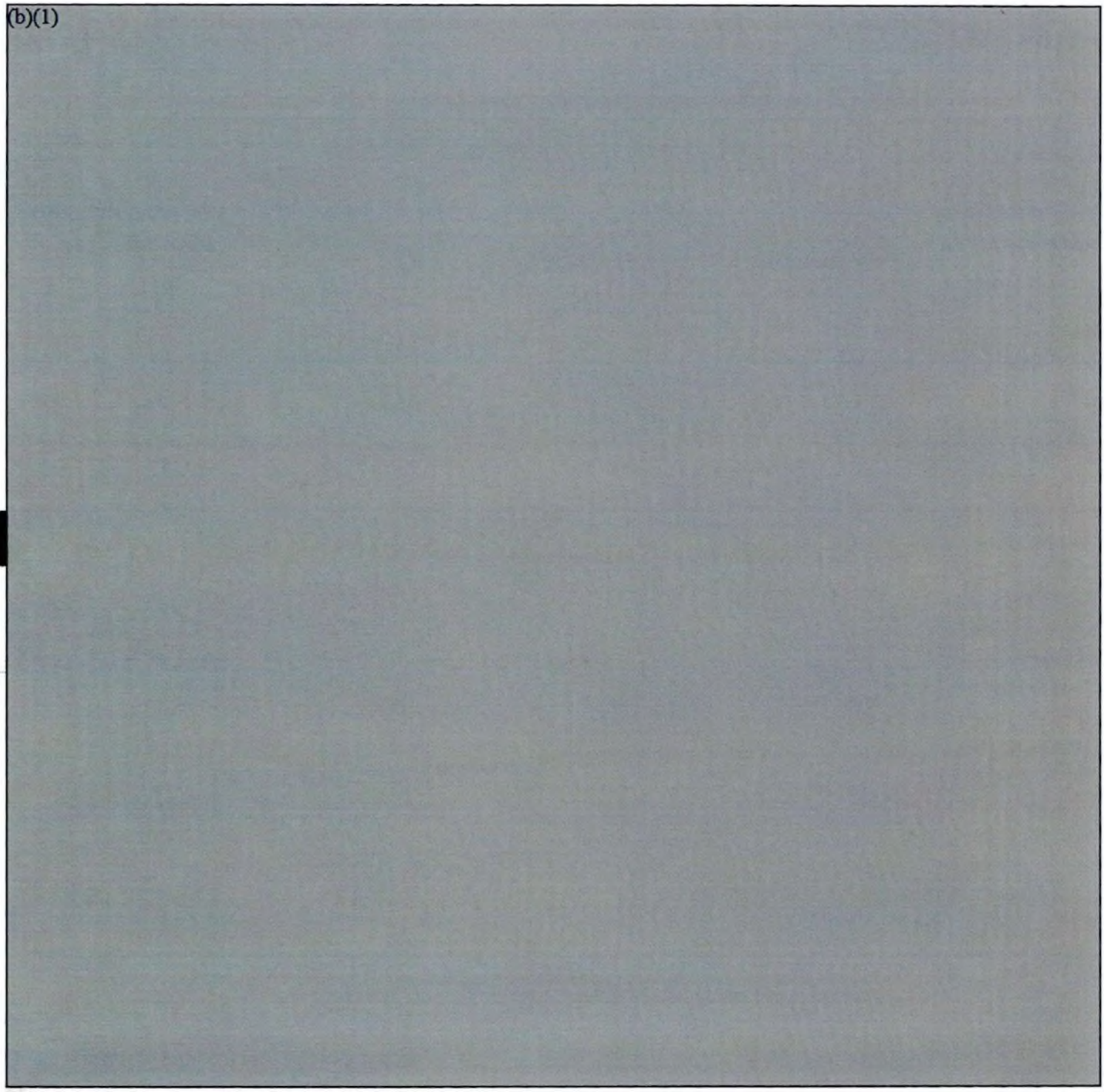
(Ch 1) Reflects approval of DAE Baseline, December 14, 1988.

d. (U) References --

Development Estimate: Acquisition Decision Memorandum, dated August 19, 1987.

Approved Program: DAE Baseline, December 14, 1988.

(b)(1)



(b)(1);(b)(3):42 USC §2168(a) (1)(C)--(FRD)

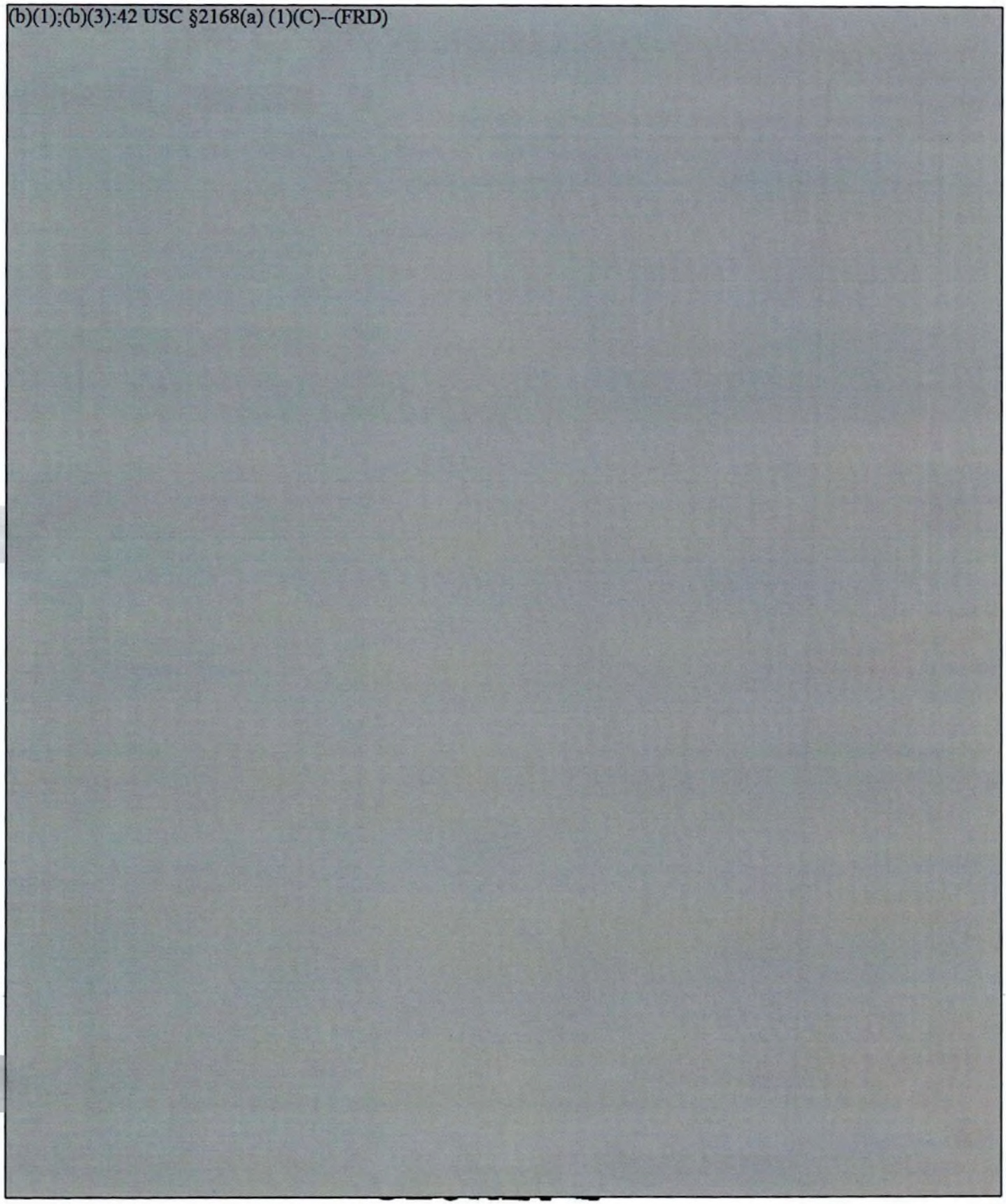
c.

d.

e.

"FORMERLY RESTRICTED DATA"
"Unauthorized Disclosure Subject to Administrative and Criminal Sanctions. Handle as Restricted Data in Foreign Dissemination Section 144.b, Atomic Energy Act, 1954."

(b)(1);(b)(3):42 USC §2168(a) (1)(C)--(FRD)



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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	2397.7	2393.4	2397.7
(2) Quantity	1633	1633	1633
(3) Unit Cost	1.468	1.466	1.468
b. Current Procurement --	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	N/A	N/A	10.8
Less CY Adv Proc	N/A	N/A	6.4
Plus PY Adv Proc	N/A	N/A	0
Net Total	N/A	N/A	4.4
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

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				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0	0	0	0
Current Changes				
Economic	+0.5	-16.2		-15.7
Quantity				
Schedule				
Engineering	+97.2	+66.7		+163.9
Estimating	-109.9			-109.9
Other				
Support		-34.0		-34.0
Subtotal	-12.2	+16.5	0	+4.3
Total Changes	-12.2	+16.5	0	+4.3
Current Estimate	1070.7	1327.0	0	2397.7

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 Estimating Other Support				
Subtotal	0	0	0	0
Current Changes Quantity Schedule Engineering Estimating Other Support	 +74.0 -90.9 	 +45.1 -22.5		 +119.1 -90.9 -22.5
Subtotal	-16.9	+22.6	0	+5.7
Total Changes	-16.9	+22.6	0	+5.7
Current Estimate	843.7	882.5	0	1726.2

13. (U) **Cost Variance Analysis -(Cont'd):**

b. Previous Change Explanations --

None.

c. Current Change Explanations--

	(Dollars in Millions) Base Year	Then Year
(1) RDT&E:		
Revised economic escalation indices. (Economic)	N/A	+0.5
Engineering Change to increase missile size. (Engineering)	+74.0	+97.2
Revised program office estimate based on B-1B integration contract negotiations. (Estimating)	-90.6	-109.5
Current and prior year inflation offset. (Estimating)	-0.3	-0.4
(2) PROCUREMENT		
Revised economic escalation indices. (Economic)	N/A	-16.2
Revised program office estimate for increased missile size. (Engineering)	+45.1	+66.7
Revised initial spares estimate. (Support)	+11.8	+17.9
Revised program office estimate to include projected savings on Tech Mod and reduced Electronic Test Set maintenance costs. (Support)	-34.3	-51.9

(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	-.010			+.100	-.067		-.021	+.002	1.468

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 *	$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
$286.6	$315.9	N/A	$315.9	$315.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-1.809	-2.433
Cumulative Variance To Date (10/31/88)*	-17.135	-6.566
Net Change	-15.326	-4.133

Explanation of Variance: The unfavorable cost variance results primarily from the propulsion subcontractor, Hercules Inc., due to difficulty in achieving the required mechanical properties for the solid-fueled rocket motor. In addition, the air vehicle computer required redesign when the selected VHSIC chip failed to have advertised capability. The unfavorable schedule variance reflects the additional time necessary to solve these problems.

Boeing Aerospace served Hercules with a contractual Cure Notice and has installed a Boeing manager at the Hercules' plant. Additionally, a Boeing Aerospace team has been activated to find ways to control and reduce program costs.

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: 42.9% (6 yrs/14 yrs)

(2) Percent Program Cost Appropriated: 18.8% ($451.0M/$2397.7M)

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

Appropriation	Current & Prior Yrs (FY84-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-97)	Total
RDT&E	451.0	217.0	212.8	189.9	1070.7
Procurement	0.0	10.8	83.2	1233.0	1327.0
MILCON	0.0	0.0	0.0	0.0	0.0
Total	451.0	227.8	296.0	1422.9	2397.7

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: RDT&E								
1984				6.0	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	29.0	2.8
1987				56.3	65.2	65.2	58.7	2.7
1988				116.5	140.0	138.9	51.4	3.1
1989				158.8	197.0	97.5	3.1	4.0
1990				168.5	217.0			3.6
1991				160.5	212.0			3.3
1992				129.5	175.9			2.8
1993				10.1	13.9			2.3
Sub-total				843.7	1070.7	349.6	160.5	

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				7.8	10.8			3.6
1991	25	2.0	41.6	58.4	83.2			3.3
1992	75		58.2	89.6	130.0			2.8
1993	300		159.2	176.9	261.4			2.3
1994	400		177.2	189.6	285.1			1.8
1995	400		169.0	185.2	283.6			1.8
1996	433		176.3	171.4	267.2			1.8
1997				3.6	5.7			1.8
Sub-total	1633	2.0	781.5	882.5	1327.0			
Total	1633	2.0	781.5	1726.2	2397.7			

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

a. Annualized Production Rates: (NOTE: The annual production rates shown differ from the annual funded quantities because the funded delivery period is 6 months for FY 1991, 11 months for FY 1992, and 12 months thereafter.)

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1991	42.9	N/A	50.0	N/A
1992	112.5	N/A	81.8	N/A
1993	300	N/A	300	N/A
1994	400	N/A	400	N/A
1995	400	N/A	400	N/A
1996	433	N/A	433	N/A

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$)	N/A	N/A	1726.2	N/A	N/A
(TY$)	N/A	N/A	2397.7	N/A	N/A
PAUC (BY83$)	N/A	N/A	1.057	N/A	N/A
(TY$)	N/A	N/A	1.468	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	7/91	N/A	N/A
Duration (in Months)	N/A	N/A	91	N/A	N/A
End Date (Mo/YR)	N/A	N/A	3/98	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 --

Estimate is based on steady state for the SRAM II system operating on the B-1B aircraft.

Personnel was based on the SAC Unit Manning Document (UMD), and includes all SRAM II base level personnel support costs.

Consumables costs are for expendables directly associated with base level maintenance.

Depot maintenance costs include manpower and materials for component repair, repair of Nuclear Test Instrumentation Kits (NTIKs), surveillance testing, and depot supply.

Sustaining Investment costs include replenishment spares, support equipment maintenance and software modification/maintenance.

Other direct cost includes Follow-On-Test-and-Evaluation flights and all transportation charges.

Indirect costs include acquisition and training of personnel.

b. Costs -- (FY 1983 Constant (Base-Year) Dollars in Millions)

Cost Element*	Avg Annual Cost Per AGM-131A Squadron (SRAM II)	Avg Annual Cost Per AGM-69A Squadron (SRAM A)
Personnel	3.483	3.483
O&S Consumables	0.031	0.031
Direct Depot Maintenance	0.136	0.234
Sustaining Investment	0.283	0.310
Other Direct Costs	0.074	0.079
Indirect Costs	0.194	0.194
Total	4.201	4.331**

* Last year total costs were reported instead of cost per squadron.

** SRAM A costs are based on an equivalent SRAM II wing.

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

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)	13.4	6.5	6.1	TBD	26.0
Industrial Fund	0.0	0.0	0.0	TBD	0.0
Total	13.4	6.5	6.1	TBD	26.0

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AF-21 MLS

SAR-88-089

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

PROGRAM: MICROWAVE LANDING SYSTEM (MLS)

AS OF DATE: 31 December 1988

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1. Designation and Nomenclature (Popular Name): Microwave Landing System (MLS)

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

Airborne Voice Communications Systems Directorate
Electronic Systems Division
Hanscom AFB, MA 01731-5000

PM: Col Roger A. Moseley
AV 478-4952
Comm (617) 377-4952
Assigned: 1 July 88

4. Program Elements/Procurement Line Items:

RDT&E: PE 35114F Project 2759 (Shared Funding)

PROCUREMENT: APPN 3010 ICN C13000 (Shared Funding)
APPN 3080 ICN 833010 (Shared Funding)

O&M: PE 35114F (Shared Funding)
PE 72207F (Shared Funding)

[redacted]

SAF/PAS

89-0036-T

#20

89-0221

Related Programs: None

6. Mission and Description:

a. Mobile Microwave Landing System (MMLS) (formerly Tactical MLS): The Mobile Microwave Landing System is a precision approach guidance system which will provide an off-airfield capability for operation in adverse weather and support initial deployment of ground forces, forward area supply, medical evacuation and special operating forces. The Mobile MLS ground system is common with the FAA Civil System and generates microwave guidance signals, identical to the FAA system enabling MLS equipped aircraft to continuously display aircraft position relative to a pre-selected courseline and glideslope during approach to a minimum guidance altitude (decision height). The MMLS will replace mobile Precision Approach Radars (PAR).

b. Fixed Base MLS (FBMLS): The Fixed Base Microwave Landing System will be identical to the FAA's civil system and is intended as a replacement for the present fixed base PARs and Instrument Landing System (ILS). The Air Force is consolidating tri-service FBMLS requirements and coordinating with the FAA for systems acquisition under the FAA's next MLS contract.

c. Commercial Microwave Landing Systems Avionics (CMLSA): The Commercial Microwave Landing System Avionics equipment will be modified and tested for integration and installation into cargo, tanker, trainer, bomber, and operational support aircraft. The CMLSA will interoperate with the Civil and Military Ground System.

d. Military Microwave Landing System Avionics (MMLSA): The military avionics [redacted]ll be developed for integration and installation on high performance and space constrained aircraft. MMLSA will have both MLS and ILS capability. The MMLSA will be the same form/fit as the AN/ARC-108 ILS receiver.

7. Program Highlights:

a. Significant Historical Developments:

(1) In January 1983, the Air Force was designated the lead service for DOD MLS activities. In July 1983, the North Atlantic Treaty Organization (NATO) nations agreed to transition from PAR to the MLS as the standard NATO military precision landing system at Main Operating Bases (MOBs).

(2) In November 1985 the results of a HQ USAF ROADMAP Study of all Traffic Control and Landing Systems (TRACALS) aids, increased the Tactical MLS weight requirement from 500 lbs to a max of 1000 lbs and deleted air droppability requirements. The name of the program changed from Tactical MLS to Mobile MLS to reflect the relaxed requirements.

(3) On 27 Nov 85 HQ USAF notified Congress of the restructured Mobile MLS program based on a system specification 85% common with FAA. Release of the request for proposals for the Mobile MLS was held pending further discussions with the Congressional Committees. On 22 May 1986, the FAA and USAF signed a Memorandum of Agreement (MOA) linking the acquisition schedules of the Mobile MLS and civil fixed MLS systems. The intent is to provide industry an opportunity to bid on one or both programs. If bidding on both programs, the contractor would demonstrate to the government the benefits from common designs or hardware. Since then, due to continued congressional hold on the FAA Fixed Based MLS RFP release, the USAF can no longer pursue a parallel procurement for Mobile MLS with the FAA procurement. Congress was notified and the Mobile RFP was released in Aug 1987.

(4) An overall MLS avionics architecture was briefed to OSD on 17 Dec 1986. A decision was made to continue with a Technology Demonstration of the High Reliability Military MLS Avionics design. FY88 President's Budget reinstated outyear funding for the restructured Mobile MLS and Commercial MLS Avionics.

(5) Commercial MLS Avionics development contract awarded in Oct 1987.

(6) Mobile MLS development contract awarded in August 1988.

b. Significant Developments Since Last Report:

(1) Military MLS Avionics Technical Demonstration was completed October 1988 with good results.

(2) FINAL MLS SAR, 31 DECEMBER 1988; MLS does not meet $1 billion FY80 procurement expenditure criteria.

(3) The Mobile MLS, Commercial MLS Avionics, Military MLS Avionics and Fixed Base MLS are expected to satisfy the mission requirements as directed.

c. Changes since 31 December 1988 -- None.

8. Threshold Breaches: N/A

9. Schedule:

a. Milestones --

	Planning Estimate/ Approved Program	Current Estimate
(1) MMLS		
Service Component Program Initiation	Jan 83/ N/A	Jan 83
System Operational Concept MAC TMLS	Sep 84/ N/A	Sep 84
System Operational Concept	Sep 85/ N/A	TBD

Schedule: (Cont'd)	Planning Estimate/ Approved Program	Current Estimate
MMLS Development Contract Award	Jun 86/N/A	Aug 88
MMLS IOT&E Completion	Sep 88/N/A	Feb 91
MMLS Production Contract Award	Oct 88/N/A	Mar 91
MMLS Initial Operational Capability	Sep 89/N/A	Jul 92
(2) FBMLS		
FBMLS Program Initiated	Jan 83/N/A	Jan 83
FBMLS Production Contract Award (FAA)	Jun 87/N/A	May 90
FBMLS First System Delivery (FSD)	Mar 90/N/A	Apr 92
(3) CMLSA		
CMLSA Contract Award	May 87/N/A	Oct 87
CMLSA DT&E/IOT&E Completion	Sep 88/N/A	Apr 90
CMLSA Production Decision	Dec 88/N/A	Jun 90
CMLSA Initial Operational Capability	Oct 90/N/A	Oct 91
(4) MMLSA -		
MMLSA FSD Contract Award	N/A/N/A	Aug 89 (Ch-1)
MMLSA DT&E, IOT&E (Complete)	N/A/N/A	Nov 92 (Ch-1)
MMLSA Production Decision	N/A/N/A	Dec 92 (Ch-1)
MMLSA IOC (1 Wing of F-16s)	N/A/N/A	Nov 94 (Ch-1)

b. Previous Change Explanations --

Milestones were clarified to reflect the change in direction from a Tactical MLS system to a Mobile MLS system. Fixed Base MLS milestones were added. As a result of HQ USAF hold on RFP release pending resolution of Congressional concerns and completion of the TRACALS Roadmap Study, the System Operational Concept milestone was changed from September 1985 to TBD, Mobile MLS Development Contract Award from June 1986 to December 1986, Mobile MLS Production Contract Award from October 1988 to June 1989, and Mobile MLS IOC from September 1989 to June 1990.

Delays were caused by change in acquisition strategy. Air Force and FAA have agreed to release RFPs and award contract simultaneously causing Mobile MLS Development Contract Award date to slip from December 1986 to June 1987. Subsequent milestones also slipped as follows: Mobile MLS IOT&E Completion from December 1988 to December 1989, Mobile MLS Production Contract Award from June 1989 to March 1990, and Mobile MLS IOC from June 1990 to September 1990.

FBMLS Production Contract Award (FAA) and FBMLS First System Delivery milestone dates were established (previously TBD).

Due to delay caused by Congressional hold on the FAA procurement RFP release and resulting FY88 USAF funding reduction, the Mobile MLS Development Contract Award changed from June 1987 to November 1987, Mobile MLS IOT&E Completion from December 1989 to March 1990, Mobile MLS Production Contract Award from March 1990 to May 1990 and Mobile IOC from September 1990 to May 1991. FBMLS Production Contract Award changed from June 1987 to November 1987 and FBMLS First System Delivery from March 1990 to August 1990.

Commercial MLS Avionics Milestones added.

Continued delays in USAF and FAA parallel procurement due to Congressional hold on the FAA Fixed-Base MLS RFP release, changed Mobile MLS Development Contract Award from Nov 87 to Jan 88, Mobile MLS IOT&E Completion from Mar 90 to May 90, Fixed-Base MLS Production Contract Award from Nov 87 to Oct 88 and Fixed Base MLS First System Delivery from Aug 90 to Aug 91. Due to continued FAA delays, USAF can no longer pursue a parallel procurement with the FAA and released the mobile RFP.

Commercial MLS Source Selection delays changed Commercial MLS Avionics Contract Award from May 87 to Oct 87, Commercial MLS Avionics DT&E/IOT&E Completion from Sep 88 to Aug 89 and Commercial MLS Avionics Production Decision from Dec 88 to Apr 89.

Due to continued delay caused by Congressional hold on the FAA procurement RFP release of the Fixed-Base MLS, FBMLS Production Contract Award changed from October 1988 to June 1989 and FBMLS First System Delivery from August 1991 to April 1992.

Delay due to processing a waiver to use a Fixed Price Incentive (Firm) contract type instead of Cost Plus Contract type as required by the FY88 DoD Appropriations Act. An additional slip in subsequent milestones is caused by a three-month increase in the development schedule. These changes delayed Mobile MLS Development Contract Award from Jan 88 to Aug 88, Mobile MLS IOT&E Completion from May 90 to Feb 91, Mobile MLS Production Contract from May 90 to Mar 91 and Mobile MLS IOC from May 91 to Jul 92.

The FAA current acquisition strategy (which changed due to FAA funding limitation) resulted in a delay of the Fixed-Base MLS Contract Award from Jun 89 to May 90.

Contractor redesign effort required to correct producibility and performance problems resulted in the delays of Commercial MLS Avionics IOT&E Completion from Aug 89 to Apr 90, Commercial MLS Production Decision from Apr 89 to Jun 90 and Commercial MLS IOC from Oct 90 to Oct 91.

c. Current Change Explanations --

(CH-1) Military MLS Avionics Milestones added.

d. References --

(1) Planning Estimate:

(a) Air Force Communications Command (AFCC) General Operating Requirement(GOR) 702-78, Advanced Military Landing System, 16 February 1978.

(b) USDRE Memo, 13 January 1983, Subject: Service Responsibility for Microwave Landing System Activities.

(c) Microwave Landing System (MLS) PMD 4030(1)/PE 35114F, 3 January 1984.

(d) MAC System Operational Concept (SOC), 10 September 1984.

(2) Approved Program: No DAE baseline has been established for this program.

Technical/Operational Characteristics:

	Planning Estimate	Apprvd Prgm Goal/Thresh	Demon Perf	Current Estimate
a. Technical --				
(1) MMLS				
Degrees of Azimuth Coverage	± 40	N/A	N/A	± 40
Degrees of Elevation Coverage	0.9 to 15	N/A	N/A	0.9 to 15
Range in Nautical Miles (Min)	15	N/A	N/A	15
Operating Temperature Range in degrees Fahrenheit	-60 to +120	N/A	N/A	-60 to +120
(2) FBMLS				
Degrees of Azimuth Coverage (to 20 NM)	± 40	N/A	N/A	± 40
Degrees of Elevation Coverage	0.9 to 15	N/A	N/A	0.9 to 15
Range in Nautical Miles	20	N/A	N/A	20
Operating Temperature Range in degrees Fahrenheit	-68 to +131	N/A	N/A	-68 to +131
(3) CMLSA				
Mean Time between Corrective Maintenance Action (Receiver Processor) in hours	5,000	N/A	N/A	5,000
System Mean Time between Critical Failures in hours	7,000	N/A	N/A	7,000
System Mean Time between Corrective Maint. Action in hours	2,000	N/A	N/A	2,000
(4) MMLSA -				
Mean Time Between Critical Failures In Hours	N/A	N/A	N/A	10,000 (CH-1)
Mean Time To Repair (Minutes)	N/A	N/A	N/A	30 (CH-1)

b. Operational --

(1) MMLS

	Planning Estimate	Apprvd Prgm Goal/Thresh	Demon Perf	Current Estimate
Percent Interoperable with International Civil Aviation Organization (ICAO) MLS Equipment	100	N/A	N/A	100
Number of selectable channels from 5031 MHz to 5090.7 MHz	200	N/A	N/A	200
Field Assembly personnel/ time (minutes) required	2/30	N/A	N/A	2/30

(2) FBMLS

Percent Interoperable with International Civil Aviation Organization (ICAO)	100	N/A	N/A	100
Number of selectable channels from 5031-5090.7 MHz	200	N/A	N/A	200

(3) CMLSA

Critical Failures per year	0.1	N/A	N/A	0.1

(4) MMLSA

Percent Interoperable with International Civil Organization (ICAO) MLS Equipment	N/A	N/A	N/A	100(CH-1)
Number of Selectable Channels from 5031 MHz to 5090.7 MHz	N/A	N/A	N/A	200(CH-1)
MLS/ILS Receiver Processor Interoperable with FBMLS, MMLS and present ILS Ground Stations	N/A	N/A	N/A	100(CH-1)

c. Previous Change Explanations -- FBMLS technical/operational characteristics were added. CMLSA technical/operational characteristics were added.

d. Current Change Explanations -- (CH-1) MMLSA technical/operational characteristics were added.

e. References --

(1) Planning Estimate :

(a) Air Force Communications Command (AFCC) General Operating Requirement(GOR) 702-78, Advanced Military Landing System, 16 February 1978.

(b) USDRE Memo, 13 January 1983, Subject: Service Responsibility for Microwave Landing System Activities.

(c) Microwave Landing System (MLS) PMD 4030(1)/PE 35114F, 3 January 1984.

(d) MAC System Operational Concept (SOC), 10 September 1984.

(2) Approved Program: No DAE baseline has been established for this program,

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

a. Cost --	Planning Estimate	Approved Program	Current Estimate
(1) Ground Systems			
Development (RDT&E)	29.9	28.0	28.0
Procurement	47.8	149.7	149.7
MMLS	(39.4)	(26.3)	(26.3)
FBMLS	-	(99.1)	(99.1)
Total Flyaway	(39.4)	(125.4)	(125.4)
Peculiar Support	-	-	-
Other Weapon/System Cost	-	-	-
Initial Spares	(8.4)	(24.4)	(24.4)
MMLS	(8.4)	(1.7)	(1.7)
FBMLS	-	(22.7)	(22.7)
Operations & Maintenance (O&M)		36.0	36.0
Total FY82 Base-Year $	77.7	213.7	213.7
Escalation	26.2	106.4	106.4
Development (RDT&E)	(7.4)	(7.6)	(7.6)
Procurement	(18.8)	(78.8)	(78.8)
Ops & Maint (O&M)	-	(20.0)	(20.0)
Total Then-Year $	103.9	320.1	320.1
(2) Avionics Systems			
Development (RDT&E)	4.7	66.9	66.9
Procurement	16.4	305.2	305.2
CMLSA	(15.2)	(102.6)	(102.6)
MMLSA	-	(179.4)	(179.4)
Total Flyaway	(15.2)	(282.0)	(282.0)
Peculiar Support	-	-	-
Other Weapon/System Cost	-	-	-
Initial Spares	(1.2)	(22.6)	(22.6)
CMLSA		(8.4)	(8.4)
MMLSA		(14.2)	(14.2)
Operations & Maintenance (O&M)	6.7	64.0	64.0
Total FY 82 Base-Year $	27.8	436.1	436.1
Escalation	12.3	271.6	271.6
Development (RDT&E)	(0.9)	(22.9)	(22.9)
Procurement	(9.1)	(212.7)	(212.7)
Ops & Maint (O&M)	(2.3)	(36.0)	(36.0)
Total Then-Year $	40.1	707.7	707.7

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

	Planning Estimate	Approved Program	Current Estimate
(3) MLS Summary			
Development	34.6	94.9	94.9
Procurement	64.2	454.9	454.9
MMLS	(39.4)	(26.3)	(26.3)
FBMLS	-	(99.1)	(99.1)
CMLSA	(15.2)	(102.6)	(102.6)
MMLSA	-	(179.4)	(179.4)
Total Flyaway	(54.6)	(407.4)	(407.4)
Peculiar Support	-	-	-
Other Weapon/System Cost	-	-	-
Initial Spares	(9.6)	(47.0)	(47.0)
MMLS	(8.4)	(1.7)	(1.7)
FBMLS	-	(22.7)	(22.7)
CMLSA	(1.2)	(8.4)	(8.4)
MMLSA		(14.2)	(14.2)
Operations & Maintenance (O&M)	6.7	100.0	100.0
Total FY82 Base Year	105.5	649.8	649.8
Escalation	38.5	378.0	378.0
Development (RDT&E)	(8.3)	(30.5)	(30.5)
Procurement	(27.9)	(291.5)	(291.5)
Ops & Maint (O&M)	(2.3)	(56.0)	(56.0)
Total Then-Year $	144.0	1,027.8	1,027.8

b. Quantities --

(1) Ground Systems			
Development (RDT&E)	2	6	6
Procurement	128	316	316
Total	130	322	322
(2) Avionics Systems			
Development (RDT&E)	0	30	30
Procurement	376	9795	9795
Total	376	9825	9825
(3) MLS Summary			
Development (RDT&E)	2	36	36
Procurement	504	10,111	10,111
Total	506	10,147	10,147

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

c. Foreign Military Sales -- N/A

d. Nuclear Costs -- N/A

e. References --

Planning Estimate: FY1987 President's Budget.

Approved Program: FY 1990/1991 President's Budget, 9 January 1989.

Program Acquisition/Current Procurement Unit Cost Summary:

(Current (Then-Year) Dollars in Millions)

	Current Est Dec 88 SAR	Current Year UCR Baseline Dec 87 SAR	Budget Year UCR Baseline Dec 88 SAR
a. Program Acquisition --			
(1) Ground Systems			
(a) Cost	320.1	302.4	320.1
(b) Quantity	322	340	322
(c) Unit Cost	0.994	0.889	0.994
(2) Avionics Systems			
(a) Cost	707.7	35.9	707.7
(b) Quantity	9825	376	9825
(c) Unit Cost	0.072	0.095	0.072
b. Current Procurement --	(FY 1989)	(FY 1989)*	(FY 1990)
	Current Est Dec 88 SAR	Current Year UCR Baseline Dec 87 SAR	Budget Year UCR Baseline Dec 88 SAR
(1) Ground Systems			
No procurement program in the current or budget year.			
(2) Avionics Systems			
(a) Cost	5.6	5.6	13.4
Less CY Adv Proc	0	0	0
Plus PY Adv Proc	0	0	0
Net Total	5.6	5.6	13.4
(b) Quantity	160	160	293
(c) Unit Cost	0.035	0.035	0.046

* Adjusted to reflect FY89 Appropriations Act in accordance with Congressional change to SAR law.

. Cost Variance Analysis:

a. Summary -- Ground System

(Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	O&M	TOTAL
Planning Estimate	37.3	66.6	0	103.9
Previous Changes:				
Economic	-0.6	-1.8	+0.5	-1.9
Quantity	-	+157.0	-	+157.0
Schedule	-	+12.6	-	+12.6
Engineering	-	-	-	-
Estimating	-9.6	-32.8	-	-42.4
Other	-	-	-	-
Support	-	+20.7	+52.5	+73.2
Subtotal	-10.2	+155.7	+53.0	+198.5
Current Changes:				
Economic	0.0	- 2.8	-0.9	- 3.7
Quantity	-	-12.2	-	-12.2
Schedule	+8.5	+5.4	-	+13.9
Engineering	-	-	-	-
Estimating	-	+9.6	-	+9.6
Other	-	-	-	-
Support	-	+6.2	+3.9	+10.1
Subtotal	+8.5	+6.2	+3.0	+17.7
Total Changes	-1.7	+161.9	+56.0	+216.2
Current Estimate	35.6	228.5	56.0	320.1

(FY 1982 Constant Dollars (Base-Year) in Millions)

	RDT&E	PROC	O&M	TOTAL
Planning Estimate	29.9	47.8	0	77.7
Previous Changes:				
Quantity	-	+109.7	-	+109.7
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-8.5	-21.0	-	-29.5
Other	-	-	-	-
Support	-	+13.0	+35.2	+48.2
Subtotal	-8.5	+101.7	+35.2	+128.4
Current Changes:				
Quantity	-	- 8.5	-	- 8.5
Schedule	+6.6	-	-	+6.6
Engineering	-	-	-	-
Estimating	-	+5.8	-	+5.8
Other	-	-	-	-
Support	-	+2.9	+0.8	+3.7
Subtotal	+6.6	+0.2	+0.8	+7.6
Total Changes	-1.9	+101.9	+36.0	+136.0
Current Estimate	28.0	149.7	36.0	213.7

13. Cost Variance Analysis (Cont'd):

a. Summary -- Avionics Systems

(Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	O&M	TOTAL
Planning Estimate	5.6	25.5	9.0	40.1
Previous Changes:				
Economic	-0.1	-2.3	-0.1	-2.5
Quantity	-	-	-	-
Schedule	-	+1.0	-	+1.0
Engineering	-	-	-	-
Estimating	+3.4	-6.9	-	-3.5
Other	-	-	-	-
Support	-	+0.3	+0.5	+0.8
Subtotal	+3.3	-7.9	+0.4	-4.2
Current Changes:				
Economic	0.0	-0.1	-0.1	-0.2
Quantity	-	+154.6	-	+154.6
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+80.9	+308.7	-	+389.6
Other	-	-	-	
Support	-	+37.1	+90.7	+127.8
Subtotal	+80.9	+500.3	+90.6	+671.8
Total Changes	+84.2	+492.4	+91.0	+667.6
Current Estimate	89.8	517.9	100.0	707.7

(FY 1982 Constant Dollars (Base-Year) in Millions)

	RDT&E	PROC	O&M	TOTAL
Planning Estimate	4.7	16.4	6.7	27.8
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+2.7	-4.9	-	-2.2
Other	-	-	-	-
Support	-	+0.2	+0.1	+0.3
Subtotal	+2.7	-4.7	+0.1	-1.9
Current Changes:				
Quantity	-	+92.6	-	+92.6
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+59.5	+179.5	-	+239.0
Other	-	-	-	-
Support	-	+21.4	+57.2	+78.5
Subtotal	+59.5	+293.5	+57.2	+410.2
Total Changes	+62.2	+288.8	+57.3	+408.3
Current Estimate	66.9	304.6	64.0	436.1

Cost Variance Analysis (Cont'd):

a. Summary -- MLS Summary

(Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	O&M	TOTAL
Planning Estimate	42.9	92.1	9.0	144.0
Previous Changes:				
Economic	-0.7	-4.1	+0.4	-4.4
Quantity	-	+157.0	-	+157.0
Schedule	-	+13.6	-	+13.6
Engineering	-	-	-	-
Estimating	-6.2	-39.7	-	-45.9
Other	-	-	-	-
Support	-	+21.0	+53.0	+74.0
Subtotal	-6.9	+147.8	+53.4	+194.3
Current Changes:				
Economic	0.0	- 2.8	-1.0	-3.9
Quantity	-	+142.4	-	+142.4
Schedule	+8.5	+5.4	-	+13.9
Engineering	-	-	-	-
Estimating	+80.9	+318.2	-	+399.2
Other	-	-	-	-
Support	-	+43.3	+94.6	+137.9
Subtotal	+89.4	+506.5	+93.6	+689.5
Total Changes	+82.5	+654.3	+147.0	+883.8
Current Estimate	125.4	746.4	156.0	1,027.8

(FY 82 Constant Dollars (Base-Year) in Millions)

	RDT&E	PROC	O&M	TOTAL
Planning Estimate	34.6	64.2	6.7	105.5
Previous Changes:				
Quantity	-	+109.7	-	+109.7
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-5.8	-25.9	-	-31.7
Other	-	-	-	-
Support	-	+13.2	+35.3	+48.5
Subtotal	-5.8	+97.0	+35.3	+126.5
Current Changes:				
Quantity	-	+84.1	-	+84.1
Schedule	+6.6	-	-	+6.6
Engineering	-	-	-	-
Estimating	+59.5	+185.3	-	+244.8
Other	-	-	-	-
Support	-	+24.3	+58.0	+82.3
Subtotal	+66.1	+293.7	+58.0	+417.8
Total Changes	+60.3	+390.7	+93.3	+544.3
Current Estimate	94.9	454.9	100.0	649.8

Cost Variance Analysis (Cont'd) :

b. Previous Change Explanations --

(1) Ground Systems

(a) RDT&E

ECONOMIC: Revised escalation indices.
ESTIMATING: OSD funding reduction and partial restoration based on further definition of development effort.
Refinement of prior year actual development cost.

(b) PROCUREMENT

ECONOMIC: Revised escalation indices.
QUANTITY: Addition of 256 FBMLS and reduction of 46 MMLS.
SCHEDULE: Compressed MMLS buy and congressional delay in FBMLS procurement.
ESTIMATING: Refinement of estimated costs of hardware.
SUPPORT: Additional spares for FBMLS. Refinement of estimated spares costs and delay in procurement of support.

(c) O&M

ECONOMIC: Revised escalation indices.
SUPPORT: Refinement of added installation costs of 256 FBMLS.
Refinement of estimated support costs.

(2) Commercial Avionics

(a) RDT&E

ECONOMIC: Revised escalation indices.
ESTIMATING: OSD funding reduction and restoration based on further definition of development effort.
Refinement of prior year actual development costs.

(b) PROCUREMENT

ECONOMIC: Revised escalation indices.
SCHEDULE: Rephasing of flyaway procurement.
ESTIMATING: Refinement of estimated costs of hardware.
SUPPORT: Delay in support procurement. Refinement in estimated support costs.

(c) O&M

ECONOMIC: Revised escalation indices.
SUPPORT: Increase and refinement of estimated installation costs.

Current Change Explanations --

Ground Systems (Dollars in Millions)

	Base-Year	Then-Year
1) RDT&E		
Revised DEC 1988 economic escalation rates (Economic)	N/A	0.0
Contract Award Slip (Schedule)	+6.6	+8.5
2) Procurement		
Revised DEC 1988 economic escalation rates (Economic)	N/A	-2.8
Reduction of 23 quantities (Quantity)	-8.5	-12.2
Contract award slip and realignment of quantities in years (Schedule)	N/A	+5.4
Estimating changes to reflect actual contract values (Estimating)	+5.8	+9.6
Spares adjustment to reflect change and mix of quantities (Support)	+2.9	+6.2
3) O&M		
Revised DEC 1988 economic escalation rates (Economic)	N/A	-0.9
Realignment of quantities in to later years (Support)	+0.8	+3.9

Current Change Explanations --

Avionics Systems (Dollars in Millions)

		Base-Year	Then-Year
1)	RDT&E		
	Revised DEC 1988 economic escalation rates (Economic)	N/A	0.0
	Addition of Military MLS Avionics Program (Estimating)	+59.5	+80.9
2)	Procurement		
	Revised DEC 1988 economic escalation rates. (Economic)	N/A	-0.1
	Military MLS Avionics Program added 7256 quantities. (Estimating)	+179.5	+309.2
	Commercial MLS Avionics quantities increased by 2163. (Quantity)	+92.6	+154.6
	Spares associated with increased quantities (Support)	+21.4	+37.1
3)	O&M		
	Revised DEC 1988 economics escalation rates (Economic)	N/A	-0.1
	A kit integration associated with added Military MLS Avionics Program. (Support)	+57.2	+90.7

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

Initial SAR/Planning Estimate to Current Estimate

(1) Ground Systems

PAUC (Initial SAR/ Planning Est)	Changes (Then Year Dollars in Millions)								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
0.799	-0.017	-0.027	+0.082	-	-0.102	+0.259	-	+0.195	0.994

(2) Avionics Systems

PAUC (Planning Estimate)	Changes (Then Year Dollars in Millions								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
0.107	-0.000	+2.612	+0.000	-	-3.460	+0.813	-	-0.035	0.072

15. Contract Information:

N/A

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

a. Program Status --

(1) Ground Systems

(a) Percent Program Completed: 37.5% (6 yrs/16 yrs)

(b) Percent Program Cost Appropriated: 8.9% ($28.4/$320.1)

(2) Commercial Avionics

(a) Percent Program Completed: 27.8% (5 yrs/18 yrs)

(b) Percent Program Cost Appropriated: 5.1% ($36.0/$707.7)

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

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY84-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-2002)	Total
(1) Ground Systems					
RDT&E	28.4	7.2	-	-	35.6
Procurement	-	-	21.0	207.5	228.5
O&M	-	-	-	56.0	56.0
Total	28.4	7.2	21.0	263.5	320.1
(2) Avionics Systems					
RDT&E	30.4	15.6	20.2	23.6	89.8
Procurement	5.6	13.4	13.1	485.8	517.9
O&M	-	2.2	2.4	95.4	100.0
Total	36.0	31.2	35.7	604.8	707.7
(3) Total Program					
RDT&E	58.8	22.8	20.2	23.6	125.4
Procurement	5.6	13.4	34.1	693.3	746.4
O&M	-	2.2	2.4	151.4	156.0
Total	64.4	38.4	56.7	868.3	1,027.8

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

c. Annual Summary -- Ground Systems: A\

Fiscal Year	Qty	FY82 Base-Year Dollars			Total Then-Year Dollars			Escl Rate (%)
		Flyaway		Total Base Year $	Program	Obligated	Expended	
		Nonrec	Rec					
Appropriation: RDT&E								
1984	-	-	-	0.7	0.8	0.8	0.8	3.8
1985	-	-	-	0.9	1.0	1.0	1.0	3.4
1986	-	-	-	2.0	2.3	2.3	2.0	2.8
1987	-	-	-	1.2	1.4	1.4	1.4	2.7
1988	-	-	-	10.3	13.0	10.4	1.0	3.1
1989	-	-	-	7.6	9.9	2.2	-	4.0
1990				5.3	7.2	-	-	3.6
Subtotal	6	-	-	28.0	35.6	18.1	6.2	-
Appropriation: Procurement								
1991	33	-	13.9	14.8	21.0	-	-	3.3
1992	34	-	17.3	18.1	26.3	-	-	2.8
1993	10	-	5.5	6.4	9.4	-	-	2.3
1994	23	-	8.7	10.8	16.2	-	-	1.8
1995	72	-	26.9	33.5	51.3	-	-	1.8
1996	72	-	26.5	33.0	51.5	-	-	1.8
1997	72	-	26.6	33.1	52.8	-	-	1.8
Subtotal	316	-	125.4	149.7	228.5	-	-	-
Appropriation: O&M								
1994	-	-	-	1.6	2.4	-	-	1.8
1995	-	-	-	2.3	3.5	-	-	1.8
1996	-	-	-	6.6	10.0	-	-	1.8
1997	-	-	-	10.1	15.7	-	-	1.8
1998	-	-	-	10.2	16.1	-	-	1.8
1999	-	-	-	5.2	8.3	-	-	1.8
Subtotal	-	-	-	36.0	56.0	-	-	-
Total	322	-	125.4	213.7	320.1	18.1	6.2	-

A\ Obligation and expenditure information is based on program office records as of 30 Dec 88.

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

c. Annual Summary (Cont'd) -- Avionics Systems: A\

Fiscal Year	Qty	FY82 Base-Year Dollars			Total Then-Year Dollars			Escl Rate (%)
		Flyaway		Total Base Year $	Program	Obligated	Expended	
		Nonrec	Rec					
Appropriation: RDT&E								
1985	-	-	-	4.4	5.0	5.0	5.0	3.4
1986	-	-	-	3.3	3.9	3.9	3.9	2.8
1987	-	-	-	5.0	6.1	6.1	2.3	2.7
1988	-	-	-	1.4	1.8	1.8	1.0	3.1
1989				10.4	13.6	2.2	-	4.0
1990				11.5	15.6	-	-	3.6
1991				14.5	20.2	-	-	3.3
1992				12.1	17.3	-	-	2.8
1993				2.5	3.6	-	-	2.3
1994				1.8	2.7	-	-	1.8
Subtotal	30	-	-	66.9	89.8	19.0	12.2	-
Appropriation: Procurement								
1989	160		3.6	3.8	5.6	-	-	4.0
1990	293		8.5	8.9	13.4	-	-	3.6
1991	231		7.9	8.5	13.1	-	-	3.3
1992	123		6.7	7.6	11.9	-	-	2.8
1993	248		15.6	17.9	28.7	-	-	2.3
1994	304		17.1	20.3	33.0	-	-	1.8
1995	889		43.9	47.2	78.2	-	-	1.8
1996	1015		43.2	46.4	78.2	-	-	1.8
1997	1405		34.5	37.0	63.5	-	-	1.8
1998	1568		35.3	37.8	66.1	-	-	1.8
1999	1407		28.1	30.1	53.5	-	-	1.8
2000	1063		20.4	21.6	39.1	-	-	1.8
2001	887		13.5	14.1	26.0	-	-	1.8
2002	202		3.7	4.0	7.6	-	-	1.8
Subtotal	9,795		282.0	305.2	517.9	-	-	-

A\ Obligation and expenditure information is based on program office records as of 30 Dec 88.

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

c. Annual Summary (Cont'd) -- Avionics Systems: A\

Fiscal Year	Qty	FY82 Base-Year Dollars			Total Then-Year Dollars			Escl Rate (%)
		Flyaway		Total Base Year $	Program	Obligated	Expended	
		Nonrec	Rec					
				Appropriation: O&M				
1990	-	-	-	1.6	2.2	-	-	3.6
1991	-	-	-	1.7	2.4	-	-	3.3
1992	-	-	-	1.3	1.8	-	-	2.8
1993				1.7	2.5	-	-	2.3
1994				3.5	5.2	-	-	1.8
1995				6.2	9.3	-	-	1.8
1996				7.7	11.7	-	-	1.8
1997				9.0	14.0	-	-	1.8
1998				9.9	15.7	-	-	1.8
1999				8.6	13.8	-	-	1.8
2000				6.3	10.4	-	-	1.8
2001				5.3	8.9	-	-	1.9
2002				1.2	2.1	-	-	
Subtotal	-	-	-	64.0	100.0	-	-	-
Total	9,825	-	282.0	436.1	707.7	19.0	12.2	-

A\ Obligation and expenditure information is based on program office records as of 30 Dec 88.

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

c. Annual Summary -- MLS Summary: A\

Fiscal Year	Qty	FY82 Base-Year Dollars			Total Then-Year Dollars			Escl Rate (%)
		Flyaway		Total Base Year $	Program	Obligated	Expended	
		Nonrec	Rec					
Appropriation: RDT&E								
1984	-	-	-	0.7	0.8	0.8	0.8	3.8
1985	-	-	-	5.3	6.0	6.0	6.0	3.4
1986	-	-	-	5.3	6.2	6.2	5.9	2.8
1987	-	-	-	6.2	7.5	7.5	3.7	2.7
1988	-	-	-	11.7	14.8	12.2	2.0	3.1
1989	-	-	-	18.0	23.5	4.4	-	4.0
1990				16.8	22.8	-	-	3.6
1991				14.5	20.2	-	-	3.3
1992				12.1	17.3	-	-	2.8
1993				2.5	3.6	-	-	2.3
1994				1.8	2.7	-	-	1.8
Subtotal	36	-	-	94.9	125.4	37.1	18.4	-
Appropriation: Procurement								
1989	160	-	3.6	3.9	5.6	-	-	4.0
1990	293	-	8.5	8.9	13.4	-	-	3.6
1991	264	-	21.8	23.3	34.1	-	-	3.3
1992	157	-	24.0	25.7	38.2	-	-	2.8
1993	258	-	21.1	24.3	38.1	-	-	2.3
1994	327	-	25.8	31.1	49.2	-	-	1.8
1995	961	-	70.8	80.7	129.5	-	-	1.8
1996	1,087	-	69.7	79.4	129.7	-	-	1.8
1997	1,477	-	61.1	70.1	116.3	-	-	1.8
1998	1,568	-	35.3	37.8	66.1	-	-	1.8
1999	1,407	-	28.1	30.0	53.5	-	-	1.8
2000	1,063	-	20.4	21.6	39.1	-	-	1.8
2001	887	-	13.5	14.1	26.0	-	-	1.8
2002	202	-	3.7	4.0	7.6	-	-	1.8
Subtotal	10,111	-	407.4	454.9	746.4	-	-	-

A\ Obligation and expenditure information is based on program office records as of 30 Dec 88.

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

c. Annual Summary -- MLS Summary: (Cont'd): A\

Fiscal Year	Qty	FY82 Base-Year Dollars			Total Then-Year Dollars			Escl Rate (%)
		Flyaway		Total Base Year $	Program	Obligated	Expended	
		Nonrec	Rec					
				Appropriation: O&M				
1990	-	-	-	1.6	2.2	-	-	3.6
1991	-	-	-	1.7	2.4	-	-	3.3
1992	-	-	-	1.3	1.8	-	-	2.8
1993	-	-	-	1.7	2.5	-	-	2.3
1994	-	-	-	5.1	7.6	-	-	1.8
1995	-	-	-	8.5	12.8	-	-	1.8
1996	-	-	-	14.3	21.7	-	-	1.8
1997	-	-	-	19.1	29.7	-	-	1.8
1998	-	-	-	20.1	31.8	-	-	1.8
1999	-	-	-	13.8	22.1	-	-	1.8
2000	-	-	-	6.3	10.4	-	-	1.8
2001	-	-	-	5.3	8.9	-	-	1.8
2002	-	-	-	1.2	2.1	-	-	1.8
ubtotal	-	-	-	100.0	156.0	-	-	-
Total	10,147	-	407.4	649.8	1,027.8	37.1	18.4	-

A\ Obligation and expenditure information is based on program office records as of 30 Dec 88.

Production Rate Data: N/A

18. Operating and Support Costs:

a. N/A
b. N/A
C. Contractor Support Costs - N/A

AF-3 ATF
(3)

SAR-88-062

(b)(1)

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: ADVANCED TACTICAL FIGHTER

AS OF DATE: December 31, 1988

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1. (U) Designation/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

Col J. Fain
Assigned: December 1, 1986
AV 785-4167; COMM (513) 255-4167

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

PDT&E: PE 0603230F
PE 0604239F
PE 0604227F BPAC 643143 (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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SAF/PAS
89-0036-T
#15

OASD(PA) DFOISR 89-T-0284

(b)(1)

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 mid-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 (JAFE) program awarded two contracts in Sept 83 to build demonstrator engines with new technologies required to support the ATF mission. 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 fabricate and demonstrate a ground-based prototype avionics integration 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 ground based demonstrator engines developed under the Joint Advanced Fighter Engine program by General Electric and Pratt and Whitney have run in the test stands. The Joint Integrated Avionics Working Group (JIAWG) had its kickoff meeting in Jan 87. A detailed plan has been laid out to define a complete Common Avionics Baseline by the dates needed for the FSD phases of the Air Force - ATF, Navy- ATA, and Army - LHX programs.

b. (U) Significant Developments Since Last Report -- Both the airframe and engine contractors have continued development of the prototype airframes and engines, the avionics ground and airborne prototypes, and the pursuit of risk reduction trade studies. Ground demonstrator engine testing is nearly complete and the first prototype engines are scheduled to begin testing in January. The Scientific Advisory Board reviewed the ATF avionics development effort and highlighted several areas where additional effort is required but endorsed the overall program approach. The JIAWG continued work on the specifications that will document the standards for common avionics modules for the ATF, A-12, and LHX. The Joint Program Managers Group and the associated Industry Advisory Council met together for the first time to review the commonality assessment and the Joint Integrated Avionics Plan (JIAP) revision. A requirement alternatives review was conducted which evaluated several alternative approaches to achieve the TAC requirements. This review confirmed that the weapon system being developed is the optimum mix between meeting the requirements of performance, availability, supportability, and affordability.

ATF as currently planned will satisfy its mission requirements.

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

8. (U) **Threshold Breaches** -- There are currently no DAE Baseline (dated Dec 1988) breaches.

9. (U) **Schedule:**

a. (U) 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	Oct 86
4. Dem/Val Contract Award	Oct 85/N/A	Oct 86
5. Milestone II (DAB II)	Dec 88/Nov 90	Dec 90 (Ch-1)
6. Milestone III (DAB III)	Dec 91/N/A	Dec 96 (Ch-1)
7. IOC*	Sep 95/N/A	Sep 97 (Ch-1)
8. System Requirements Review Complete	N/A /May 87	May 87 (Ch-2)
9. System Design Review (SDR)	N/A /Nov 89	Nov 89 (Ch-2)
10. Prototype First Flight	N/A /Dec 89	Dec 89 (Ch-2)

* IOC is defined as delivery of one combat-coded squadron, however, this Milestone is currently in the process of being redefined.

b. (U) Previous Change Explanations --

Milestones 9.a.3 and 4 changed due to the delay in obtaining the necessary 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 the Packard Commission recommendations, reduce the concurrency in the program, and be consistent with DAB Milestone II and III projections.

c. (U) Current Change Explanations --

(Ch-1) DAB Milestone II is changed from November 90 to December 90, DAB III from November 95 to December 96, and IOC from September 96 to September 97 to meet the budget realities in the FY90/91 President's Budget, and align with a new schedule that further reduces concurrency between FSD and Production. (Ch-2) Milestone added to reflect approved DAE baseline.

d. (U) References --

Planning Estimate: Advanced Tactical Fighter, Mission Element Need Statement, approved by Defense Resources Board Nov 23, 1981

Approved Program: DAE baseline dated December 1988.

(b)(1)

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	$ 10089.0	$ 10089.0
Procurement	--	--	--
Construction (MILCON)	--	--	--
Total FY 85 Base-Year $	11785.5	10089.0	10089.0
Escalation	3508.5	2530.7	2530.7
Development (RDT&E)	(3508.5)	(2530.7)	(2530.7)
Procurement	--	--	--
Construction (MILCON)	--	--	--
Total Then Year $	$ 15294.0	$ 12619.7	$ 12619.7
b. (U) Quantities --			
Development (RDT&E)	12	9	9
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: FY90-91 President's Budget

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	-616.2	--	--	-616.2
Quantity	-467.7	--	--	-467.7
Schedule	+407.1	--	--	+407.1
Engineering	0.0	--	--	0.0
Estimating	-2229.2	--	--	-2229.2
Other	0.0	--	--	0.0
Support	+282.0	--	--	+282.0
Subtotal	-2624.0	--	--	-2624.0
Current Changes				
Economic	-56.3	--	--	-56.3
Quantity		--	--	
Schedule	-29.4	--	--	-29.4
Engineering	-109.8	--	--	-109.8
Estimating	+144.2	--	--	+144.2
Other		--	--	
Support	+1.0	--	--	+1.0
Subtotal	-50.3	--	--	-50.3
Total Changes	-2674.3	--	--	-2674.3
Current Estimate	12619.7	--	--	12619.7

(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	0.0	--	--	0.0
Estimating	-1577.9	--	--	-1577.9
Other	0.0	--	--	0.0
Support	+218.6	--	--	+218.6
Subtotal	-1728.3	--	--	-1728.3
Current Changes				
Quantity		--	--	
Schedule	0.0	--	--	0.0
Engineering	-82.5	--	--	-82.5
Estimating	+114.3	--	--	+114.3
Other	0.0	--	--	0.0
Support		--	--	
Subtotal	+31.8	--	--	+31.8
Total Changes	-1696.5	--	--	-1696.5
Current Estimate	10089.0	--	--	10089.0

b. (U) 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 (JPMB I) decision delayed, revision of program estimate to reflect funding constraints.

Estimating: Adjustment for prior year escalation, updated estimating methodology, increased engine funding, congressional reductions, and addition of INEWS/ICNIA avionics effort including prototype modules.

Support: Simulator funding in 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)	--	-56.3
Adjustment of fiscal year funding profiles due to rephasing of development effort (Schedule)	--	-29.4
USAF realignment of electronic efforts:		
FY89 Congressional addition for integrated avionics.	+28.0	+32.5
Deletion of Seek Spartan funding. (Engineering)	-110.5	-142.3
Adjustment for current and prior years escalation change. (Estimating)	-1.3	-1.5
Reinstatement of previous engine reduction. (Estimating)	+24.8	+26.7
FY89 Congressional reduction resulted in reduction of test. (Estimating)	-15.2	-17.7
Increase in FSD estimate for higher level of testing during FSD. (Estimating)	+106.0	+136.7
Delay of simulator start to FY92. (Support)	--	+1.0

(2) (U) Procurement -- Not Applicable

(3) (U) MILCON -- Not Applicable

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

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
$ 373.4	N/A	6	$ 373.4	$ 373.4

* No CPR (FFP Contract)

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
$ 372.7	N/A	6	$ 372.7	$ 372.7

* No CPR (FFP Contract)

Airframe:

Lockheed Corporation, Burbank, CA
F33657-86-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
$ 691.0	N/A	N/A	$ 691.0	$ 691.0

* No CPR (FFP Contract)

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
$ 691.0	N/A	N/A	$ 691.0	$ 691.0

* No CPR (FFP contract)

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)

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

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

a. (U) Program Status --

(1) Percent Program Completed: 46.7 % (7 yrs / 15 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 15.2 % ($1912.3M / $12619.7M)
(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 (FY92-97)	Total
RDT&E	$ 1912.3	$ 1212.7	$ 1628.1	$ 7866.6	$ 12619.7
Procurement	$ --	$ --	$ --	$ --	$ --
MILCON	$ --	$ --	$ --	$ --	$ --
Total	$ 1912.3	$ 1212.7	$ 1628.1	$ 7866.6	$ 12619.7

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	151.4	2.8
1987	--	--	--	275.4	297.2	297.2	294.5	2.7
1988	--	--	--	450.3	504.4	503.8	489.1	3.1
1989	--	--	--	700.8	813.7	432.9	263.6	4.0
1990	--	--	--	1010.6	1212.7	--	--	3.6
1991	--	--	--	1318.3	1628.1	--	--	3.3
1992	--	--	--	1427.3	1805.5	--	--	2.8
1993	--	--	--	1931.1	2493.0	--	--	2.3
1994	--	--	--	1515.8	1991.8	--	--	1.8
1995	--	--	--	716.8	959.1	--	--	1.8
1996	--	--	--	401.7	547.1	--	--	1.8
1997	--	--	--	50.5	70.1	--	--	1.8
Total	9	--	--	10089.0	12619.7	1530.9	1343.5	

* Not Available.

** Reflects Program Office records as of 31 December 1988.

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17. (U) Production Rate Data:

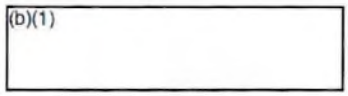
Not Applicable.

18. (U) Operating and Support Costs:

a. N/A

b. N/A

c. Contractor Support Costs - N/A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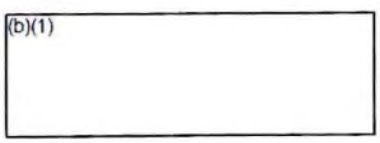
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SAR-88-069

AF-7 CIS

SECRET

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)
PROGRAM: (U) Mark XV Identification, Friend or Foe (IFF) System

"RDT&E ONLY SAR" AS OF DATE: December 31, 1988

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1. (U) Designation/Nomenclature: Mark XV Identification, Friend or 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:

Directorate of Combat Identification
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433-6503

Col Donald M. Bohler
Assigned: July 15, 1987
AV: 785-4523
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)

[redacted] CLEARED [redacted] FEB 10 1989 [redacted]

[redacted] Classified by: Mark XV SCG, 29 Oct 82 [redacted] Review On: OADR

SAF/PAS
89-0036-T
#17

OASD(PA) DFOISR 89-T-0272

SECRET

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 or Foe (IFF) system. It is required to realize the full potential of our beyond visual range weapons. 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 standardized 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.

b. (U) Significant Developments Since Last Report-

(1) (U) A Request for Proposal (RFP) was released soliciting offerors to perform 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 sucessfully conducted and Allied Bendix Corporation was selected for contract award by the Source Selection Authority, Mr. J.J. Welch, Jr. Contract award is expected to occur in Feb 1989.

(2) (U) A Defense Acquisition Board for milestone II (DAB II) was held in Dec 1988.

NOTE: This is a RDT&E only SAR. A Defense Acquisition Board for milestone II (DAB II) was held on 21 Dec 88. After receipt of an approved Acquisition Decision Memorandum (ADM) a full production transitional SAR will be submitted.

(3) (U) The Mark XV system is expected to satisfy the mission requirements.

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

8. (U) Threshold Breaches: There are currently no DAE Baseline breaches or SDDM (dated Aug 22, 1984) breaches.

9. (U) Schedule:

a. (U) Milestones --	Planning 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	Mar 88/Jan 89	Jan 89 Ch-1
FSD Contract Award	Jun 88/Feb 89	Feb 89 Ch-1
Critical Design Review	Jun 89/Dec 90	Dec 90 Ch-2
DAB IIIA	Sep 91/Jun 93	Jun 93 Ch-2
First Production Contract Award	Oct 91/Jul 93	Jul 93 Ch-2
DAB III B	Sep 92/Nov 94	Nov 94
IOC	Sep 94/Sep 94	Sep 94 *

Notes:

* Definition of IOC and dates for Tri-Service IOC are currently being reviewed. Upon completion of the review, a revised IOC will be included in a future SAR.

b. (U) Previous Change Explanations -

FSD Contract Award and subsequent milestones were delayed two years to accomodate funding cuts in FY86 President's Budget. Funding shortfalls were fully restored in the FY88 President's Budget, thereby allowing Approved Program milestones to be reinstated.

JRMB was changed to DAB. DAB II had been established as May 88 (From Mar 88) per Assistant Secretary of Defense Memorandum dated Mar 3, 1987. FSD Contract Award was delayed from Jun 1988 to Aug 1988 to allow for implementation of SDDM actions and contractual procedures. The DAB II date was delayed to Nov 1988 due to the Air Force decision to hold release of the Request for Proposal (RFP) for FSD to review the system requirement. DAB IIIA, First Production Contract Award, and DAB IIIB were delayed by nine months in order to complete and report results on the combined DT&E/IOT&E prior to the DAB IIIA. DAB IIIA changed from Sep 1991 to Jun 1992, First Production Contract Award changed from Oct 1991 to Jul 1992, & DAB IIIB changed from Sep 1992 to Jun 1993. Subsequent milestones are impacted by this delay. The time from FSD contract award to DAB IIIA was increased by twelve months due to a reassessment of the development schedule.

9. (U) Schedule (Cont'd): c. (U) Current Change Explanations

(CH-1) The DAB II was held in Dec 1988. Approval of DAB II is expected in Jan 1989, a change from Mar 1988. Subsequently, FSD contract award is changed from Jun 1988 to Feb 1989.

(CH-2) Based on the actual schedule identified by the winning FSD offeror, CDR is changed from May 1990 to Dec 1990. DAB IIIA is accelerated from Aug 1993 to Jun 1993 and first production award is accelerated from Sep 1993 to Jul 1993.

d. (U) References -

(1) (U) Planning Estimate: SDDM, August 22, 1984 (Unclassified), System Concept Paper (SCP) (draft) November 16, 1984 [redacted] PMD 4015(13)/63742F, April 5, 1985 (Unclassified) AFSC Form 56, 63742-85-122, August 28, 1985 (Unclassified)

(2) (U) Approved Program: DAE baseline dated February 1988.

(b)(1)

(b)(1)

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

Notes:

(1) (U) Standard Transponder and Fighter Interrogator.

(2) (U) F3PC to the maximum extent possible is a design goal.

(3) (U) Contractual, FSD phase at completion of FSD Reliability Qualification Test (RQT).

(4) (U) Fielded MTBF for airborne system based on 1000 hours achieved during RQT.

(5) (U) Friend rejection probability per ID attempt is defined as the probability , for any identification of a friendly target, that the system will declare that the target "no friend" given adequate S/J in jamming or S/N in a benign environment. This probability also assumes that all hardware is within minimum performance specification (avionics shop check all right).

(6) (U) Enemy acceptance probability per ID attempt for a random guesser is defined as the probability the system declares an enemy a friend when the enemy is randomly guessing the correct reply to each interrogation.

(7) (U) Exploitation probability per interrogation attempt by a random guesser is a measure of the ability of an enemy interrogator to randomly guess a correct interrogation on a single try resulting in the victim transponder replying.

(8) (U) Transponder will receive S(E) and X(J) band interrogations as well as L(D). All transponder reply transmissions will be in L(D) band.

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. Actual volumes being coordinated through Tri-Service Review.

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

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

e. (U) References -

Planning Estimate: Mark XV MROC, July 16, 1984 ~~(Secret)~~, SDDM, August 22, 1984 (Unclassified), and System Concept Paper (SCP) (draft), November 16, 1984 ~~(Secret)~~.
Approved Program: DAE baseline dated February 1988.

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

	Planning Estimate	Approved Baseline	Current Estimate
a. (U) Cost -			
Development (RDT&E)	$ 1200.6	$ 723.0	$ 723.0
Total FY82 Base Year $	1200.6	723.0	723.0
Escalation	471.5	250.9	250.9
Development (RDT&E)	(471.5)	(250.9)	(250.9)
Total Then Year $	1672.1	973.9	973.9
b. (U) Quantities --	N/A	N/A	N/A

c. (U) Foreign Military Sales -- N/A
d. (U) Nuclear Costs -- N/A

e. (U) References -
Planning Estimate: Mark XV MROC, 16 July 84 ~~(Secret)~~, SDDM, 22 August 84 (Unclassified), and System Concept Paper (SCP) (draft), 16 November 84 ~~(Secret)~~.
Approved Program: FY90/91 President's Budget

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

13. (U) Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	1672.1	N/A	N/A	1672.1
Previous Changes:				
Economic	-86.6			-86.6
Quantity	-			-
Schedule	+92.9			+92.9
Engineering	-			-
Estimating	-433.1			-433.1
Other	-			-
Support	+6.7			+6.7
Subtotal	-420.1			-420.1
Current Changes:				
Economic	-2.2			-2.2
Quantity	-			-
Schedule	-			-
Engineering	-			-
Estimating	-275.9			-275.9
Other	-			-
Support	-			-
Subtotal	-278.1			-278.1
Total Changes	-698.2			-698.2
Current Estimate	973.9			973.9

a. (U) Summary--(FY1982 Constant Dollars (Base Year) In Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	1200.6	N/A	N/A	1200.6
Previous Changes:				
Economic	-			-
Quantity	-			-
Schedule	-			-
Engineering	-			-
Estimating	-285.3			-285.3
Other	-			-
Support	+5.7			+5.7
Subtotal	-279.6			-279.6
Current Changes:				
Economic	-			-
Quantity	-			-
Schedule	-			-
Engineering	-			-
Estimating	-198.0			-198.0
Other	-			-
Support	-			-
Subtotal	-198.0			-198.0
Total Changes	-477.6			-477.6
Current Estimate	723.0			723.0

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

b. (U) Previous Change Explanations -

(U) RDT&E

Economic: Revised economic escalation indices.

Schedule: Schedule extended two years to FY95 to accommodate low funding amounts in FY86 PB; advanced to reflect increased funding in FY87 PB; delayed to reflect decreased funding in FY89 PB.

Estimating: Adjustment for current and prior year escalation change. Change from two independent FSD contractors to a single team. Requirement to fund prime contract to ceiling. Reprogramming of funds for combined F-16/Mark XV Interrogator/Transponder Compatibility Study. Reduction in Navy and Army effort in current and prior years.

Support: Additional NATO interoperability data.

(U) PROCUREMENT --
N/A

(U) MILCON --
N/A

c. (U) Current Change Explanations: (Dollars in Millions)

	Base-Year $	Then-Year $
(1) (U) RDT&E		
Revised Economic Escalation Indices. (Economic)	N/A	-2.2
Adjustment for current and prior year escalation changes. (Estimating)	-0.2	-0.2
Funding reductions in FY87 & FY88 resulting in reduced discretionary Dem/Val risk reduction effort. (Estimating)	-8.6	-10.8
Non-Core platform integration deleted from FSD program. (Estimating)	-189.2	-264.9

(2) (U) PROCUREMENT -- N/A

(3) (U) MILCON -- N/A

14. (U) Program Acquisition Unit Cost (PAUC) History:

(Millions of Then-Year Dollars) -- N/A

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

(U) a. RDT&E -- Currently no contracts over $40 Million.

(U) b. Procurement -- N/A

(U) c. MILCON -- N/A 16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status -

(1) Percent Program Completed: 62.5% (10 yrs/16 yrs)

(2) Percent Program Cost Appropriated: 27.4% ($266.5/$973.9)

b. (U) Appropriation Summary -

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-FY95)	Total
RDT&E	$ 266.5	$ 133.3	$ 161.4	$ 412.7	$ 973.9
TOTAL	$ 266.5	$ 133.3	$ 161.4	$ 412.7	$ 973.9

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

c. (U) Annual Summary --

Fiscal Year	Qty	Flyaway FY 82 Dollars Nonrec	Flyaway FY 82 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Obl	Exp	Escl Rate (%)
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	23.6	2.7
1988				23.6	29.8	28.5	13.8	3.1
1989				66.4	86.8	10.8	0.2	4.0
1990				98.6	133.3			3.6
1991				116.0	161.4			3.3
1992				94.3	134.4			2.8
1993				86.4	125.7			2.3
1994				65.2	96.5			1.8
1995				37.2	56.1			1.8
SUBTTL				723.0	973.9	188.2	160.2	-
TOTAL				723.0	973.9	188.2	160.2	
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	8.9	2.7
1988				16.5	20.8	18.7	9.2	3.1
1989				50.7	66.2	1.3	0.1	4.0
1990				80.2	108.4			3.6
1991				72.9	101.4			3.3
1992				47.3	67.4			2.8
1993				49.9	72.6			2.3
1994				32.9	48.7			1.8
1995				13.1	19.7			1.8
SUBTTL				422.9	570.3	85.1	73.5	-

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

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				1.2	1.5	1.4	0.3	3.1
1989				3.8	5.0	2.4	0.0	4.0
1990				3.7	5.0			3.6
1991				7.2	10.0			3.3
1992				11.9	17.0			2.8
1993				12.3	17.9			2.3
1994				10.1	14.9			1.8
1995				5.3	8.0			1.8
SUBTTL				89.1	116.0	40.5	35.9	-

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	10.3	2.7
1988				5.9	7.5	7.4	4.3	3.1
1989				11.9	15.6	7.1	0.1	4.0
1990				14.7	19.9			3.6
1991				35.9	50.0			3.3
1992				35.1	50.0			2.8
1993				24.2	35.2			2.3
1994				22.2	32.9			1.8
1995				18.8	28.4			1.8
SUBTTL				211.0	287.6	62.6	50.8	-

17. (U) Production Rate Data: - N/A

18. (U) Operating and Support Costs - N/A

a. N/A

b. N/A

c. Contractor Support Costs - N/A

AF-27 SMALL ICBM

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SAR-88-075

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

AS OF DATE: Dec 31, 1988

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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
Ballistic Missile Office
Norton AFB, Ca 94209-6468

Maj Gen Edward P. Barry, Jr.
Assigned: 4 September 1985
AV 876-6014; COMM (714) 382-6014

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

RDT&E: PE 64312F (Shared funding)

PROCUREMENT: APPN: 3020 PE 11219F

MILCON: PE 11219F

5.(U) Related Programs: Peacekeeper; Rail Garrison

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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 stages capable of delivering a single Mark 21 reentry vehicle 6000 nautical miles plus. The missile is deployed in a nuclear hardened mobile launcher. The Small ICBM is not programmed to replace an existing system.

7.(U) Program Highlights:

a. 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. The entire test program for pre-operational prototype hardware was successfully completed and the System Design Review was successfully accomplished in FY87 on the entire weapon system and its subsystems. However, in FY88 Congress constrained the Small ICBM appropriations to $700M and action to defer some FSD tasks was taken.

b. Significant Developments Since Last Report -- In January 1988, the initial deferral actions were completed and contract modifications were issued to Small ICBM contractors. In February 1988 however, agreement was reached between OSD and the Air Force to allocate the $700M in FY 1988 funds together with $200M in FY 1989 funds as projected in the President's FY89 budget to fund a combined two-year $900M program to 30 September 1989. This major restructure of the program was contractually implemented on 1 April 1988 per Air Force direction. The effect of this restructure was to significantly descope the planned basing development activities, and partially terminate missile development activities. This resulted in erosion of the program subcontractor/vendor base, whose restoration is the critical item pacing continuation of the program.

7. PROGRAM HIGHLIGHTS (cont'd)

The Small ICBM program has continued with cold-launch demonstrations, full-scale development stage firings and integration testing in preparation for two flight tests to be conducted in FY 1989. The full-scale development configuration of the HML has been completed, and mobility testing is underway. After completion of the two test flights and HML mobility testing, the Small ICBM program is scheduled to terminate on 30 Sep 1989. The Small ICBM is expected to satisfy mission requirement.

c. Changes Since "As Of" Date: None

8. (U) Threshold Breaches: There are currently no DCP (dated 1 November 1986) threshold breaches.

(b)(1)

(b)(1)

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

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	9776.6	2843.4	2843.4
Procurement	22207.2	0	0
Missile Flyaway	(9044.4)	0	0
Other Weapon System	(7121.4)	0	0
Support	(4191.0)	0	0
Initial Spares	(1850.4)	0	0
Construction (MILCON)	1727.2	0	0
Total FY84 Base-Year	$33711.0	2843.4	2843.4
Escalation	11016.9	294.7	294.7
Development (RDT&E)	(1873.2)	(294.7)	(294.7)
Procurement	(8470.3)	0	0
Construction (MILCON)	(673.4)	0	0
Total Then-Year$	$44727.9	3138.1	3138.1
b. Quantities --			
Development (RDT&E)	22	3	3
Procurement	623	0	0
Total	645	3	3

c. Foreign Military Sales -- None

d. Nuclear Costs -- N/A

e. Reference --

Development Estimate: Secretary of Defense memorandum, Nov 1,1983 and National Security Decision Directive

Approved Program: FY90/91 Presidents Budget

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	3138.1	3352.0	3138.1
(2) Quantity	3	3	3
(3) Unit Cost	N/A	N/A	N/A
b. Current Procurement	(FY 1989)	(FY 1989)	(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.Cost Variance Analysis:

a. 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	-10.1	235.0	7.3	232.2
Quantity	---	-12604.8	---	-12604.8
Schedule	---	---	---	---
Engineering	---	---	---	---
Estimating	25.8	---	---	25.8
Other	-8313.5	---	-2407.9	-10721.4
Support	---	-18307.7	---	-18307.7
Subtotal	-8297.8	-30677.5	-2400.6	-41375.9
Current Changes				
Economic	2.4	---	---	2.4
Quantity	---	---	---	---
Schedule	---	---	---	---
Engineering	---	---	---	---
Estimating	-2.4	---	---	-2.4
Other	-213.9	---	---	-213.9
Support	---	---	---	---
Subtotal	-213.9	---	---	-213.9
Total Changes Baseline Adjstmts	-8511.7	-30677.5	-2400.6	-41589.8
Current Est	3138.1	0.0	0.0	3138.1

13. Cost Variance Analysis: (Cont)

a. 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	---	-9044.4	---	-9044.4
Schedule	---	---	---	---
Engineering	---	---	---	---
Estimating	23.0	---	---	23.0
Other	-6759.3	---	-1727.2	-8486.5
Support	---	-13162.8	---	-13162.8
Subtotal	-6736.3	-22207.2	-1727.2	-30670.7
Current Changes				
Quantity	---	---	---	---
Schedule	---	---	---	---
Engineering	---	---	---	---
Estimating	-2.1	---	---	-2.1
Other	-194.8	---	---	-194.8
Support	---	---	---	---
Subtotal	-196.9	---	---	-196.9
Total Changes Baseline Adjstmts	-6933.2	-22207.2	-1727.2	-30867.6
Current Est	2843.4	0.0	0.0	2843.4

b. Previous Change Explanations --

(1) RDT&E:

Economic: Revised Economic Escalation Indices

Estimating: Adjustment for Current and Prior Year Escalation

Other: Deletion of 19 Flight Test Units

b. Previous Change Explanations (Cont)

(2) Procurement:

Economic: Revised Economic Escalation Indices

Quantity: Deletion of 623 Missiles

Support: Deletion of support requirement associated with 623 missiles

(3) MILCON:

Economic: Revised Economic Escalation Indices

Other: Program reduction caused by replanned FY89 and beyond President's budget

c. Current Change Explanations --	BY84$	TY$
(1) RDT&E:		
Economic: Revised Economic Escalation Indices	---	2.4
Other: Congressional recision action in FY87 Funding line	-194.8	-213.9
Estimating: Adjustment for Current and Prior Year Escalation	-2.1	-2.4

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

a. Initial SAR Estimate to Current Baseline Estimate -- Not required, RDT&E-only SAR

b. Current Baseline Estimate to Current Estimate -- Not required, RDT&E-only SAR

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

a. RDT&E --

	Initial Contract Price		
	Target	Ceiling	Qty
Guidance and Control Integration	$205.9M	N/A	N/A

Rockwell International (Autonetics)
Anaheim, Ca
F04704-84-C-0061, CPIF/AF
Awarded: 25 May 1984
Definitized: 26 May 1984

This contract was reported in the Dec 87 SAR and is now over 90% complete and no longer being reported

	Initial Contract Price		
	Target	Ceiling	Qty
System Support	$125.3M	N/A	N/A

Martin Marietta
Denver, Co.
F04704-85-C-0040, CPFF/AF
Awarded: 26 June 1985
Definitized: 26 June 1985

This contract was reported in the Dec 87 SAR and is no longer one of the six largest contracts

15a. RDT&E -- (Cont)

	Initial Contract Price		
	Target	Ceiling	Qty
Small ICBM Hard Mobile Basing 2/	$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 3/			Estimated Price at Completion 4/	
Target	Ceiling	Qty	Contractor	Program Manager
$590.8M	$677.9M	N/A	$603.8M	$603.8M

	Cost Variance	Schedule Variance
Previous Cumulative Variances (30 Nov 87)	$-7.4M	$-6.8M
Cum. Variances to Date (30 Sep 88)	$-5.6M	$ 0.0M
Net Change	$+1.8M	$+6.8M

Explanation of Change: The cost variance change is due to increased contractor efficiency subsequent to contract partial termination. The schedule variance change resulted from the replanning of the remaining effort on the partially terminated contract. No program impact. This contract is currently being restructured to support the $900M through Sep 89 program implemented on 1 Apr 88. The current contract price and estimated price at completion reflect values prior to definitization of the restructure.

1/ Includes basic cost, fee, and 100% of award fee pool at start of contract.

2/ This report reflects the merger of the Weapon Control System contract with the Hard Mobile Launcher contract.

3/ Based on definitized values only.

4/ Includes basic cost, authorized unpriced work, profit, the current award fee/pool, and a cost plus fixed fee line item.

15a. RDT&E -- (Cont)

	Initial Contract Price		
	Target	Ceiling	Qty
Post Boost Vehicle/Assembly & Test Martin Marietta, Denver CO F04704-85-C-0039, FPIF Awarded: 26 June 1985 Definitized: 26 June 1985	$333.5M 1/	$376.0M	N/A

Current Contract Price 2/			Estimated Price at Completion 3/	
Target	Ceiling	Qty	Contractor	Program Manager
$344.7M	$401.3M	N/A	$413.6M	$401.7M

	Cost Variance	Schedule Variance
Previous Cumulative Variances (30 Nov 87)	$-17.7M	$-10.0M
Cumulative Variances to Date (30 Sep 88)	$-12.3M	$- 6.5M
Net Change	$+ 5.4M	$+ 3.5M

Explanation of Change: The schedule variance change is caused by deletion of terminated effort and replanning of effort to completion. Cost variance change is caused by partial termination baseline adjustments: a) accounting adjustments to earned value to equal negotiated actuals for definitized change orders; and b) accounting adjustments resulting from the transfer of management reserve to earned value for underplanned cost accounts. No program Impact. This contract is currently being restructured to support the $900M through Sep 89 program implemented on 1 Apr 88. The current contract price and estimated price at completion reflect values prior to definitization of the restructure.

1/ Includes basic cost and fee.

2/ Based on definitized values only.

3/ Includes negotiated cost, authorized unpriced work, overrun, profit, and priced options/follow-on efforts to support the 37,000 pound missile decision.

15a. 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
$479.1M	$529.2M	N/A	$541.6M	$541.6M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (30 Sep 88)	$+1.3M	$-0.4M
Net Change	------	------

Explanation of Change: This is the first time for this contract to be reported in the SAR. Variances are insignificant . No program or contract impact. This contract is currently being restructured to support the $900M through Sep 89 program implemented on 1 Apr 88. The current contract price and estimated price at completion reflects values prior to definitization of the restructure.

1/ Includes basic cost, fee, and 100% of award fee pool at start of contract.

2/ Based on definitized values only.

3/ Includes basic cost, authorized unpriced work, profit, the current award fee/pool, and a cost plus fixed fee line item.

15a. RDT&E -- (Cont)

	Initial Contract Price		
	Target	Ceiling	Qty
Missile Stage II Aerojet Nevada Rocket Operations Sacramento CA F04704-87-C-0050/FPIF/AF Awarded: 23 December 1986 Definitized: 23 December 1986	$186.4M 1/	$201.2M	N/A

Current Contract Price 2/			Estimated Price at Completion 3/	
Target	Ceiling	Qty	Contractor	Program Manager
$179.0M	$195.6M	N/A	$201.0M	$205.0M

	Cost Variance	Schedule Variance
Previous Cumulative Variances (30 Nov 87)	$-0.9M	$-4.6M
Cumulative Variances to Date (30 Sep 88)	$-3.9M	$-2.1M
Net Change	$-3.0M	$+2.5M

Explanation of Change: The schedule variance change is due to deletion of terminated effort and replanning of remaining effort on the partially terminated contract. The cost variance change is due to higher than planned labor rates, manufacturing overruns in the inner stage, and additional engineering hours for design iterations. No program impact. This contract is currently being restructured to support the $900M through Sep 89 program implemented on 1 Apr 88. The current contract price and estimated price at completion reflect values prior to definitization of the restructure.

1/ Includes basic cost, fee, and 100% of award fee pool at start of contract.

2/ Based on definitized values only.

3/ Includes basic cost, fee, authorized unpriced work, the current award fee/pool, a priced option, and a cost plus fixed fee line item.

15a. 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
$168.4M	$185.3M	N/A	$184.0M	$184.0M

	Cost Variance	Schedule Variance
Previous Cumulative Variances (30 Nov 87)	$-4.2M	$-1.4M
Cumulative Variances to Date (30 Sep 88)	$-6.0M	$-1.6M
Net Change	$-1.8M	$-0.2M

Explanation of Change: The cost variance change is due to unfavorable overhead rate changes plus subsystem design iterations and fabrication. The schedule variance change is insignificant. No program impact. This contract is currently being restructured to support the $900M through Sep 89 program implemented on 1 Apr 88. The current Contract Price and estimated price at completion reflect values prior to definitization of the restructure.

1/ Includes basic cost, fee, and 100% of award fee pool at start of contract.

2/ Based on definitized values only.

3/ Includes basic cost, authorized unpriced work, profit, the current award fee/pool, a priced option, and a cost plus fixed fee line item.

15a. RDT&E -- (Cont)

	Initial Contract Price		
	Target	Ceiling	Qty
Missile Stage I			
Morton Thiokol Wasatch Div Brigham City, UT F04704-87-C-0052, FPIF/AF Awarded: 23 Dec 1986 Definitized: 17 Dec 1986	125.1 1/	134.4	N/A

Current Contract Price 2/			Estimated Price at Completion 3/	
Target	Ceiling	Qty	Contractor	Program Manager
$125.3M	$139.4M	N/A	$162.6M	$162.6M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (30 Sep 88)	$-4.3M	$-1.8M
Net Change	------	------

Explanation of Change: This is the first time for this contract to be reported in the SAR. Schedule variance is due to late raceway material receipt and assembly delays in flight proof test/flight test motors. Cost variance is due to schedule recovery efforts in the integration, assembly and checkout of flight proof test/flight test motors. No program impact. This contract is currently being restructured to support the $900M through Sep 89 program implemented on 1 Apr 88. The current contract price and estimated price at completion reflect values prior to definitization of the restructure.

1/ Includes basic cost, fee and 100% of award fee pool at start of contract.

2/ Based on definitized values only.

3/ Includes basic cost, authorized unpriced work, profit, the current award fee/pool, a priced option, and a cost plus fixed fee line item.

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

a. Program Status --

(1) Percent Program Completed: 100.0% (6 yrs/6 yrs)

(2) Percent Program Cost Appropriated: 100.0% ($3138.1/$3138.1)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY84-89)	Budget Year (FY90)	Budget Year (FY91-94)	Balance to Complete (FY95-00)	Total
RDT&E	3138.1	0.0	0.0	0.0	3138.1
Procurement	0.0	0.0	0.0	0.0	0.0
MILCON	0.0	0.0	0.0	0.0	0.0
Total	3138.1	0.0	0.0	0.0	3138.1

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: RDT&E								
1984				321.9	328.3	327.8	324.2	3.8
1985				435.8	458.5	458.2	456.8	3.4
1986				538.1	581.2	579.0	571.0	2.8
1987				734.9	820.1	820.1	760.8	2.7
1988				604.5	700.0	626.1	314.5	3.1
1989				208.2	250.0	64.0	9.4	4.0
Total	3			2843.4	3138.1	2875.2	2436.7	---

17. Production Rate Data: None

18. Operating and Support Costs: None

    a. N/A

    b. N/A

    c. Contractor Support Costs - N/A

SAC-88-087

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

AF-8 CSRL

PROGRAM: Common Strategic Rotary Launcher

AS OF DATE: December 31, 1988

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1. Designation and Nomenclature (Popular Name): Common Strategic Rotary Launcher (CSRL)

2. DOD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

Logistics Management Section
B-52 System Program Management Division
Tinker AFB, OK 73145

Michael Burdick
Assigned: Jun 84
AV 336-5401 COMM (405) 736-5401

4. Program Elements/Procurement Line Items:

RDT&E: PE 0603258F
PE 0604234F

PROCUREMENT: APPN 3010 ICN B05200

MILCON: N/A

O&M: APPN 3400 PE 0101113F (Shared Funding)

5. Related Programs: OAS/CMI, B-1B, B-2, SRAM II, ALCM, ACM, and future standoff conventional weapons.

[redacted]

SAF/PAS

89-0036-T

#30

DECLASSIFIED 84-0214

[redacted]ission Description:

The Common Strategic Rotary Launcher (CSRL) is a multipurpose weapons launcher for strategic internal weapons carriage. The CSRL will accommodate current and projected gravity nuclear weapons, Short Range Attack Missiles (SRAM), Advanced Cruise Missile (ACM) and Air Launched Cruise Missile (ALCM). Space provisions are also provided for MIL-STD 1760 avionics and wiring permitting carriage of future conventional standoff munitions and SRAM II. The CSRL will be common to the B-52H, B-1B, and B-2 to the maximum extent practical. For B-52H/B-1B, it provides each aircraft with internal capability to safely load, carry, launch/release, and jettison the following weapons: eight SRAMs (AGM-69A, B-52 carriage only), eight ALCMs (AGM-86B), four ACMs (B-1B only), eight B-61s, eight B-83s, and four B-28s (B-52 only). Weapon loading requirements for the B-2 are covered within the security constraints of that program. The CSRL does not replace any weapon system since the B-52 and B-1 do not presently have internal cruise missile capability without the CSRL.

7. Program Highlights:

a. Significant historical developments - The Full Scale Development (FSD) program is currently 93.3% complete. No significant technical problems have been identified to date. From Oct 84 - Oct 85, the CSRL underwent a totally successful qualification testing program which included proof load testing ground vibration tests, power drive system qualification tests, durability tests, damage tolerance tests and ultimate load tests. All requirements were [redacted]sfactorily met or exceeded. Additional CSRL ground tests were initiated [redacted] the arrival of the flight test aircraft at Edwards AFB on 1 Aug 85. The [redacted]d test to verify upload, download, and reconfiguration requirements were successfully completed on 16 Sep 85. The flight test program began on 17 Sep 85 and included ALCM and gravity bomb jettisions and releases. All flight objectives have been successfully completed with no significant CSRL hardware related problems. Launcher rotation, weapon ejection, and aircraft software/launcher hardware interfaces have been successfully demonstrated. All program objectives and milestones are on schedule to support the directed initial B-52H operational capability of March 1990.

The B-52H CSRL flight testing was successfully completed on 5 Aug 86. The Air Force Operational Test and Evaluation Center (AFOTEC) evaluated the B-52 OAS software during the last five months of flight test to ensure all existing B-52 capabilities had not been disturbed by the addition of the CSRL to the B-52. A final Initial Operational Test and Evaluation (IOT&E) test report was released to HQ USAF on 5 Oct 86 evaluating the CSRL and the associated aircraft software. An AFOTEC final report briefing was presented to representatives of the HQ USAF Modification Review Group on 10 Oct 86 which stated that there were no CSRL discrepancies. HQ AFSC, HQ AFLC, HQ AFOTEC, and HQ SAC recommended, and HQ USAF approved proceeding with full rate production (Lots II through V). B-1B flight test program started in June 1986.

Dur[illegible] Nov 1987 the first ALCM was successfully launched from a B-1B using a CSRL. The Air Force took delivery of the first production launcher during Dec 1987.

b. Significant Developments Since Last Report - During Nov 1988, Lot IV production options for 24 launchers and 23 Integration Kits were exercised.

c. This is the final SAR report for CSRL/CSRLI. The CSRL is expected to satisfy the mission requirements.

d. Changes Since "As Of" Date - None

8. Threshold Breaches: No DCP or DAE baseline (dated February 1988) breaches.

9. Schedule:

a. Milestones -

	Production Estimate/ Approved Program	Current Estimate
Demonstration/Validation	Jun 82 / N/A	Jun 82
Source Selection	Jun 83 / N/A	Jun 83
Full Scale Development	Jun 83 / Jun 83	Jun 83
Preliminary Design Review	Sep 83 / N/A	Sep 83
[illegible]ritical Design Review	Mar 84 / N/A	Mar 84
[illegible]-52 CSRL Flight Test Initiation	Aug 85 / N/A	Aug 85
[illegible]ompletion of B-52 CSRL Qualification Testing	Oct 85 / Oct 85	Oct 85
Low rate initial production	Nov 85 / Nov 85	Nov 85
B-52 CSRL Flight Test Completion	Jan 86 / N/A	Aug 86
IOT&E Final Report (AFOTEC)	Aug 86 / N/A	Oct 86
Full rate production	Nov 86 / Nov 86	Nov 86
B-52 FAC *	Sep 89 / Sep 89	Sep 89
B-52 IOC **	Mar 90 / Mar 90	Mar 90
B-1B Flight Test Completion	N/A / May 89	May 89 (CH-1)
B-52 FOC	N/A / Aug 93	Aug 93 (CH-1)

* B-52 First Alert Capability (FAC) is defined as the capability to place on alert, if so directed, three Offensive Avionics System (OAS) modified B-52Hs loaded with two cruise missiles pylons, cruise missiles and a CSRL.

** B-52 Initial Operational Capability (IOC) consists of one squadron with internal/external cruise missile capability and associated support equipment.

Previous Change Explanations:

The B-52 CSRL flight test completion date was extended from Jan 86 to Aug 86 to test and verify Block II software and CSRL/B-28 employment fixes. The IOT&E final report (AFOTEC) was rescheduled accordingly from Aug 86 to Oct 86.

c. Current Change Explanations: (CH-1) Addition of DAE Baseline Milestones.

d. Milestones:

Production Estimate: PMD NR. R-Q 2087(5), dated 22 Apr 85
PMD NR. 4126 (3)/3142, dated 31 Oct 85

Approved Program: DAE baseline dated February 1988.

10. Technical/Operational Characteristics:

a. Technical - ***	Production Est/ Approved Program	Demonstrated Performance *	Current Estimate
Time required to rotate from an adjacent station (sec)	5/ 4.4	4.4	4.4
Maximum time required to jettison full weapon load (sec)	60/ 45.1	45.1	45.1
[illegible]n-commission rate (%) **	93/N/A	93	93
[illegible]eapon system reliability (%)	96/96	97	97
Maximum design weight (lbs)	5000/4703	4703	4703
b. Operational -			
Capability to carry/release AGM-86B (missiles)	8/ N/A	8	8
Capability to carry/release B-61 (bombs)	8/ N/A	8	8
Capability to carry/release B-28 (bombs)	4/ N/A	4	4
Capability to carry/release B-83 (bombs)	8/ N/A	8	8
Mean time to upload/download a weapon-configured CSRL in B-52H bomb bay (min)	60/56	56	56
Mean time to perform single weapon exchange (min)	60/53	53	53

* Worst case
** Percentage of CSRL's capable of performing the specific mission with no corrective maintenance required.
*** The B-52 CSRL is a mature system, which has demonstrated threshold performance. Goal values for the system were essentially the same as the threshold values.

c. Previous Change Explanations:

The actual time to rotate from an adjacent station and the maximum time to jettison full weapon load were validated by AFOTEC at Edwards AFB. The current predictions for weapon system reliability were validated by AFOTEC at Edwards AFB. The maximum design weight is the verified weight of the final production configuration (B1-B). The actual mean time to upload/download a weapon-configured CSRL in a B-52H bomb bay and the mean time to perform single weapon exchange were verified by SAC/AFOTEC at Edwards AFB.

d. Current Change Explanations: None

e. References:

Production Estimate: PMD NR. R-0 2087(5), dated 22 Apr 85
PMD NR. 4126 (3)/3142, dated 31 Oct 85

Approved Program: DAE baseline dated February 1988.

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

	Production Estimate	Approved Program	Current Estimate
a. Cost -			
Development (RDT&E)	265.6	238.8	238.8
Procurement	326.6	242.2	242.2
Nonrecurring	(12.2)	(5.0)	(5.0)
Group A - Integration	(66.3)	(47.4)	(47.4)
Group B - Launcher	(172.7)	(130.6)	(130.6)
Total Flyaway	(251.2)	(183.0)	(183.0)
Other Weapon Systems Cost	(51.5)	(41.0)	(41.0)
Initial Spares	(23.9)	(18.2)	(18.2)
Construction (MILCON)	0.0	0.0	0.0
O&M	23.1	19.7	19.7
Total FY82 Base-Year $	615.3	500.7	500.7
Escalation	198.5	134.9	134.9
Development (RDT&E)	(34.6)	(28.2)	(28.2)
Procurement	(155.3)	(99.3)	(99.3)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
O&M	(8.6)	(7.4)	(7.4)
Total Then-Year $	813.8	635.6	635.6

b. Quantities -

Development (RDT&E: 1 used for destructive testing)	(7)	(7)	(7)
Procurement (includes retrofit of 6 FSD)	104	104	104
Total	104	104	104

c. Foreign Military Sales - N/A

d. Nuclear Costs - N/A

e. References:
Production Estimate: PMD NR. R-Q 2087(5), dated 22Apr85
PMD NR. 4126(3)/3/42, dated 31 Oct 85

Approved Program: FY90/91 President's Budget

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

	Current Year CURRENT EST (DEC 88 SAR)	Current Year UCR Baseline (DEC 87 SAR)	Budget Year UCR Baseline (DEC 88 SAR)
a. Program Acquisition -			
(1) Cost	635.6	633.6	635.6
(2) Quantity	104	104	104
(3) Unit Cost	6.112	6.092	6.112
b. Current Procurement -	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	71.0	66.0	63.0
Less CY Adv Proc	0.0	0.0	0.0
Plus FY Adv Proc	0.0	0.0	0.0
Net Total	71.0	66.0	63.0
(2) Quantity	24	24	26
(3) Unit Cost	2.958	2.750	2.423

13. Cost Variance Analysis

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

	RDT&E	PROC	O&M	TOTAL*
Production Estimate	300.2	481.9	31.7	813.8
Previous Changes:				0.0
Economic	-0.6	-15.4	-0.3	-16.3
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating	-31.7	-110.9	-2.1	-144.7
Other				
Support		-19.2		-19.2
Subtotal	-32.3	-145.5	-2.4	-180.2
Current Changes:				0.0
Economic		-1.5	-0.1	-1.6
Quantity			-0.3	-0.3
Schedule				0.0
Engineering				0.0
Estimating	-0.9	+9.2	-1.8	6.5
Other				0.0
Support		-2.6		-2.6
Subtotal	-0.9	+5.1	-2.2	+2.0
al Changes	-33.2	-140.4	-4.6	-178.2
Current Estimate	267.0	341.5	27.1	635.6

* MILCON: N/A

17. Cost Variance Analysis (Cont'd):

a. (FY82 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	O&M	TOTAL*
Production Estimate	265.6	326.6	23.1	615.3
Previous Changes:				0.0
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating	-26.1	-74.3	-1.8	-102.2
Other				
Support		-13.7		-13.7
Subtotal	-26.1	-88.0	-1.8	-115.9
Current Changes:				0.0
Quantity			-0.2	-0.2
Schedule				0.0
Engineering				0.0
Estimating	-0.7	+6.1	-1.4	4.0
Other				0.0
Support		-2.5		-2.5
Subtotal	-0.7	+3.6	-1.6	+1.3
Total Changes	-26.8	-84.4	-3.4	-114.6
Current Estimate	238.8	242.2	19.7	500.7

* MILCON: N/A

b. Previous Change Explantions -

RDT&E

Economic: Revised economic escalation indices.

Estimating: Refinement of estimate for engineering change orders, launchers, government test and mission support.

Procurement

Economic: Revised economic escalation indices.

Estimating: Refinement of estimate due to favorable contract negotiations; Adjustments for prior and current year escalation. Reduction of hardware requirements.

Support: Reduction in weapon system support requirements.

O&M

Economic: Revised economic escalation indices.

Estimating: Refinement of estimate for engineering change orders.
Refinement of outyear requirements based on current actuals.

c. Current Change Explanations: (Dollars in Millions)

	Base-Year	Then-Year
(1) RDT&E		
Refinement of prior estimates for RDT&E (Estimating)	-0.7	-0.9
(2) Procurement		
Revised economic escalation indices. (Economic).	N/A	-1.5
Refinement of prior estimates for flyaway costs based on latest contract prices (Estimating)	5.3	8.0
Adjustment for prior and current year escalation (Estimating)	0.8	+1.2
Revised spares estimates (Support)	+3.5	+6.8
Revised other weapon system costs (Support)	-6.0	-9.4
(3) O&M		
Revised economic escalation indices (Economic).	N/A	-0.1
Decrease of installation of 1 aircraft modified with R&D funds (Quantity).	-0.2	-0.3
Refinement of outyear requirements based on current actuals (Estimating).	-1.4	-1.8

. Program Acquisition Unit Cost (PAUC) History: (Millions of Then Year $)

a. Initial SAR Estimate to Current Estimate

PAUC (Initial SAR EST/ PDE)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
7.825	-0.172	-.003			-1.329		-.209	-1.713	6.112

15. Contract Information: (Millions of Then Year $)

a. RDT&E -

Common Strategic Rotary Launcher:

Boeing Military Airplance Co, Wichita KS F33657-83-C-0533, FPI		Initial Contract Price Target	Ceiling	Qty
Award: Jun 83 (CSRL)	CSRL	$25.1	$29.2	2
Apr 84 (CSRL Integration)	CSRLI	$84.3	$98.1	
Definitized: Jun 83 (CSRL)				
Apr 84 (CSRLI)				
	CSRL/CSRLI Total	$109.4	$127.3	2

Current Target	Contract Ceiling	Price Qty	Estimated Price At Completion Contractor	Program Manager
$152.4	$173.2	7	$146.0	$145.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	+8.7	-0.1
Cumulative Variances To Date (24 Nov 88)	+8.5	-0.1
Net Change	-0.2	0.0

Explanation of Change: Cost variance remains as an underrun. The schedule variance has been constant and has no impact on the contract.

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

b. Procurement -

Common Strategic Rotary Launcher
Group B
Boeing Military Airplane Co, Wichita KS
F33657-83-C-0533 FFP*
Award: Feb 86
Definitized: Feb 86

Initial Contract Price		
Target	Ceiling	Qty
$44.5	N/A	5

Current Contract Price		
Target	Ceiling	Qty
$141.1	N/A	54

Est Price at Completion	
Contractor	PM
$141.1	$141.1

*No CPR (FFP Contract)

Common Stragetic Rotary Launcher
Group A

Boeing Military Airplane Co, Wichita KS
F34601-86-C-1600 FPI
Award: Feb 86
Definitized: Feb 86

Target	Ceiling	Qty
$17.7	$18.7	3

Current Contract Price		
Target	Ceiling	Qty
$50.4	$53.0	48

Est Price at Completion	
Contractor	PM
$50.4	$46.4

	Cost Variance	Sch Variance
Previous Cumulative Variances	+3.0	+0.7
Cumulative Variances to date (31 Dec 87)	+3.0	+0.7
	0.0	0.0

Variance analysis - Cost variance is reported as an underrun due to favorable material pricing. The contractor is working ahead of schedu No impact on contract or program.

c. MILCON - N/A

d. O&M - N/A

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

a. Program Status -

(1) Percent Program Completed: 66.7% (8 yrs/12 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 85.2% ($541.8M/$635.6M)
(Funds Appropriated to Date/Total Program Funding)

b. Appropriation Summary -

(Then-Year Dollars in Millions)

Appropriation	Current $ Prior Yrs (FY82-89)	Budget Year (FY90)	Budget Year (FY 91)	Balance to Complete (FY92-93)	Total
RDT&E	267.0	-	-	0.0	267.0
Procurement	268.8	63.0	6.2	3.5	341.5
MILCON	-	-	-	-	0.0
O&M	6.0	6.0	6.0	9.1	27.1
Total	541.8	69.0	12.2	12.6	635.6

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

c. Annual Summary -

Fiscal Year	QTY	Flyaway 82$ Nonrec	Flyaway 82$ Rec	Total Base Year $	Total Then Year $ Program	Total Then Year $ Obligated	Total Then Year $ Expended	Escl Rate (%)
Appropriation: RDT&E								
1982				21.4	21.9	21.8	21.8	9.2
1983				59.4	63.6	59.8	59.8	4.9
1984				55.1	61.2	58.9	58.9	3.8
1985				49.5	56.7	56.2	56.2	3.4
1986				39.2	46.1	45.2	43.6	2.8
1987				9.7	11.8	11.4	4.5	2.7
1988				4.5	5.7	3.5	0.7	3.1
Subtotal			N/A	238.8	267.0	256.8	245.5	

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

Fiscal Year	QTY	Flyaway FY 82 Dollars Nonrec	Flyaway FY 82 Dollars Rec	Total Base Year $	Total Then Year $ Program	Total Then Year $ Obligated	Expended	Escl Rate (%)
Appropriation: Procurement								
1986	5	3.4	26.7	48.1	63.2	62.9	30.5	2.8
1987	26		46.0	51.6	70.3	70.1	29.9	2.7
1988	23	1.6	34.4	45.6	64.3	51.2	2.2	3.1
1989	24		36.4	48.7	71.0	52.1	0.0	4.0
1990	26		34.5	42.0	63.0			3.6
1991				4.0	6.2			3.3
1992				2.1	3.3			2.8
1993				0.1	.2			2.3
Subtotal	104	5.0	178.0	242.2	341.5	236.3	62.6	
Appropriation: MILCON								
N/A							0.0	N/A
Appropriation: O&M (Qty represent A/C installs)								
1987	1			0.2	0.3	0.3	0.3	2.7
1988	0			0.0	0.0	0.0	0.0	3.1
1989	20			4.4	5.7	3.0	0.0	4.0
1990	21			4.5	6.0			3.6
1991	21			4.3	6.0			3.3
1992	21			4.2	6.0			2.8
1993	11			2.1	3.1			2.3
Subtotal	(95)			19.7	27.1			
Total	104	5.0	178.0	500.7	635.6	3.3	0.3	

17. Production Rate Data: (Based upon the surge rate)*
*NOTE: The annual production rates shown differ from annual funded quantities because the funded delivery period is 10 months for FY86, 14 months for FY87, and 12 months for FY 88-90.

a. Annualized Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Dev Est	Prd Est	Cur Est	Max
1986	6	6	6	6
1987	21.5	21.5	22.3	22.3
1988	24	24	23	48
1989	24	24	24	48
1990	24	24	26	48

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

Item		Prod Estimate	Variance (CE-PdE)	Current Estimate	Variance (CE-Max)	Maximum
Prog Acq Cost	(BY $)	615.3	-114.6	500.7	0.0	500.7
	(TY$)	813.8	-178.2	635.6	0.0	635.6
PAUC	(BY $)	5.916	-1.102	4.814	0.0	4.814
	(TY$)	7.825	-1.713	6.112	0.0	6.112

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

Item	Prod Estimate	Variance (CE-PdE)	Current Estimate	Varianc (CE-Max)	Maximum
Start Date (MO/YR) *	12/87	-	12/87	-	12/87
Duration (Months)	59	-4	55	7	48
End Date (Mo/YR)	10/92	-	6/92	-	11/91

* Based upon delivery rates

	To Date
d. Deliveries To Date (Plan/Actual) -- RDT&E	4/4
e. Approved Design to Cost Goal -- N/A. Procurement	1/1

18. Operating and Support Costs:

a. Assumptions and Ground Rules - The baseline Life Cycle Cost (LCC) estimate and LCC analysis are based on a three tier maintenance concept. Operations and Support (O&S) costs are based on total production buys of 104 units, and an operational life of 15 years for the B-52 and 20 years for the B-1B. There are four operational bases for each aircraft type (8 total). Since the CSRL is a dormant system, the failure data represents possessed hours. Initial training and technical publications costs have been priced within the Full Scale Development and production contracts. AFLC LSC Model, Version 1.1 (1979) was used to determine costs.

b. Cost - (FY 1982 Constant (Base-Year) Dollars)

Cost Elements	AVG ANNUAL COST Per CSRL B-52	AVG ANNUAL COST Per CSRL B-1B
SUPPORT		
- SPARES	1,099	725
- ON EQUIPMENT MAINTENANCE	48	50
- OFF EQUIPMENT MAINTENANCE	933	340
- INVENTORY	450	415
- MAINTENANCE MANAGEMENT	37	10
- FUEL	520	640
- PERIODIC INSPECTIONS	90	90
- RECURRING TRAINING	2	5
OPERATIONS		
- LOAD OPERATIONS	2,099	2,190
- CLIP BUILD UP & CHECK OUT	3,015	2,625
CSRLI		
- FUEL	4,131	
- O&S	190	
TOTAL O&S COST/YEAR/CSRL	12,614	7,090

18c. Contractor Support Costs - N/A

AF-30 TITAN IV

SAR-88-078

SELECTED ACQUISITION REPORT (SAR): RCS: DD-COMP(Q&A)823)
PROGRAM: Titan IV

AS OF DATE: December 31, 1988

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1. **Designation and Nomenclature (Popular Name):** Titan IV, formerly Complementary Expendable Launch Vehicle (CELV)

[redacted]

2. **DoD Component:** United States Air Force

3. **Responsible Office and Telephone Number:**

[redacted]

Assistant Deputy Commander for Launch Systems, Space Division, Los Angeles AFB, CA 90009	Col Lester L Lyles Assigned: April 29, 1988 AV 833-2286; COMM (213)643-2286
Titan IV Systems Program Office Space Division, Los Angeles AFB, CA 90009	Col Sebastian F Coglitore Assigned: August 1, 1987 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: PE 0305119F (Shared Funding) 3020 Appn ICN MSBSTR
PE 0304111F (Shared Funding)

SAF/PAS
89-0036-T
#3

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

OASD(PA) DFOISR 89-T-0197

6. 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 5,000 pound payload into GSO. When configured without an upperstage, the Titan IV can place a 32,000 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. Since the initial contract for 10 Titan IVs was awarded in February 1985, the program has progressed in a number of technical areas. Program Design Reviews have been accomplished for all major sub-systems except the Hercules Solid Rocket Motor Upgrade. A successful series of static firings of the solid rocket motors have been accomplished. An additional series of Titan IV/Centaur qualification tests will occur prior to the first Centaur launch.

As a result of the 28 January 1986 Space Shuttle Challenger accident, the DoD embarked upon a recovery plan which included the acquisition of 18 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. This is in addition to the original 10 vehicle program which included the activation and operation of Titan IV/Centaur at Cape Canaveral AFS, FL (CCAFS). The resulting 28 vehicle Titan IV program was definitized by contract in December 1987, to include the impacts of the April 1986 Titan 34D accident and the June 1986 NASA/Centaur Cancellation.

b. Significant Developments Since Last Report -- In 1988 the prime contractor conducted a competition to develop an upgraded solid rocket motor (SRMU). Hercules won the competition and was added to the Titan IV contract in July 1988.

b. Significant Developments Since Last Report (cont) -- The Hercules SRMU will have a 1991 ILC and increase booster reliability and performance in all configurations. The current program budget reflects a total transition to the SRMU after procurement of 16 shipsets of the Chemical Systems Division solid rocket motors.

Structural testing and qualification of the core vehicle will be completed by mid January, prior to ILC. A second SRM static firing was successfully completed in February 1988. Two successful payload fairing separation tests have also been completed, the first in Jan 88 and the second in March 88. Two more fairing tests are expected in late 1989 to complete the fairing qualification. The first and second vehicles have been delivered to CCAFS. The original baseline ILC of Oct 88 has moved to Jan 89. This was primarily due to a delay in structural testing on the core vehicle and the payload fairing, and late electromechanical valve deliveries. A Test and Evaluation Master Plan (TEMP) for the Solid Rocket Motor Upgrade is in final coordination. Qualification of the Titan IV/ Centaur is scheduled for completion in early fiscal year 1990. No other IOT&E has been performed or is planned on the Titan IV at this time.

The system is expected to satisfy mission requirements.

c. Changes Since "As of Date" -- The core vehicle has been qualified following its successful structural testing.

8. Threshold Breaches:

None, there are no SDDMs, SCPs, or DCPs applicable to the Titan IV program. The Titan IV is not currently a DAB program, and there is no approved DAE baseline.

9. Schedule:

a. Milestones --

	Development Estimate/ Approved Program	Current Estimate
Initial Contract Award	Feb 85/N/A	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/N/A	Oct 86
Addition of 13 Vehicles	N/A /N/A	Dec 87 (Ch-1)
First Core Delivery to CCAFS	N/A /N/A	Jan 88 (Ch-1)
First Delivery to CCAFS	Feb 88/N/A	Apr 88
Initial Launch Capability (IUS)	Oct 88/N/A	Jan 89 (Ch-2)
Titan IV/NUS (WTR) ILC	N/A /N/A	Feb 90 (Ch-1)
Titan IV/Centaur ILC	N/A /N/A	Dec 90 (Ch-1)
First SRMU Flight	N/A /N/A	11th vehicle (Ch-3)

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.

c. Current Changes -- (Ch-1) Previously not reported.
(Ch-2) The Titan IV ILC has been delayed until January 1989 due to delays in structural testing on the core vehicle and the payload fairing, and late electromechanical valve deliveries. (Ch-3) Incorporation of significant program milestone into SAR.

d. References --
Development Estimate: FY87 President's Budget, February 1986.
Approved Program: There is no approved DAE baseline.

10. Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
a. Technical --				
Systems Reliability (%)	98	N/A/N/A	N/A	98
Solid Rocket Motors:				
Length (ft)*	112.2	N/A/ N/A	N/A	112.2
Diameter (ft)*	10.2	N/A/ N/A	N/A	10.2
Thrust (M-lbs)	1.6	N/A/ N/A	N/A	1.6
Core Vehicle:				
Stage One:				
Length (ft)*	86.5	N/A/ N/A	N/A	86.5
Diameter (ft)*	10.0	N/A/ N/A	N/A	10.0
Engine Thrust (k-lbs)	546.0	N/A/ N/A	N/A	546.0
Stage Two:				
Length (ft)*	32.6	N/A/ N/A	N/A	32.6
Diameter (ft)*	10.0	N/A/ N/A	N/A	10.0
Engine Thrust (k-lbs)	104.0	N/A/ N/A	N/A	104.0
Payload Fairing:				
Diameter (ft)*	16.7	N/A/ N/A	N/A	16.7
Length (ft)*	86.0	N/A/ N/A	N/A	86.0
b. Operational --				
Payload to geosynchronous orbit (k-lbs) (TIV/Cent)	10.0	N/A/ N/A	N/A	10.0
Payload to geosynchronous orbit (k-lbs) (TIV/IUS)	N/A	N/A/ N/A	N/A	5.0 (Ch-1)
Payload to low earth polar orbit (k-lbs) (TIV/NUS)	N/A	N/A/ N/A	N/A	32.0 (Ch-1)

c. Previous Change Explanations -- None.

d. Current Change Explanation -- (Ch-1) Previously not reported.

e. References--
Development Estimate: FY87 President's Budget, February 1986.
Approved Program: There is no approved DAE baseline.

* These parameters are not significant to mission performance and will be deleted in the next SAR.

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

	Development Estimate	Approved Program	Current Estimate
a. Cost --			
Development (RDT&E)	$ 579.7	1727.6	1727.6
Program Development	(488.7)	(1633.1)	(1633.1)
RDT&E Funded Centaurs	(91.0)	(94.5)	(94.5)
Procurement	1570.8	7993.9	7993.9
Total Flyaway	(1106.6)	(7257.2)	(7257.2)
Other Weapon Systems Costs	(464.2)	(736.7)	(736.7)
Construction (MILCON)	0.0	175.4	175.4
Total FY 85 Base-Year $	2150.5	9896.9	9896.9
Escalation	378.7	2304.4	2304.4
Development (RDT&E)	(61.4)	(259.4)	(259.4)
Procurement	(317.3)	(2000.9)	(2000.9)
Construction (MILCON)	(0.0)	(44.1)	(44.1)
Total Then-Year $	$ 2529.2	12201.3	12201.3
b. Quantities --			
Development (RDT&E)	-	-	-
Procurement	10	57	57*
Total	10	57	57*

c. Foreign Military Sales -- None
d. Nuclear Costs -- None
e. References --
Development Estimate: FY87 President's Budget, February 1986.
Approved Program: FY 1990-91 President's Budget.

* 23 vehicle program FY87-FY91, Follow-on 20 vehicles FY91-FY94, planned replenishment 14 vehicles FY94-95.

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

	Current Estimate (Dec 88 SAR)	Current Year UCR Baseline (Dec 87 SAR)	Budget Year UCR Baseline (Dec 88 SAR)
a. Program Acquisition --			
(1) Cost	$12201.3	$5133.5	$12201.3
(2) Quantity	57	23	57
(3) Unit Cost	$ 214.058	$ 223.196	$ 214.058
b. Current Procurement --	(FY 1989)	(FY 1989 APPN)*	(FY 1990)
(1) Cost	$1089.0	$1089.0	$ 758.9
Less CY Adv Proc	-130.0	-130.0	-50.3
Plus PY Adv Proc	+266.5	+266.5	+315.0
Net Total	$1225.5	$1225.5	$1023.6
(2) Quantity	5	5	5
(3) Unit Cost	245.100	245.100	204.720

* Adjusted to reflect FY89 Appropriations Act in accordance with Congressional change to SAR law.

3. Cost Variance Analysis:

a. Summary --

(Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	641.1	1888.1	0.0	2529.2
Previous Changes:				
Economic	-9.8	-36.9	+1.0	-45.2
Quantity		+1793.2		+1793.2
Schedule		-36.2		-36.2
Engineering	+196.0	-355.1		-159.1
Estimating	+356.4	+732.2	+214.0	+1302.6
Other				
Support	+175.0	-426.0		-251.0
Subtotal	+718.1	+1671.2	+215.0	+2604.3
Current Changes:				
Economic	+1.0	+16.8	-1.1	+16.7
Quantity		+5042.5		+5042.5
Schedule			+5.0	+5.0
Engineering	+102.1	-1019.2		-917.1
Estimating	+402.7	+1672.6	+0.6	+2075.9
Other				
Support	+122.0	+722.8		+844.8
Subtotal	+627.8	+6435.5	+4.5	+7067.8
Total Changes	+1345.9	+8106.7	+219.5	+9672.1
Current Estimate	1987.0	9994.8	219.5	12201.3

(FY 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		+1466.4		+1466.4
Schedule				
Engineering	+170.4	-287.1		-116.7
Estimating	+314.2	+569.3	+172.4	+1055.9
Other				
Support	+153.8	-307.0		-153.2
Subtotal	+638.4	+1441.6	+172.4	+2252.4
Current Changes:				
Quantity		+3835.2		+3835.2
Schedule				
Engineering	+84.7	-741.6		-656.9
Estimating	+324.5	+1308.4	+3.0	+1635.9
Other				
Support	+100.3	+579.5		+679.8
Subtotal	+509.5	+4981.5	+3.0	+5494.0
Total Changes	+1147.9	+6423.1	+175.4	+7746.4
Current Estimate	1727.6	7993.9	175.4	9896.9

b. Previous Change Explanations --

RDT&E

Economic: Revised economic escalation indices.

Engineering: Design effort for satellite dual compatibility; initial design effort for a new SLC-7 Titan IV launch pad at Vandenberg AFB, CA; initial 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.

Support: Additional support equipment for accelerated activation at the CCAFS, FL, launch site; initial funds for facility modifications at the launch sites.

Procurement

Economic: Revised economic escalation indices.

Quantity: Hardware costs for an additional 13 vehicles.

Schedule: Accelerated buy of original 10 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 launch schedule; unit price benefits of increased 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.

b. 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 requirements to support increased launch requirements at CCAFS, FL.

MILCON

Economic: Revised economic escalation indices.

Estimating: Funds added to program to construct a new SLC-7 Titan IV launch pad at Vandenberg AFB, CA; adjustment for outyear escalation; realignment of SLC-7 costs into outyears.

c. Current Change Explanations --	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised economic escalation indices. (Economic)	N/A	+1.0
Continued development of the Solid Rocket Motor Upgrade for FY90-93. (Engineering)	+56.4	+68.0
Vehicle configuration design changes. (Engineering)	+5.1	+6.1
Design of enhanced Centaur capability for FY90-91. (Engineering)	+23.2	+28.0
Current and prior year escalation offset. (Estimating)	-1.1	-1.2
Congressional reprogramming for Centaur configuration development. (Estimating)	+17.1	+18.5
Payload integration of missions due to increased program scope for FY90-95. (Estimating)	+140.2	+176.7
Continued design of new SLC-7 launch pad at VAFB, CA for FY 90-94. (Estimating)	+74.7	+95.0
Funds to accommodate projected contractor overrun. (Estimating)	+53.7	+64.4
Provisions for engineering changes due to increased program scope. (Estimating)	+5.4	+7.8

c. Current Change Explanations (cont) --	(Dollars in Millions) Base-Year	Then-Year
Federal Contract Research Center (FCRC) support for increased program scope. (Estimating)	+3.2	+4.0
Facility design for the new Solid Rocket Motor Assembly Facility, the new Centaur Offline Processing Facility, and upgrades to the SRM testing facility at CCAFS, FL. (Estimating)	+31.3	+38.0
Design of upgraded AGE at CCAFS, FL to support increased program scope and duration. (Support)	+26.4	+32.0
SLC-40 launch pad and MST modifications to change from Titan 34D to Titan IV capability at CCAFS, FL. (Support)	+73.9	+90.0
(2) Procurement		
Revised economic escalation indices. (Economic)	N/A	+16.8
Additional buy of 20 follow-on vehicles and 14 planned replenishment vehicles.	+3798.4	+4952.9
-- Additional hardware costs for 34 vehicles. (Quantity)	(+3835.2)	(+5042.5)
-- Mission requirements preclude the need to procure Centaur upperstages for 22 Titan IVs. (Engineering)	(-1163.8)	(-1551.1)
-- Contractor launch incentives required through FY95 for additional vehicles. (Estimating)	(+74.4)	(+101.6)
-- Propellant requirements through FY95 for additional vehicles. (Estimating)	(+32.2)	(+44.0)
-- Additional funds for FCRC support of increased program scope. (Estimating)	(+107.3)	(+143.8)
-- Payload integration of additional missions due to increased program scope. (Estimating)	(+585.6)	(+729.6)
-- Additional unit price costs due to previously incorporated vehicle configuration changes. (Estimating)	(+265.2)	(+354.6)

c. Current Change Explanations (cont) --	(Dollars in Millions) Base-Year	Then-Year
	(+62.3)	(+87.5)
Increased ECO requirements associated with 34 additional vehicles. (Estimating)		
Tooling to support Solid Rocket Motor Upgrade requirement. (Engineering)	+63.2	+76.1
Continued procurement of Solid Rocket Motor Upgrade hardware for FY 90-94. (Engineering)	+351.8	+446.8
Redesign of Centaur hardware to accommodate enhancements. (Engineering)	+7.2	+9.0
Current and prior year escalation offset. (Estimating)	-13.9	-16.1
Production hardware changes due to vehicle configuration changes. (Estimating)	+54.7	+65.4
Budget for subcontractor incentives. (Estimating)	+129.8	+167.8
Lower reserve due to more mature hardware and production definition. (Estimating)	-39.1	-44.9
Revised user vehicle cost estimate. (Estimating)	-69.4	-112.2
Continued FCRC support for increased program scope for FY90-95. (Estimating)	+59.4	+73.5
Additional budget for vehicle propellant due to increased propellant cost. (Estimating)	+60.4	+79.0
Communication equipment for new SLC-7 launch pad at VAFB, CA. (Support)	+20.4	+26.0
AGE requirements for new SLC-7 launch pad at VAFB, CA. (Support)	+204.3	+264.0
Activation of SLC4-E launch pad from Titan 34D to Titan IV capability at VAFB, CA. (Support)	+278.5	+331.4
AGE requirements at CCAFS, FL to support increased program scope and duration. This scope includes the new Solid Rocket Motor Assembly Facility and the new Centaur Offline Processing Facility. (Support)	+76.3	+101.4

c. Current Change Explanations (cont) --	(Dollars in Millions) Base-Year	Then-Year
(3) MILCON		
Revised economic escalation indices. (Economic)	N/A	-1.1
Realignment of construction costs for new SLC-7 launch pad at VAFB, CA due to 1 year delay. (Schedule)	N/A	+5.0
Reduction in estimate of construction costs for new SLC-7 launch pad at VAFB, CA. (Estimating)	-89.4	-118.9
Construction of a new Solid Rocket Motor Assembly Facility at CCAFS, FL. (Estimating)	+73.8	+90.5
Construction of a new Centaur Offline Processing Facility at CCAFS, FL. (Estimating)	+18.6	+24.0

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	-0.500	-88.624	-0.547	-18.881	+59.272	-	+10.418	-38.862	214.058

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

RDT&E/Procurement --

	Initial Contract Price		
Titan IV:	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
$5009.8	$5322.5	23	$5190.4	$5308.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$- 67.0	$-104.7
Cumulative Variances To Date (27 Nov 88)	$-130.4	$- 92.6
Net Change	$- 63.4	$+ 12.1

Explanation of Change: The unfavorable Cost Variance is due to fabrication problems at Chemical Systems Division (solid rocket motors), schedule recovery efforts at McDonnell Douglas (payload fairing) and poor performance in production of the core vehicle at both Martin Marietta Aerospace Group and Martin Marietta Aero-Naval System. The negative schedule variance, based on a 100 day margin, improved since last report due to a scheduling rebaseline at McDonnell Douglas, Chemical Systems Division, VAFB and Martin Marietta Aero-Naval System to include no schedule margin. Due to the deletion of this schedule margin, any future schedule variances from these areas are expected to impact future production schedules.

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

a. Program Status --
   (1) Percent Program Complete: 45.5% (5 yrs/11yrs)
   (2) Percent Program Cost Appropriated: 40.5% ($4938.7/$12201.3)

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

Appropriation	Prior Years (FY85-89)	Budget Year (FY90)	Budget Year (FY91)	Outyears (FY92-95)	Total
RDT&E	1255.5	328.1	191.0	212.4	1987.0
Missile Proc	3683.2	755.9	964.6	4565.1	9968.8
Other Proc	0.0	8.0	10.0	13.0	26.0
MILCON	0.0	107.5	48.0	64.0	219.5
Total	4938.7	1194.5	1213.6	4854.5	12201.8

c. Annual Summary -- (Dollars in Millions)

Fiscal Year	FY85 Base-Year Dollars Flyaway Qty	Nonrec	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				248.5	259.7	259.7	211.4	2.8
1987				188.9	203.8	203.8	161.6	2.7
1988				298.1	338.9	883.9	297.2	3.1
1989				361.7	419.9	94.6	0.0	4.0
1990				278.4	328.1			3.6
1991				154.7	191.0			3.3
1992				76.5	96.7			2.8
1993				44.5	57.5			2.3
1994				19.9	26.2			1.8
1995				23.9	32.0			1.8
Subtotal				1727.6	1987.0	930.2	708.4	-
Appropriation: Missile Procurement								
1985				42.9	45.0	45.0	45.0	3.4
1986				436.3	477.7	477.7	477.7	2.8
1987	2	56.9	149.6	785.7	892.5	892.5	742.6	2.7
1988	6	189.5	498.5	1003.4	1179.0	1160.0	38.2	3.1
1989	5	180.1	478.6	897.8	1089.0	891.7	0.0	4.0
1990	5	180.1	478.6	606.7	755.9			3.6
1991	9	293.7	772.6	757.1	964.6			3.3
1992	2	75.8	199.3	1138.9	1474.1			2.8
1993	8	322.0	846.9	1199.7	1587.2			2.3
1994	10	341.1	897.1	754.3	1016.1			1.8
1995	10	360.0	946.8	855.7	487.7			1.8
Sub	57	1999.2	5258.0	7973.5	9968.8	3466.9	1303.5	-
Appropriation: Other Procurement								
1990				2.4	8.0			3.6
1991				7.9	10.0			3.3
1992				7.8	10.0			2.8
1993				2.3	8.0			2.3
Subtotal				20.4	26.0	0.0	0.0	-
Appropriation: MILCON								
1990				87.7	107.5			3.6
1991				38.2	48.0			3.3
1992				34.2	44.0			2.8
1993				15.3	20.0			2.3
Subtotal				175.4	219.5	0.0	0.0	-
Total	57	1999.2	5258.0	9896.9	12201.8	4397.1	2011.9	-

1/ FYs 86, 87, and 88 amounts include the purchase of two RDT&E funded Centaurs originally designed for the Shuttle RDT&E missions. The missions have been redesignated on the Titan IV.

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	9	N/A
1992		N/A	2	N/A
1993		N/A	8	N/A
1994		N/A	10	N/A
1995		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	2/2

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 up to five per year 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	82.7	
Range Support	7.0	
Total	89.7	

c. Contractor Support Costs -- N/A

* No antecedent

SAR-88-055

AF-17 JSTARS

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

Program: Joint STARS (U)

AS OF DATE: 31 December 1988

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SAR-A
89-0036-T
#27

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. (U) Responsible Office and Telephone Number:

Joint STARS Program Office
Electronic Systems Division
Hanscom AFB, MA 01731-5000

PM: Col John J. Colligan
Assigned: 7 Jul 1986
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

~~SECRET~~

6. (U) Mission and Description: The Joint Surveillance Target Attack Radar System (Joint STARS) is a Joint Army and Air Force Program, with the Air Force as lead service. Joint STARS fills a critical need for an 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. (U) Program Highlights:

a. (U) Significant Historical Developments -- In May 1982, an OSD/USRDE 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 1984 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 August 1984. Following the meeting of the Defense Systems Acquisition Review Council in August 1985 (Milestone IIA), a Secretary of Defense Decision Memorandum directed initiation of Full Scale Development (FSD) of the airborne segment. On 27 September 1985 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, July 1987. 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 March 1986.

In December 1986, the Army directed the Limited Procurement Urgent acquisition of nine Ground Station Modules. The basing of all Joint STARS (airborne) testing was consolidated to the contractor's facility in Melbourne, FL, for test efficiency, although numerous military test ranges will still be used. The OSD-directed Operational 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.

b. (U) Significant Developments Since Last Report -- The first flight test of the Joint STARS aircraft took place at Grumman Melbourne Systems Division, (GMSD) Melbourne, FL on 1 April 1988. The System Preliminary Design Review (PDR) was also conducted in April 1988. The PDR concluded months of preparation and was accomplished through close interaction with the contractor. The Air Force successfully completed Milestone IIB with a signed Acquisition Decision Memorandum dated 5 July 1988. Direction approved the procurement of new vs used aircraft and increased the production buy from 10 to 21 aircraft. Block II efforts including a Self Defense Suite (SDS) development, Mission and Flight Simulators, and Reliability improvements were approved. The restructure of the GSM program was approved in December 1988. In the radar area, three antennas have been built. FSD Aircraft #2 flew at Wichita, KS, on 31 August 1988 and completed airworthiness tests for the modified B-707 airframe on 22 October 1988. The program's phase I and phase II radar testing has been completed and has cleared a temporary flight envelope and collected radar vibration data, an essential step in refining radar algorithms prior to full system testing. Antenna #3, which reflects the final design, was tested at the end of September 1988 with the first patterns well within design specifications. The program's phase III communication/navigation flight tests also have been completed. During December 1988, the first increment of the Critical Design Review (CDR) was conducted. CDR will be finalized with the identification of a design baseline for the integrated hardware and software to satisfy Government requirements. On 22 December 1988, an operating Joint STARS radar flew for the first time, confirming digital steering commands, high power transmission element integrity, and transmit and receive beam formation. Acquisition of the third FSD airborne platform (a modified E-6) went on contract through the Navy. In addition, negotiations started for the Prime Mission Equipment (PME). Further platform modification and integration of the PME will follow in 1989. Also in 1988, ongoing field evaluation on the Ground Station Module (GSM) in Korea has aided significantly in the maturation of the GSM software and has identified areas for hardware improvements. During 1988, continuing emphasis has focused on international cooperation among NATO allies. Under the Airborne Radar Demonstrator (ARDS) Program, the Joint STARS Program began technical data exchange with the UK and France to develop interfaces between the National Radar Systems of each country. Additionally, a Joint STARS Ground Station Module was deployed to the UK in November 1988 to begin integration with the UK ASTOR Radar System. With this objective in mind, the Program Office chaired the NATO Air Force Armaments Group (NAFAG), Air Group IV Special Working Group, and played a key role in establishing the NATO Staff Target (NST) for the Stand Off Surveillance and Target Acquisition Systems (SOSTAS).

This is a rebaselined SAR to a development estimate.

The Joint STARS system is expected to satisfy the mission requirement.

c. (U) Changes since "As of" Date -- none.

8. (U) Threshold Breaches: There are currently no baseline breaches, or ADM dated 5 July 1988 threshold breaches.

9. (U) Schedule: a. Milestones -- (1) Air Force	Planning Estimate/ Approved Program	Current Estimate/DE
Milestone IIA (AF & A)	Apr 85/N/A	Sep 85
Radar/Aircraft FSD Award	May 85/N/A	Sep 85
PDR Hardware	Jan 86/N/A	May 86
PDR Software	- / -	Mar 87
First Test Flight	- / -	Apr 88 (Ch-1)
CDR Hardware	Aug 86/N/A	Dec 86
CDR System	- / -	Nov 88
Milestone IIB	- / -	Apr 88
Contractor DT&E	Nov 88/N/A	Apr 89
System level perf verif start	- / -	Nov 90 (Ch-1)
GDT&E/IOT&E start	- / -	Feb 91 (Ch-1)
Milestone III	- / -	Dec 91 (Ch-1)
SDS Flight Test	- / -	Dec 92 (Ch-1)
SDS Production Decision	- / -	Oct 93 (Ch-1)
First production AC delivery	- / -	Mar 94 (Ch-2,3)
First SDS Installation	- / -	Jan 95 (Ch-1)
IOC	- / -	FY 96 (Ch-2,3)
Last AC Delivery	- / -	FY 00 (Ch-2,3)

9. (U) Schedule: a. Milestones -- (2) Army	Planning Estimate/ Approved Program	Current Estimate/DE
First Delivery	- / -	- (Ch-4)
IOC	TBD / -	- (Ch-4)
Last Delivery	- / -	- (Ch-4)
Interim GSM (FSED)		
GSM Contract Award	Aug 84/ N/A	Aug 84
CDR	- / -	Feb 85
Force Dev. Test & Experimentation	- / -	Feb 90 (Ch-1)
Joint IOT&E	- / -	Oct 90 (Ch-1)
First Unit Equipped	- / -	Oct 93 (Ch-1)
Limited Production Urgent (LPU) GSM		
Contract Award	- / -	Sep 87
FDT&E Start	- / -	Jun 89 (Ch-1)
First US unit equipped	- / -	Jun 90 (Ch-1)
Block I GSM		
Contract Award (FSD)	- / -	Aug 89 (Ch-1)
CDR	- / -	Mar 90 (Ch-1)
Milestone III	- / -	Nov 92 (Ch-1)
Production Contract Awd	- / -	Dec 92 (Ch-1)
First Unit Equipped	- / -	Sep 94 (Ch-1)
Block II GSM		
Contract Award (FSD)	- / -	Oct 92 (Ch-1)
CDR	- / -	Apr 93 (Ch-1)
FDT&E Start	- / -	Jan 94 (Ch-1)
Production Award	- / -	Mar 95 (Ch-1)
First Unit Equipped	- / -	Mar 97 (Ch-1)

9. b. (U) Previous Change Explanations -- Milestone II decision was delayed due to affordability considerations and examination of alternatives. Milestones were added and/or dates were established as a result of the Milestone IIA SDDM. AF Hardware CDR slipped due to software development review replan and subcontractor design delays. Software CDR was replaced with a System CDR. Milestone IIB delayed initially to complete Phase I of the Operational Utility Evaluation and again due to re-evaluation of the force structure by the service secretaries. DT&E changed as a result of establishing a Single Test Site, which transferred testing from Wright Patterson AFB to the contractor's facility. New GSM production award reflects implemented contract mod changing GSM-Radar interface requirements IAW Army/Air Force Chiefs of Staff Joint Initiative Decision directing a single platform single radar Joint STARS, giving the GSM the ability to use full radar capability.

c. (U) Current Change Explanations --

(Ch-1) Milestone or date added since December 1987.

(Ch-2) Milestone IIB recognized a fact-of-life 1 year FSD slip, resulting in a 1 year AF production start slip from FY91 to Jan 92.

(Ch-3) Milestone IIB changed platform from used to new 707 aircraft, extending required production time, and increased production quantities from 10 to 21 aircraft.

(Ch-4) Milestone IIB Approved Army program restructure. Milestones no longer applicable, and will not be shown in future SARs.

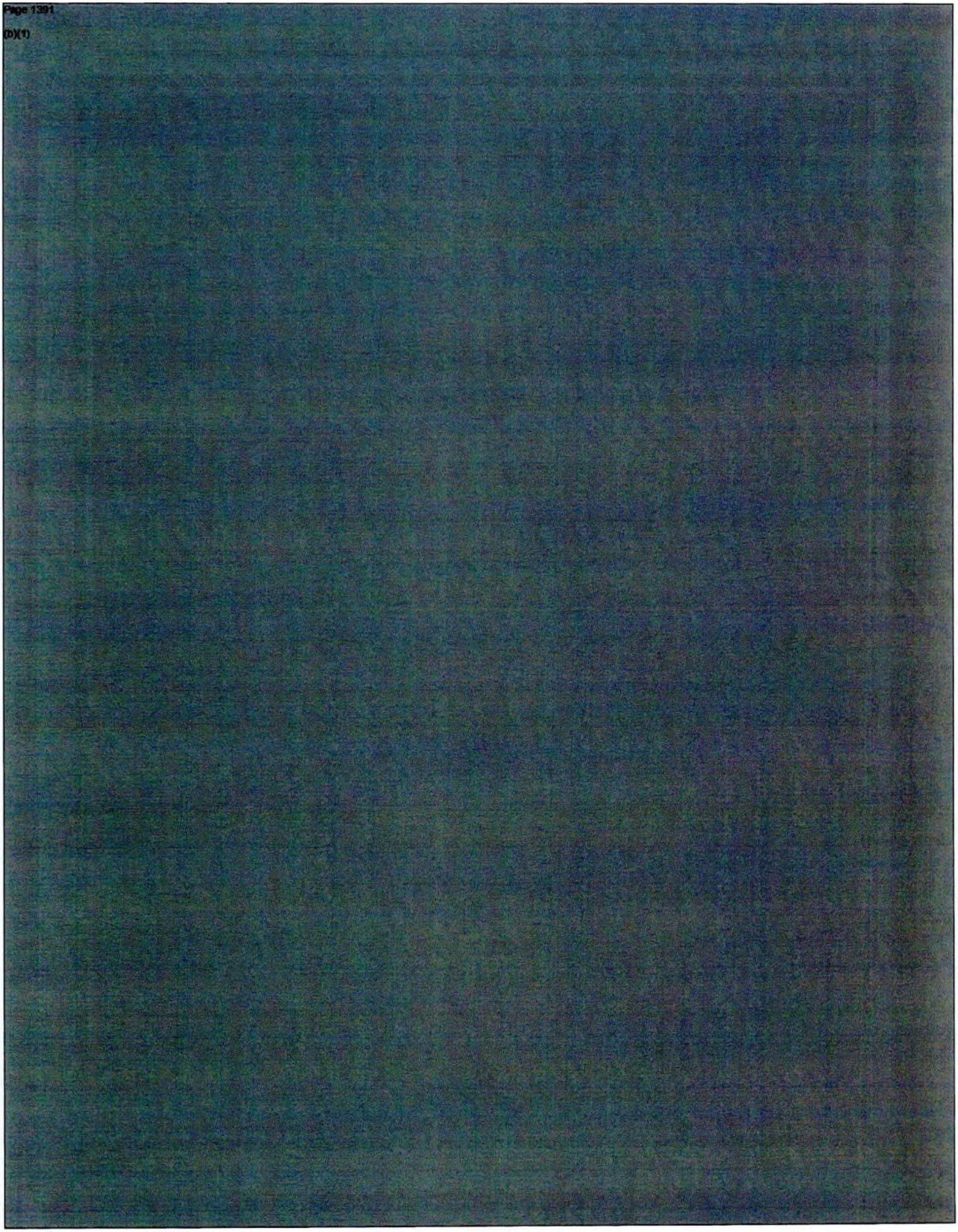
d. (U) References --

Planning Estimate: Army and Air Force R&D Descriptive Summaries. Joint STARS Program Management Directive, 21 Sep 1984.

Approved Program: No DAE baseline has been established for this program.

Development Estimate: ADM dated 5 July 1988, subject "Joint Surveillance Target Attack Radar System: Milestone IIB Acquisition Decision Memorandum."

(b)(1)



(b)(1)

e. (U) References --

Planning Estimate: Draft Joint STARS JSOR dated 26 September 1984. Joint STARS System Specification dated 24 September 1984, revised 17 October 1984.

Approved Program: No DAE baseline has been established for this program.

Current Estimate: ADM dated 5 July 1988, subject "Joint Surveillance Target Attack Radar System: Milestone IIB Acquisition Decision Memorandum.

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

Air Force & Army

A. Cost --	Planning Estimate	Approved Program	Current Estimate/DE
Development (RDT&E)	1185.3	1820.2	1820.2
Procurement	TBD	3752.5	3752.5
Flyaway		(3173.2)	(3173.2)
Recurring		(2944.8)	(2944.8)
Non-Recurring		(228.4)	(228.4)
Other Weapon System Cost		(299.7)	(299.7)
Initial Spares		(279.6)	(279.6)
Construction (MILCON)	TBD	87.7	87.7
Total FY Base-Year $	1185.3	5660.4	5660.4
Escalation	202.9	2373.1	2373.1
Development (RDT&E)	(202.9)	(391.4)	(391.4)
Procurement	(TBD)	(1941.6)	(1941.6)
Construction (MILCON)	(TBD)	(40.1)	(40.1)
		8033.5	8033.5
Total Then-Year $	1388.2		

B. Quantities -- (see individual Air Force and Army Sections)
C. Foreign Military Sales -- None
D. Nuclear Costs -- None
E. References: Planning Estimate: FY 1986 President's Budget
Approved Program: FY 90-91 President's Budget dated 9 January 1989.
Development Estimate: ADM dated 5 July 1988, FY90-91 President's Budget.

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

Air Force Only

A. Cost --	Planning Estimate	Approved Program	Current Estimate/DE
Development (RDT&E)	963.3	1448.2	1448.2
Procurement	TBD	3192.8	3192.8
Flyaway		(2663.8)	(2663.8)
Recurring		(2481.1)	(2481.1)

	Planning Estimate	Approved Program	Current Estimate/DE
Non-Recurring		(182.7)	(182.7)
Other Weapon System Cost		(286.4)	(286.4)
Initial Spares		(242.6)	(242.6)
Construction (MILCON)	TBD	87.7	87.7
Total FY83 Base-Year	963.3	4728.7	4728.7
Escalation	179.5	2013.2	2013.2
Development (RDT&E)	(179.5)	(315.0)	(315.0)
Procurement	TBD	(1658.1)	(1658.1)
Contruction (MILCON)	(TBD)	(40.1)	(40.1)
Total Then-Year $	1,142.8	6741.9	6741.9
B. Quantities --			
Development (RDT&E)	TBD	2	2
Procurement	TBD	21*	21*
Total	TBD	23*	23*

C. Foreign Military Sales -- None
D. Nuclear Costs -- None
E. References - same as previous page

* 1 FSD unit refurbished in production

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

Army Only

	Planning Estimate	Approved Program	Current Estimate/DE
A. Cost --			
Development (RDT&E)	222.0	372.0	372.0
Procurement	TBD	559.7	559.7
Flyaway		(509.4)	(509.4)
Recurring		(463.7)	(463.7)
Non-Recurring		(45.7)	(45.7)
Other Weapon System Cost		(13.3)	(13.3)
Initial Spares		(37.3)	(37.3)
Construction (MILCON)		-	-
Total FY83 Base-Year $	222.0	931.7	931.7
Escalation	23.4	359.9	359.9
Development	(23.4)	(76.4)	(76.4)
Procurement	TBD	(283.5)	(283.5)
Construction (MILCON		-	-
Total Then Year $	245.4	1291.6	1291.6

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

	Planning Estimate	Approved Program	Current Estimate/DE
B. Quantities --			
Development (RDT&E)	8	15	15
Procurement	TBD	97	97
Total	TBD	112	112

C. Foreign Military Sales -- None
D. Nuclear Costs -- None
E. References: Planning Estimate: FY 1986 President's Budget
Approved Program: FY 90-91 President's Budget dated 9 January 1989.
Development Estimate: ADM dated 5 July 1988, FY90-91 President's Budget.

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

	Current Est. (Dec 88 SAR)	Current Year UCR Baseline (Dec 87 SAR)	Budget Year UCR Baseline (Dec 88 SAR)
A. Program Acquisition			
(1) Cost	6741.9	3205.9	6741.9
(2) Quantity	23	10	23
(3) Unit Cost	293.126	320.590	293.126

B. Current Procurement -- None

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

	Current Est. (Dec 88 SAR)	Current Year UCR Baseline (Dec 87 SAR)	Budget Year UCR Baseline (Dec 88 SAR)
A. Program Acquisition			
(1) Cost	1291.6	852.9	1291.6
(2) Quantity	112	103	112
(3) Unit Cost	11.532**	8.281	11.532

	Current Year (FY 1989)	Current Year (FY 1989) APPN*	Budget Year (FY 1990)
B. Current Procurement			
(1) Cost	7.3	7.3	0.7
Less CY Adv Proc	NA	0.0	NA
Plus PY Adv Proc	NA	0.0	NA
Net Total	7.3	7.3	0.7
(2) Quantity	0	0	0
(3) Unit Cost	0	0	0

*Adjusted to reflect FY89 Appropriations Act in accordance with Congressional change to SAR law.
**Nunn McCurdy Program Acquisition Unit Cost (PAUC) Breach: 39.3 percent.

13. Cost Variance Analysis:

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

Air Force and Army

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	1388.2	-	-	1388.2
Previous Changes:				
Economic	-45.2	-21.0	-0.4	-66.6
Quantity		+1,425.1	+53.2	+1478.3
Schedule		+53.8	+ 1.4	+55.2
Engineering	+33.0	-3.6	-	+29.4
Estimating	+259.5	+213.4	-6.1	+466.8
Other	-	-	-	-
Support	-	+707.5	-	+707.5
Subtotal	+247.3	+2,375.2	+48.1	+2670.6
Current Changes:				
Economic	-0.9	-28.0	-0.2	-29.1
Quantity	+196.9	+731.9	+76.2	+1005.0
Schedule	-	+76.4	+3.7	+80.1
Engineering	+246.1	+2012.0	-	+2258.1
Estimating	+134.0	+292.7	-	+426.7
Other	-	-	-	-
Support	-	+233.9		+233.9
Subtotal	+576.1	+3318.9	+ 79.7	+3974.7
Total Changes	+823.4	+5694.1	+127.8	+6645.3
Current Estimate	2211.6	5694.1	127.8	8033.5

FY 1983 Constant Dollars (Base-Year) in Millions

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	1,185.3	-	-	1,185.3
Previous Changes:				
Quantity	-	+1,011.7	+40.6	+1,052.3
Schedule	-	+0.7	-	+0.7
Engineering	+26.6	-3.0	-	+23.6
Estimating	+182.4	+146.1	-4.6	+323.9
Other	-	-	-	-
Support	-	+483.2	-	+483.2
Subtotal	+209.0	+1638.7	+36.0	+1883.7
Current Changes:				
Quantify	+144.1	+512.1	+51.7	+707.9
Schedule	-	-	-	-
Engineering	+181.2	+1300.4	-	+1481.6
Estimating	+100.6	+162.5	-	+263.1
Other	-	-	-	-
Support	-	+138.8	-	+138.8
Subtotal	+425.9	+2113.8	+51.7	+2591.4
Total Changes	+634.9	+3752.5	+87.7	+4475.1
Current Estimate	1820.2	3752.5	87.7	5660.4

13. Cost Variance Analysis:

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

Air Force Only

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	1142.8	-	-	1142.8
Previous Changes:				
Economic	-31.0	-20.6	-0.4	-52.0
Quantity	-	+1000.0	+53.2	+1053.2
Schedule	-	+24.8	+1.4	+26.2
Engineering	+33.0	-	-	+33.0
Estimating	+242.6	+215.2	-6.1	+451.7
Other	-	-	-	-
Support	-	+551.0	-	+551.0
Subtotal	+244.6	+1770.4	+48.1	+2063.1
Current Changes:				
Economic	+0.5	-19.5	-0.2	-19.2
Quantity	-	+693.6	+76.2	+769.8
Schedule	-	+30.9	+3.7	+34.6
Engineering	+242.5	+1739.1	-	+1981.6
Estimating	+132.8	+374.3	-	+507.1
Other	-	-	-	-
Support	-	+262.1	-	+262.1
Subtotal	+375.8	+3080.5	+79.7	+3536.0
Total Changes	+620.4	+4850.9	+127.8	+5599.1
Current Estimate	1763.2	4850.9	127.8	6741.9

FY 1983 Constant Dollars (Base-Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	963.3	-	-	963.3
Previous Changes:				
Quantity	-	+684.8	+40.6	+725.4
Schedule	-	-	-	-
Engineering	+26.6	-	-	+26.6
Estimating	+180.5	+147.3	-4.6	+323.2
Other	-	-	-	-
Support	-	+369.9	-	+369.9
Subtotal	+207.1	+1202.0	+36.0	+1445.1
Current Changes:				
Quantity	-	+478.3	+51.7	+530.0
Schedule	-	-	-	-
Engineering	+178.3	+1124.1	-	+1302.4
Estimating	+99.5	+227.7	-	+327.2
Other	-	-	-	-
Support	-	+160.7	-	+160.7
Subtotal	+277.8	+1990.8	+51.7	+2320.3
Total Changes	+484.9	+3192.8	+87.7	+3765.4
Current Estimate	1448.2	3192.8	87.7	4728.7

13. (U) Cost Variance Analysis (Continued):
B. Previous Change Explanations -- Air Force Only
(1) (U) RDT&E

Economic: Revised economic escalation indices.
Estimating: Refinement and rephasing of program estimate, Adjustment for prior, current and future escalation, deletion of 3rd aircraft and ADA implementation, Congressionally directed cuts, addition of Self Defense Suite, reauthorization and partial funding for 3rd aircraft.

PROCUREMENT

Economic: Revised economic escalation indices.
Quantity: Addition of Procurement cost for 10 aircraft.
Estimating: Production deferral of one year and rephasing of buy schedule. Adjustment for future escalation change.
Support: Addition of Procurement Support cost associated with 10 aircraft.

MILCON

Economic: Revised economic escalation indices.
Quantity: Addition of MILCON cost associated with procurement program.
Schedule: One year deferral of MILCON
Estimating: Deletion of FY 88 MILCON project. Adjustment for future escalation change.

C. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then Year
(1) (U) RDT&E		
Revised Dec 88 Economic Inflation indices (Economic)	N/A	+0.5
Adjustment for current and prior year escalation change (Estimating)	-0.7	-0.8
Budgetary Reprogrammings and reductions (Estimating)	-9.4	-11.5
Program estimate refining/rephasing (Estimating)	+109.6	+145.1
Funding for increased scope approved at DAB IIB	+178.3	+242.5
Added for Self Defense (Engineering)	(+126.4)	(+170.5)
Added for Mission Sim (Engineering)	(+26.9)	(+37.0)
Added for Flight Sim (Engineering)	(+10.8)	(+15.0)
Added for Readiness Improvement (Engineering)	(+14.2)	(+20.0)
(2) (U) PROCUREMENT		
Revised Dec 88 Economic Inflation indices (Economic)	N/A	-19.5

13. (U) Cost Variance Analysis (continued) -- Air Force only

	(Dollars in Millions) Base-Year	Then-Year
Increased Force Structure from 10 to 21 production aircraft	625.5	986.6
Addition of 11 procurement units (Quantity)	(478.3)	(693.6)
Delay and extension of procurement schedule (Schedule)	(0.0)	(30.9)
Change in initial Spares (Support)	(150.8)	(233.7)
Change in other support costs (Support)	(9.9)	(28.4)
Change from used to new airframes	1052.6	1657.3
Increase in airframe costs (Engineering)	(824.9)	(1283.0)
Refinement of program estimate (Estimating)	(227.7)	(374.3)
Added scope for SDS (Engineering)	299.2	456.1
(3) (U) MILCON		
Revised economic escalation indices (Economic)	N/A	-0.2
Addition of MILCON cost associated with increased production (Quantity)	+51.7	+76.2
2 year deferral of MILCON (Schedule)	+0.0	+3.7

13. Cost Variance analysis:

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

Army Only

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	245.4	-	N/A	245.4
Previous Changes:				
Economic	-14.2	-0.4	-	-14.6
Quantity	-	+425.1	-	+425.1
Schedule	-	+29.0	-	+29.0
Engineering	-	-3.6	-	-3.6
Estimating	+16.9	-1.8	-	+15.1
Other	-	-	-	-
Support	-	+156.5		+156.5
Subtotal	+2.7	+604.8	N/A	+607.5
Current Changes:				
Economic	-1.4	-8.5	-	-9.9
Quantity	+196.9	+38.3	-	+235.2
Schedule	-	+45.5	-	+45.5
Engineering	+3.6	+272.9	-	+276.5
Estimating	+1.2	-81.6	-	-80.4
Other	-	-	-	-
Support	-	-28.2	-	-28.2
Subtotal	+200.3	+238.4	N/A	+438.7
Total Changes	+203.0	+843.2	N/A	+1046.2
Current Estimate	448.4	843.2	N/A	1291.6

FY 1983 Constant Dollars (Base-Year in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	222.0		N/A	222.0
Previous Changes:				
Quantity	-	+326.9	-	+326.9
Schedule	-	+0.7	-	+0.7
Engineering	-	-3.0	-	-3.0
Estimating	+1.9	-1.2	-	+0.7
Other	-	-	-	-
Support	-	+113.3	-	+113.3
Subtotal	+1.9	+436.7	N/A	+438.6
Current Changes:				
Quantity	+144.1	+33.8	-	+177.9
Schedule	-	-	-	-
Engineering	+2.9	+176.3	-	+179.2
Estimating	+1.1	-65.2	-	-64.1
Other	-	-	-	-
Support	-	-21.9	-	-21.9
Subtotal	+148.1	+123.0	N/A	+271.1
Total Changes	+150.0	+559.7	N/A	+709.7
Current Estimate	372.0	559.7	N/A	931.7

13. Cost Variance Analysis (Continued):

B. Previous Change Explanation -- Army Only

(1) (U) RDT&E

Economic: Revised economic escalation indices.

Estimating: Refinement and rephasing of program estimate and results of Congressionally directed cuts. Adjustment for current and prior year escalation change. Decreased costs due to refinement and rephasing of grass roots estimate.

PROCUREMENT

Economic: Revised economic escalation indices.

Quantity: Addition of procurement flyaway costs for 95 ground stations.

Schedule: Two year schedule delay. Rephasing of program production schedule resulting in deferral of 8 units from FY89 to FY95. Three year procurement delay due to unavailability of data link. Increased flyaway costs due to schedule stretchout.

Estimating: Refinement and rephasing of program estimate. Adjustment for prior, current and future years escalation change. Increased flyaway costs due to refined estimate.

Engineering: Decreased flyaway costs due to engineering & change.

Support: Addition of procurement support costs associated with 95 ground stations. Increased support costs due to schedule deferral, correction of error, schedule stretchout and refinement of a prior current estimate. Decreased support costs associated with an engineering change, correction of a previous error.

C. Current Change Explanations -- Army Only

(Dollars in Millions)

	Base-Year $	Then-Year $
(1) (U) RDT&E		
Revised Dec 88 Economic inflation indices (Economic)	N/A	-1.4
Increase in quantity from 8 to 15 units (Quantity)	+144.1	+196.9
Adjustment for current and prior year escalation change (Estimating)	+1.3	+1.4
Congressional reductions and budgetary reprogramming (Estimating)	-0.2	-0.2
Congressional Reprogramming for early GSM development (Engineering)	+2.9	+3.6

c. Current Change Explanations -- Army Only (Continued):

	(Dollars in Millions) Base-Year $	Then-Year $
(2) (U) Procurement		
Revised Dec 88 Economic Inflation indices (Economic)	N/A	-8.5
Adjustment for current and prior year escalation change (Estimating)	+0.8	+1.0
Increase in production from 95 to 97 units	11.9	+55.6
Addition of 2 procurement units (Quantity)	(+33.8)	(+38.3)
Delay and extension of procurement schedule (Schedule)	(0.0)	(+45.5)
Change in initial spares (Support)	(-11.2)	(-15.6)
Change in other support costs (Support)	(-10.7)	(-12.6)
Budgetary Reprogramming and Reductions (Estimating)	-58.0	-77.0
Change in end item configuration	+176.3	+272.9
Added SAR/FTI capability, embedded training, full data storage rates, multi-mission archiving (Engineering)	(+30.4)	(+46.2)
Added Nuclear-Biological-Chemical Capability (Engineering)	(+145.9)	(+226.7)
Correction to previous SAR Baseline Cost Estimate (Estimating)	-8.0	-5.6

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	SCHEDULE	ENGR'G	ESTIMATE	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	SCHEDULE	ENGR'G	ESTIMATE	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.

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

a. (U) RDT&E

Radar/Aircraft Platform	Initial Contract Price Target	Ceiling	Qty
Grumman Aerospace Corp., Bethpage, NY F19628-85-C-0053 FPIF Award: 27 September 1985 Definitized: 27 September 1985	657.0	657.0	2

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
701.5	704.5	2	704.5	[redacted]* 1000.0

* This includes typical ECO historical levels and options that have not yet been exercised.

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-133.2	-105.0
Cumulative Variance to Date (11/30/88)	-149.6	-90.6
Net Change	-16.4	+14.4

Schedule variance is due to late material deliveries from subcontractors and by prime contractor delays in system engineering, software engineering, and system test. Cost variance is primarily caused by prime contractor problems in designing and implementing software. Additional cost variance is driven by problems with vendor hardware, hardware/software laboratory integration, and radar sensor development. Impact to contract is a slip in completion of testing to the 4th Qtr of FY91 as briefed in the Apr DAB IIB. No cost impacts due to the firm fixed price nature of the contract.

UNCLASSIFIED

GSM FSED Contract	Initial Contract Price Target	Ceiling	Qty
Motorola Inc, Tempe AZ DAAK-20-84-C-0879 FPIF Award: 10 Aug 1984 Definitized: 10 Aug 1984	31.5	35.4	6

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
76.3	92.2	8	81.4	92.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-8.780	-4.686
Cumulative Variances to Date (11/28/88)	-10.893	-5.127
Net Change	-2.113	-0.441

The cumulative cost variance is primarily the result of higher than anticipated costs for hardware and software development. The majority of the variance in these areas is due to significantly more labor required for mechanical design and hardware documentation. BIT and operational software design proved to be more complex than anticipated. Reliability, human factors and safety cost more than planed due to a larger number of minor parts and design changes required to insure specification compliance. The schedule variance is the result of subcontractor slippage of hardware deliveries. These delivery delays have in turn impacted both qualification testing and data items. Program office has instituted workarounds to maintain program schedule and the delivery of needed display generators has begun.

b. Procurement -- NA

c. MILCON -- NA

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

A. Program Status -- Air Force and Army
(1) Percent Program Completed: 36% (8/22)
(2) Percent Program Cost Appropriated: 18.5% (1,483.9/8,033.5)

B. Appropriation Summary --

	(Then-Year Dollars in Millions)				
Appropriation	Prior Years (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-93)	Total
RDT&E	1427.1	210.9	149.4	424.2	2211.6
Procurement	56.8	0.7	55.5	5581.1	5694.1
JTIDS				(59.1)	(59.1)
Other	(56.8)	(0.7)	(55.5)	(5522.0)	(5635.0)
MILCON				127.8	127.8
	1483.9	211.6	204.9	6133.1	8033.5

UNCLASSIFIED

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

A. Program Status -- Air Force Only

(1) Percent Program Completed: 47% (8 yrs/17 yrs)

(2) Percent Program Cost Appropriated: 17.5% (1180.6/6741.9)

B. Appropriation Summmary --

	(Then-Year Dollars in Millions)				
Appropriation	Prior Years	Budget Year	Budget Year	Balance to Complete	Total
	(FY82-89)	(FY90)	(FY91)	(FY92-98)	
RDT&E	1180.6	178.0	105.9	298.7	1763.2
Procurement			55.5	4795.4	4850.9
JTIDS				(59.1)	(59.1)
Other			(55.5)	(4736.3)	(4791.8)
MILCON				127.8	127.8
Total	1180.6	178.0	161.4	5221.9	6741.9

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

A. Program Status -- Army Only

(1) Percent Program Completed: 36% (8/22)

(2) Percent Program Cost Appropriated: 23% (303.2/1291.6)

B. Appropriation Summary --

	(Then-Year Dollars in Millions)				
Appropriation	Prior Years	Budget Year	Budget Year	Balance to Complete	Total
	FY82-89)	(FY90)	(FY91)	(FY92-03)	
RDT&E	246.5	32.9	43.5	125.5	448.4
Procurement	56.8	0.7	0.0	785.7	843.2
MILCON	-	-	-	-	-
Total	303.3	33.3	43.5	911.2	1291.6

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	Excl. Rate (%)
Appropriation: RDT&E								
1982				37.7	36.7	36.7	36.7	9.2/7.6
1983				66.5	67.8	67.8	67.8	4.9
1984				102.7	108.8	108.8	108.8	3.8
1985				70.8	77.3	77.3	74.9	3.4
1986				176.9	198.2	198.2	192.4	2.8
1987				282.1	326.7	326.7	254.5	2.7
1988				294.8	354.3	263.8	33.4	3.1
1989				206.5	257.3	76.1	3.3	4.0
1990				163.9	210.9			3.6
1991				112.7	149.4			3.3
1992				99.6	135.3			2.8
1993				114.5	158.7			2.3
1994				69.3	97.8			1.8
1995				10.3	14.8			1.8
1996				5.9	8.6			1.8
1997				3.4	5.0			1.8
1998				2.6	4.0			1.8
Sub-Total				1820.2	2211.6	1155.4	771.5	

Appropriation: Procurement
(3010 is Air Force Procurement, 2035 is Army Procurement -- see individual Air Force and Army sections for funding profiles)

Appropriation: MILCON								
1992	-	-	-	2.5	3.4			2.8
1993	-	-	-	19.5	27.5			2.3
1994	-	-	-	20.5	29.3			1.8
1995	-	-	-	7.5	10.9			1.8
1996	-	-	-	22.7	33.7			1.8
1997	-	-	-	2.6	3.9			1.8
1998	-	-	-	12.4	19.1			1.8
Sub-Total	-	-	-	87.7	127.8			
Total	N/A	228.4	2944.8	5660.4	8033.5	1185.2	782.3	

Obligations and expenditures reflect program office records as of 31 Dec 1988.

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	9.2/76
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	-	-	-	139.3	156.1	156.1	156.1	2.8
1987	-	-	-	259.2	300.2	300.2	235.6	2.7
1988	-	-	-	279.8	336.3	246.1	24.1	3.1
1989	-	-	-	188.2	234.5	71.3	3.1	4.0
1990	-	-	-	138.4	178.0			3.6
1991	-	-	-	79.9	105.9			3.3
1992	-	-	-	72.6	98.6			2.8
1993	-	-	-	93.1	129.1			2.3
1994	-	-	-	50.3	71.0			1.8
Sub-Total	2*	-	-	1448.2	1763.2	927.2	572.4	
Appropriation: Procurement								
1991			39.3	39.3	55.5			3.3
1992	1	3.5	132.0	192.3	276.9			2.8
1993	1	6.5	272.2	375.1	550.3			2.3
1994	4	154.4	468.7	767.1	1146.1			1.8
1995	4	5.1	509.1	602.7	916.1			1.8
1996	4	5.0	485.0	550.7	852.2			1.8
1997	4	5.0	410.9	470.6	741.1			1.8
1998	3	3.2	163.9	195.0	312.7			1.8
Sub-Total	21*	182.7	2481.1	3192.8	4850.9			
Appropriation: MILCON								
1992	-			2.5	3.4			2.8
1993	-			19.5	27.5			2.3
1994	-			20.5	29.3			1.8
1995	-			7.5	10.9			1.8
1996	-			22.7	33.7			1.8
1997	-			2.6	3.9			1.8
1998	-			12.4	19.1			1.8
Sub-Total	-			87.7	127.8			
Total	23*	182.7	2481.1	4728.7	6741.9	927.2	572.4	

Obligations and expenditures reflect program office records as of 31 Dec 1988.

* 1 FSD unit will be refurbished in production.

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	FY83 Base-year Dollars Flyaway Rec	Total Base Year	Total Then Year $ Program	Total Then Year $ Obligated	Total Then Year $ Expended	Escl. 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	-	-	-	37.6	42.1	42.1	36.3	2.8
1987	-	-	-	22.9	26.5	26.5	18.9	2.7
1988	-	-	-	15.0	18.0	17.7	9.3	3.1
1989	-	-	-	18.3	22.8	4.8	0.2	4.0
1990	-	-	-	25.5	32.9			3.6
1991	-	-	-	32.8	43.5			3.3
1992	-	-	-	27.0	36.7			2.8
1993	-	-	-	21.4	29.6			2.3
1994	-	-	-	19.0	26.8			1.8
1995	-	-	-	10.3	14.8			1.8
1996	-	-	-	5.9	8.6			1.8
1997	-	-	-	3.4	5.0			1.8
1998	-	-	-	2.6	4.0			1.8
Sub Total	15	-	-	372.0	448.4	228.2	199.1	

C. Annual Summary -- Army Only

Fiscal Year	Qty	FY83 Base-Year Dollars Flyaway Nonrec	FY83 Base-Year Dollars Flyaway Rec	Total Base Year	Total Then-Years $ Program	Total Then-Years $ Obligated	Total Then-Years $ Expended	Escl. Rate (%)
Appropriation: Procurement								
1987	3	1.1	10.9	18.0	21.6	14.7	7.2	2.7
1988	6	1.5	15.6	22.5	27.9	15.1	3.6	3.1
1989		0.0	0.0	5.7	7.3			4.0
1990		0.0	0.0	.5	0.7			3.6
1991		0.0	0.0	0.0	0.0			3.3
1992		2.0	20.2	26.1	36.1			2.8
1993	6	2.3	23.3	36.2	51.0			2.3
1994	6	2.1	21.7	31.4	45.0			1.8
1995	9	5.4	54.1	60.8	88.9			1.8
1996	9	4.6	47.1	53.1	79.0			1.8
1997	9	4.5	44.8	50.5	76.4			1.8
1998	9	4.2	43.0	48.5	74.7			1.8
1999	9	4.1	42.0	47.5	74.6			1.8
2000	9	4.1	41.4	46.6	74.5			1.8
2001	9	4.0	40.6	45.8	74.5			1.8
2002	13	3.1	31.8	35.9	59.4			1.8
2003		2.7	27.2	30.6	51.6			1.8
Sub Total	97	45.7	463.7	559.7	843.2	29.8	10.8	
Total	112	45.7	463.7	931.7	1291.6	258.0	209.9	

Obligations and expenditures reflect program office records as f 31 Dec 88.

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	N/A		3	N/A
1988	N/A		6	
1989	N/A			
1990	N/A			
1991	N/A			
1992	N/A			
1993	N/A		6	
1994	N/A		6	
1995	N/A		9	
1996	N/A		9	
1997	N/A		9	
1998	N/A		9	
1999	N/A		9	
2000	N/A		9	
2001	N/A		9	
2002	N/A		13	
Total			97	

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$)	N/A		931.7		
(TY$)	N/A		1291.6		
Pauc (BY$)	N/A		8.319		
(TY$	N/A		11.330		

C. Schedule Variance --

Item	Production Estimate	Variance (CE Less PDE)	Current Estimate	Variance (CE Less Max)	Maximum Economic
Start Date (Mo/Yr)			9/87		
Duration (in Months					
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

E. 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. N/A
b. N/A
c. Contractor Support Costs - N/A


(b)(1)


(b)(1)

SAR-88-074

AF-26 SFW

(b)(1)

This Page is Unclassified

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

PROGRAM: Sensor Fuzed Weapon (SFW)

AS OF DATE: December 31, 1988

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SAF/PAS
89-0036-T
#6

1. Designation and Nomenclature (Popular Name): CBU-97/B, SFW

2. DoD Component: U.S. Air Force

OASD(PA) DFOISR 89-T-0282

3. Responsible Office and Telephone Number:

Deputy for Air-to-Surface
Ballistic Weapons
Armament 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)

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

(b)(1)

6. 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 (CBU-97/B) consists of ten BLU-108/B submunitions packaged within the Tactical Munitions Dispenser (TMD). Within each BLU-108/B submunition are four self forging fragment warheads, commonly called "skeets". Each of the 40 warheads within the SFW is independently targeted by a dual channel infrared sensor. The SFW does not replace any existing system but greatly enhances antiarmor capabilities.

7. Program Highlights:

a. Significant Historical Developments -- 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 are 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.

(1) A significant pre-Critical Design Review (CDR) test program was completed to confirm design performance at the component, subsystem and system levels. As a result, early identification and resolution of design issues has allowed the SFW to enter DT&E with substantial design maturity.

b. Significant Developments Since Last Report --

(1) There were 7 munition-level tests completed during this phase which demonstrated very stable submunition dispense, ground pattern generation, projectile deployment, and multiple target engagement.

(2) During Feb 88 and Aug 88, tactical sensor captive flight tests were conducted at Grayling, MI and Yuma, AZ respectively. Over 9000 target passes were conducted to assess sensor performance in snow and desert environments.

(3) A number of submunitions were launched from rocket sleds at Sandia to test skeet deployment over a target array and to verify the parachute's capability.

(4) Supplemental altimeter countermeasure and HAVE NOTE (electromagnetic susceptibility) testing was completed Jan 88 at Rome Air Development Center. The SFW CDR was conducted 19-29 Apr 88. One action item concerning "sympathetic firing" characteristics remains open. A series of multiple submunition drop tests was conducted to assess system "sympathetic firing" characteristics. A design problem was identified during those tests, and a series of single projectile tests was added to evaluate the design fix. A fourth multisubmunition test will be conducted in the second quarter FY89 with post CDR hardware.

(5) Efforts are underway to have an alternate source for SFW on contract in FY89. The acquisition strategy is in final coordination.

(6) The SFW DT&E program started 13 Dec 88 with the drop of the first CBU-97/B containing inert submunitions with parachutes. Five of the ten inert submunitions failed to function because the battery leads had been inadvertently cut during assembly. The remaining submunitions performed well. CBU-97/B testing will evolve from using inert submunitions to submunitions with inert projectiles to all-up-live units.

(7) The goals and thresholds cited are per the draft Aug 88 SORD and are reflected in the SFW Acquisition Program Baseline (APB) which is in the approval process.

8. Threshold Breaches: The program has breached the February 1988 DAE baseline for the following milestones:

Production Decision
RDT&E Costs

(b)(1)

(b)(1)

b. Operational --

	Dev Est	Approved Program Goals/Thresholds	Demonstrated Performance	Current
System Reliability	.90	.90/.89	N/A	.90
TMD	N/A	.95/.95	.98	.95
BLU 108/B	N/A	.95/.95	N/A	.95
Environmental/ Storage	World-Wide Climatic Conditions	World-Wide/World-Wide Climatic Conditions Conditions	World-Wide Climatic Conditions	World Wide Climatic Conditions
Shelf Life	10 yrs	15 yrs/10 yrs	N/A	10 yrs
Service Life	1 yr	2 yrs/ 1 yr	N/A	1 yr
Maintainability	Wooden Rnd Concept. No Scheduled Maintenance	Wooden Rnd /Wooden Rnd Concept. No Concept. No Scheduled Scheduled Maintenance Maintenance	Wooden Rnd Concept. No Scheduled Maintenance	Wooden Rnd Concept. No Scheduled Maintenance
Aircraft Compatibility	A-7, A-10 F-4 F-15 F-16 F-111 B-52GH NATO Acft	A-7DK /A-7DK A-10 F-15E /F-15E F-16ABCD /F-16ABCD F-111ADEF&G/F-111ADEF&G B-52GH NATO Acft	N/A N/A N/A N/A N/A N/A N/A	A-7DK A-10 F-15E F-16ABCD F-111ADEF & G B-52GH NATO Acft (Ch-2)

c. Previous Change Explanations -- None

d. Current Change Explanations --

(Ch-1) Airspeed was changed from 200-650 KCAS to 200-700 KCAS per the draft Aug 88 SORD.

(Ch-2) Aircraft compatibility was changed by deleting the F-4 and adding suffix designators for the A-7, F-15, F-16, and F-111.

e. References --

Development Estimate: 16 Sep 87 DAE Baseline

Approved Program: DAE baseline approved February 1988.

Includes adaptor kit

SFW, December 31, 1988

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

a. Cost --	DEVELOPMENT ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE
Development (RDT&E)	80.0	110.7	110.7
Procurement	1139.8	1458.3	1458.3
Total Flyaway	(1127.7)	(1442.8)	(1442.8)
Other Weapon System Cost	(12.1)	(15.5)	(15.5)
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	1569.0
Escalation	1186.0	1641.8	1641.8
Development (RDT&E)	(47.7)	(69.6)	(69.6)
Procurement	(1138.3)	(1572.2)	(1572.2)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
TOTAL THEN-YEAR $	2405.8	3210.8	3210.8
b. Quantities --			
Development (RDT&E)	84	97	97
Procurement	14000	19803	19803
TOTAL	14084	19900	19900

c. Foreign Military Sales -- None.

d. Nuclear Costs -- None.

e. Development Estimate: OSD/CAIG Briefing, May 1986 (Approved by OSD).

Approved Program: FY90-91 President's Budget

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

	Current Year		Budget Year
	Current Estimate Dec 88 SAR	UCR Baseline Dec 87 SAR	UCR Baseline Dec 88 SAR
a. Program Acquisition --			
(1) Cost	3210.8	3212.7	3210.8
(2) Quantity	19900	19892	19900
(3) Unit Cost	.161	.162	.161
b. Current Procurement -	(FY1989)	(FY1989)	(FY1990)
(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	127.7	2278.1	--	2405.8
Previous Changes:				
Economic	-1.4	+12.5	--	+11.1
Quantity	+2.3	+750.9	--	+753.2
Schedule	--	+28.5	--	+28.5
Engineering	--	--	--	--
Estimating	+24.9	-18.3	--	+6.6
Other	--	--	--	--
Support	--	+7.5	--	+7.5
Subtotal	+25.8	+781.1	--	+806.9
Current Changes:				
Economic	+0.2	-60.4	--	-60.2
Quantity	+3.6	--	--	+ 3.6
Schedule	--	+54.2	--	+54.2
Engineering	--	--	--	--
Estimating	+23.0	-22.9	--	+0.1
Other	--	--	--	--
Support	--	+0.4	--	+0.4
Subtotal	+26.8	-28.7	--	-1.9
Total Changes	+52.6	+752.4	--	+805.0
Current Estimate	180.3	3030.5	--	3210.8

13. Cost Variance Analysis (Cont'd):

(FY1979 Constant (Base-Year) Dollars in-Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	80.0	1139.8	--	1219.8
Previous Changes:				
Economic	--	--	--	
Quantity	+1.4	+340.6	--	+342.0
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+14.7	-11.6	--	+3.1
Other	--	--	--	--
Support	--	+3.2	--	+3.2
Subtotal	+16.1	+332.2	--	+348.3
Current Changes:				
Economic	--	--	--	--
Quantity	+2.2	--	--	+2.2
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+12.4	-13.9	--	-1.5
Other	--	--	--	--
Support	--	+0.2	--	+0.2
Subtotal	+14.6	-13.7	--	+0.9
Total Changes	+30.7	+318.5	--	+349.2
Current Estimate	110.7	1458.3	--	1569.0

b. Previous Change Explanations --

RDT&E

Economic: Revised economic escalation indices.
Quantity: Increased RDT&E units by five for Life Cycle Surveillance Testing using funds already appropriated.
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.

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.

13. Cost Variance Analysis (Cont'd):

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 FY90.

Support: Increased data costs associated with 5,803 SFWs added to the program. Price adjusted based on actuals.

Estimating: New pricing methodology used Risk Reduction Hardware Actuals. Competition starts two years earlier.

c. Current Change Explanations -- (Dollars in Millions)

	Base-Year $	Then-Year $
(1) RDT&E		
Revised Economic Escalation Indices (Economic)	N/A	+0.2
Adjustment to reflect the purchase of 8 additional IOT&E assets (Quantity)	+2.2	+3.6
Adjustment to appropriately account for 8 additional IOT&E units (Estimating)	-2.2	-3.6
Adjusted for Current and Prior Year Escalation Offset (Estimating)	-0.1	-0.2
Increase for Pre-Production Process Verification, additional testing and SPO support requirements (Estimating)	+14.7	+26.8
(2) Procurement		
Revised Economic Escalation Indices (Economic)	N/A	-60.4
First procurement buys scheduled for FY90 were changed to FY91 (Schedule)	N/A	+54.2
Cost savings as a result of a revised alternate source strategy (Estimating)	-13.9	-22.9
Data pricing adjusted based on actuals (Support)	+.2	+.4

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

a. Initial SAR/Planning Estimate (PE) to Development Estimate --

PAUC (Initial SAR/PE	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
-	-	+0.163	-	-	+0.006	-	+0.002	+0.171	0.171

b. Development Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
+0.171	-.003	-.013	+.004	-	+.001	-	+.001	-.010	0.161

15. 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-

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$89.0	$96.0	97	$130.0	$139.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances (27 Nov 88)	-3.9M	-4.4M
Cumulative Variances To Date	-20.7M	-11.6M
Net Change	-16.8M	-7.2M

Explanation of Change: Cumulative variances reflect performance since the implementation of an Over Target Baseline adjustment in Jul 87. The variances are the result of extensive engineering and manufacturing efforts on the BLU-108B structure, late delivery of hardware from Textron to the load and pack facility, and a commitment of overtime resources to meet the scheduled CDR in Apr 88. Current cost efficiency is 54%. Government liability is limited to 96.0M. To date contractor expense totals $112.7M.

b. Procurement -- None.

c. MILCON -- None.

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

a. Program Status --

(1) Percent Program Completed: 38.9% (7 yrs/18 yrs) (Years Funds Appropriated/Total Program Years).

(2) Percent Program Cost Appropriated: 4.8% ($152.7/$3210.8) (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 (FY92-00)	Total
RDT&E	152.7	27.6	0	0	180.3
Procurement	-0-	-0-	118.7	2911.8	3030.5
MILCON	-0-	-0-	-0-	-0-	-0-
Total	152.7	27.6	118.7	2911.8	3210.8

SFW, December 31, 1988

c. Annual Summary --

Fiscal Year	Qty	Base-Year Dollars		Total	Then-Year Dollars			Escl Rate %
		Flyaway						
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: PDT&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	35.1	3.4
1986				15.6	24.6	24.5	24.0	2.8
1987				14.3	23.3	22.9	3.6	2.7
1988				13.1	22.0	21.7	4.2	3.1
1989				15.2	26.5	.7	.0	4.0
1990				15.3	27.6	0	.0	3.6
Sub-total	97	*	*	110.7	180.3	125.9	87.8	
Appropriation: Procurement								
1991	65	8.3	41.1	49.5	118.7			3.3
1992	505	13.0	86.5	100.4	205.1			2.8
1993	1535	13.0	145.9	160.5	318.1			2.3
1994	2880	0	209.0	211.4	426.4			1.8
1995	2880	0	188.5	190.6	391.4			1.8
1996	2880	0	177.5	179.6	375.5			1.8
1997	2880	0	176.7	178.7	380.4			1.8
1998	2880	0	177.2	179.2	388.3			1.8
1999	2880	0	177.9	179.9	396.8			1.8
2000	418	0	28.2	28.5	29.8			1.8
Sub-total	19803	34.3	1408.5	1458.3	3030.5			
Appropriation: MILCON								
Sub		--	--	--	--	--	--	--
Total	19900	34.3	1408.5	1569.0	3210.8	--		N/A

* Information not available.

17. 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	65	N/A
1992	1500	N/A	505	N/A
1993	2000	N/A	1535	N/A
1994	2500	N/A	2880	N/A
1995	2700	N/A	2880	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	418	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$)	N/A	N/A	1569.0	N/A	N/A
	(TY$)	N/A	N/A	3210.8	N/A	N/A
PAUC	(BY$)	N/A	N/A	0.079	N/A	N/A
	(TY$)	N/A	N/A	0.161	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	12/90	N/A	N/A
Duration (in Months)	N/A	N/A	129	N/A	N/A
End Date (Mo/Yr)**	N/A	N/A	9/01	N/A	N/A

* Projected date of Contract Award
** Projected date of last delivery

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	27/1
Procurement	0/0

18. Operating and Support Costs:

a. N/A
b. N/A
c. Contractor Support Costs - N/A

AF-31 TRI-TAC

SAR-88-079

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

PROGRAM: JOINT TACTICAL COMMUNICATIONS (TRI-TAC) PROGRAM

AS OF DATE: December 31, 1988

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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: Col Robert J. Hovde
Assigned: Sept 15 1986
AV 478-8319
COMM (617) 377-8319

4. Program Elements/Procurement Line Items:

RDT&E: PE 28010F

PROCUREMENT: APPN 3080 ICN 835100

MILCON: N/A

5. Related Programs: N/A

[redacted]

SAF/PAS

89-0036-T

#23

89 0250

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). USAF 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)

CNCE. 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 June 1976, a contract was awarded to Raytheon Company for the development of three sets of TROPOs. Each version has successfully completed joint DT&E/IOT&E at Ft Huachuca, AZ.

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 41 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).

b. Significant Developments Since Last Report--

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 FY91 acquisition strategy will be a competitive three year multiyear.

CNCE. The final CNCE delivery was in August 1988. This will be the last report on the CNCE.

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

(1) CNCE

a. Milestones

	Production 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
First Delivery	Aug 86/Aug 86	Aug 86
Last Delivery	Mar 88/Oct 88	Aug 88 (Ch-1)

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 USCENTCOM units.

c. Current Change Explanations -- (Ch-1)-Last delivery change from Oct 88- to Aug 88 because of aggressive management.

d. References --

Production Estimate: FY 85 President's Budget, January 1984.

Approved Program: DAE baseline dated February 1988.

1/ There is no directed or defined IOC for CNCE.

(2) TROPO

a. Milestones

	Production Estimate/ Approved Program	Current Estimate
Production Begins	Apr 82/Apr 82	Apr 82
Initial Operational Capability 1/	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 (Ch-1)	- /Jun 90	Jun 90
Last Delivery FY88 Option (Ch-1)	- /Nov 92	Nov 92

9. Schedule (Cont'd)

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).

c. Current Change Explanations -- (Ch-1) FY88 Option milestones not previously reported.

d. References --

Production Estimate: FY 85 President's Budget, January 1984.

Approved Program: DAE baseline dated February 1988.

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
Capacity (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

10. Technical/Operational Characteristics (Cont'd)

2. TROPO	Prod Est	Appr Program Goal/Threshold	Demonstrated Performance	Current Estimate	
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

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	1		1	1
Maximum Set Up/Tear Down (Minimum/Full Site)					
Times (Hrs)					
V-2	2/4	2-5/2-4		4/4	4/4
V-3	1/1	1-2/1-1		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 February 1988.

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)
System: TRI-TAC (CNCE)

a. Cost --	Production Estimate	Approved Program	Current Estimate
Development	112.8	112.7	112.7
Procurement	-	148.2	148.2
Total Flyaway	-	(135.0)	(135.0)
Peculiar Spt Eqp	-	(9.3)	(9.3)
Other Wpn Sys Cost	-	(3.9)	(3.9)
Initial Spares	-	-	-
Construction	-	-	-
Total FY 76 Base-Year $	112.8	260.9	260.9
Escalation	36.9	181.7	181.7
Development	(36.9)	(36.6)	(36.6)
Procurement	-	(145.1)	(145.1)
Construction	-	-	-
Total Then-Year $	149.7	442.6	442.6
b. Quantities --			
Development	4	4	4
Procurement	-	68	68
Total	4	72	72

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Production Estimate: FY 85 President's Budget, January 1984

Approved Program: FY 90/91 President's Budget

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	41.8
Procurement	306.4	290.6	290.6
Total Flyaway	(285.1)	(262.0)	(262.0)
Peculiar Spt Eqp	(17.1)	(22.3)	(22.3)
Other Wpn Costs	(4.2)	(6.3)	(6.3)
Initial Spares	-	-	-
Construction	-	-	-
Total FY 76 Base-Year $	343.7	332.4	332.4
Escalation	353.6	327.0	327.0
Development	(11.2)	(15.9)	(15.9)
Procurement	(342.4)	(311.1)	(311.1)
Construction	-	-	-
Total Then-Year $	697.3	659.4	659.4

11. Program Acquisition Cost (Cont'd) (Current Estimate in Millions of Dollars)
System: TRI-TAC (TROPO)

b. Quantities --	Production Estimate	Approved Program	Current Estimate
Development	9	9	9
Procurement	350	474	474
Total	359	483	483

c. Foreign 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: FY 85 President's Budget, January 1984

Approved Program: FY 90/91 President's Budget

11. 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	82.1
Procurement	589.8	329.4	329.4
Total Flyaway	-	-	-
Peculiar Spt Eqp	-	-	-
Other Wpn Costs	(478.0)	(255.9)	(255.9)
Initial Spares	(111.8)	(73.5)	(73.5)
Construction	-	-	-
Total FY 76 Base-Year $	670.5	411.5	411.5
Escalation	707.7	408.7	408.7
Development	(35.8)	(39.2)	(39.2)
Procurement	(671.9)	(369.5)	(369.5)
Construction	-	-	-
Total Then-Year $	1378.2	820.2	820.2

b. Quantities -- N/A

c. Foreign Military Sales -- None

d. Nuclear Costs -- None

e. References --

Production Estimate: FY 85 President's Budget, January 1984

Approved Program: FY 90/91 President's Budget

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

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
a. Program Acquisition	(Dec 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	442.6	442.6	442.6
(2) Quantity	72	72	72
(3) Unit Cost	6.147	6.147	6.147
b. Current Procurement --			
	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	0	0	0
Less CY Adv Proc	0	0	0
Plus PY Adv Proc	0	0	0
Net Total	0	0	0
(2) Quantity	0	0	0
(3) Unit Cost	0	0	0

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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
a. Program Acquisition --			
(1) Cost	659.4	724.6	659.4
(2) Quantity	483	483	483
(3) Unit Cost	1.365	1.500	1.365
b. Current Procurement --			
	(FY 1989)	(FY 1989)*	(FY 1990)
(1) Cost	100.1	100.1	81.8
Less CY Adv Proc	0	0	0
Plus PY Adv Porc	0	0	0
Net Total	100.1	100.1	81.8
(2) Quantity	91	91	82
(3) Unit Cost	1.100	1.100	0.998

* Adjusted to reflect the FY 89 Appropriations Act in accordance with Congressional change to SAR law.

3. 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	314.7	1910.5	N/A	2225.2
Previous Changes				
Economic	- 3.0	- 93.2	-	- 96.2
Quantity	-	+ 312.3	-	+ 312.3
Schedule	-	+ 37.9	-	+ 37.9
Engineering	+ 15.7	+ 4.2	-	+ 19.9
Estimating	+ 6.3	- 407.8	-	- 401.5
Other	-	-	-	-
Support	- 5.4	- 97.1	-	- 102.5
Subtotal	+ 13.6	- 243.7	-	- 230.1
Current Changes	-			
Economic	-	- 4.1	-	- 4.1
Quantity	-	-	-	-
Schedule	-	+ 0.2	-	+ 0.2
Engineering	-	-	-	-
Estimating	-	- 112.7	-	- 112.7
Other	-	-	-	-
Support	-	+ 43.7	-	+ 43.7
Subtotal	0 .0	- 72.9	-	- 72.9
Total Changes	+13.6	- 316.6	-	- 303.0
Current Estimate	328.3	1593.9	-	1922.2

(FY 1976 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	230.8	896.2	N/A	1127.0
Previous Changes				
Quantity	-	+125.6	-	+ 125.6
Schedule	-	-	-	-
Engineering	+ 7.2	+ 2.0	-	+ 9.2
Estimating	+ 2.4	-176.3	-	- 173.9
Other	-	-	-	-
Support	- 3.8	- 49.2	-	- 53.0
Subtotal	+ 5.8	- 97.9	-	- 92.1
Current Changes				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	- 48.8	-	- 48.8
Other	-	-	-	-
Support	-	+ 18.7	-	+ 18.7
Subtotal	0.0	- 30.1	-	- 30.1
Total Changes	+ 5.8	- 128.0	-	-122.2
Current Estimate	236.6	768.2	-	1004.8

13. Cost Variance Analysis
System: TRI-TAC (CNCE)

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

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	149.7	-	N/A	149.7
Previous Changes				
Economic	- 0.6	- 10.8	-	- 11.4
Quantity	-	+278.8	-	+278.8
Schedule	-	-	-	-
Engineering	-	+ 4.2	-	+ 4.2
Estimating	+ 0.5	- 5.2	-	- 4.7
Other	-	-	-	-
Support	- 0.3	+ 26.3	-	+ 26.0
Subtotal	- 0.4	+293.3	-	+292.9
Current Changes				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	0.0	0.0	-	0.0
Total Changes	- 0.4	+293.3	-	+292.9
Current Estimate	149.3	293.3	-	442.6

(FY 1976 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	112.8	-	N/A	112.8
Previous Changes				
Quantity	-	+135.3	-	+135.3
Schedule	-	-	-	-
Engineering	-	+ 2.0	-	+ 2.0
Estimating	+ 0.2	- 2.3	-	- 2.1
Other	-	-	-	-
Support	- 0.3	+ 13.2	-	+ 12.9
Subtotal	- 0.1	+148.2	-	+148.1
Current Changes				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Total Changes	- 0.1	+148.2	-	+148.1
Current Estimate	112.7	+148.2	-	260.9

13. Cost Variance Analysis (Cont'd)
System: TRI-TAC (CNCE)

b. Previous Change Explanations

RDT&E

Economic:	Revised economic escalation indices.
Estimating:	Adjustment for prior year escalation.
Support:	Training simulator requirements reduced. Revised estimate for Peculiar Support Equipment based on maintenance concept.

Procurement

Economic:	Revised economic escalation indices.
Quantity:	Addition of 68 CNCEs.
Engineering:	CNCE configuration change.
Estimating:	Adjustment for prior year economic escalation and revised contractual costs.
Support:	Refined hardware Peculiar Support Equipment requirements; increased support costs associated with production of 68 units.

c. Current Change Explanations -- None

3. 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	- 30.9	-	- 32.1
Quantity	-	+ 155.9	-	+ 155.9
Schedule	-	+ 37.9	-	+ 37.9
Engineering	+15.7	-	-	+ 15.7
Estimating	- 4.2	- 168.8	-	- 173.0
Other	-	-	-	-
Support	- 1.1	+ 24.0	-	+ 22.9
Subtotal	+ 9.2	+ 18.1	-	+ 27.3
Current Changes				
Economic	-	- 1.6	-	- 1.6
Quantity	-	-	-	-
Schedule	-	+ 0.2	-	+ 0.2
Engineering	-	+ 0.5	-	+ 0.5
Estimating	-	- 64.3	-	- 64.3
Other	-	-	-	-
Support	-	-	-	-
Subtotal	0.0	- 65.2	-	- 65.2
Total Changes	+ 9.2	- 47.1	-	- 37.9
Current Estimate	57.7	601.7	-	659.4

(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	- 64.4	-	- 66.4
Other	-	-	-	-
Support	- 0.7	+ 10.2	-	+ 9.5
Subtotal	+ 4.5	+ 11.4	-	+ 15.9
Current Changes				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	- 27.2	-	- 27.2
Other	-	-	-	-
Support	-	-	-	-
Subtotal	0.0	- 27.2	-	- 27.2
Total Changes	+ 4.5	- 15.8	-	- 11.3
Current Estimate	41.8	290.6	-	332.4

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 schedule due to quantity deletions, competition and programmatic reductions.
Estimating: Refined estimate for other programmatic costs associated with TROPO production. 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 None		
(2) Procurement		
Revised economic escalation indices. (Economic)	N/A	- 1.6
Rephasing of production schedule due to competition. (schedule)	N/A	+ 0.2
Refinement of current production estimate based upon competition of production units and a change in the quantity mix being procured. (Estimating)	- 27.5	- 64.3
Adjustment for current and prior year economic escalation. (Estimating)	+ 0.3	+ 0.5

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	- 51.5	-	- 52.7
Quantity	-	-122.4	-	-122.4
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+ 10.0	-233.8	-	-223.8
Other	-	-	-	-
Support	- 4.0	-147.4	-	-151.4
Subtotal	+ 4.8	-555.1	-	-550.3
Current Changes:				
Economic		- 2.5	-	- 2.5
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	- 48.9	-	- 48.9
Other	-	-	-	-
Support	-	+ 43.7	-	+ 43.7
Subtotal	0.0	- 7.7	-	- 7.7
Total Changes	+ 4.8	-562.8	-	-558.0
Current Estimate	121.3	698.9	-	820.2

(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	-109.6	-	-105.4
Other	-	-	-	-
Support	- 2.8	- 72.6	-	- 75.4
Subtotal	+ 1.4	-257.5	-	-256.1
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	- 21.6	-	-21.6
Other	-	-	-	-
Support	-	+ 18.7	-	-18.7
Sub total	0.0	- 2.9	-	- 2.9
Total Changes	+ 1.4	-260.4	-	-259.0
Current Estimate	82.1	329.4	-	411.5

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 -- None		
(2) Procurement		
Revised economic escalation indices. (Economic)	NA	- 2.5
Decreased various items of TRI-TAC equipment produced by the other services because of budget constraints. (Estimating)	-21.9	-49.6
Adjustment for current and prior year economic escalation. (Estimating)	+ 0.3	+ 0.7
Adjustment in spares to support Prime Mission Equipment. (Support)	+18.7	+43.7

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

a. Initial SAR/Production Estimate (PdE) to Current Estimate (CE) --

(1) CNCE

PAUC (Initial SAR/PdE)	CHANGES								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
37.425*	-0.158	-31.474	-	+0.058	-0.065	-	+0.361	-31.278	6.147

* Based on RDT&E Units Only

Initial SAR/Production Estimate (PdE) to Current Estimate (CE) --

(2) TROPO

PAUC (Initial SAR/PdE)	CHANGES								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1.942	-0.069	-0.176	+0.079	+0.033	-0.491	-	+0.047	-0.577	1.365

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

a. RDT&E -- No Active Contracts

b. Procurement

1. TROPO (FOLLOW-ON)

Raytheon Corp, Marlborough, MA
F19628-87-C-0087, FFP
Award: 29 May 1987
Definitized: 29 May 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 (Ch-1)

Raytheon Corp, Marlborough, MA
F19628-87-C-0087, FFP
Award: April 9, 1982
Definitized: April 9, 1982

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 (Ch-2)

Unisys Corp, Salt Lake City, UT
F19628-87-C-0092
Award: 29 May 1987, FFP
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

Contracter	Program Manager
93.4	93.4

Explanation of Changes:
(Ch-1) Increased price due to additional 24 units being procurred.

(Ch-2) Increased price due to additional 68 units being procured.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)
System: Joint Tactical Communications (TRI-TAC) Program

a. Program Status --

(1) Percent Program Completed: 81.0% (17/21 yrs)

(2) Percent Program Cost Appropriated: 75.8% ($1,456.2M/$1,922.2M)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

	Current & Prior Year	Budget Year	Budget Year	Balance to Complete	Total
	(FY 73-89)	(FY 90)	(FY 91)	(FY 92-93)	
RDT&E	310.1	3.6	4.7	9.9	328.3
Procurement	1146.1	126.2	115.3	206.3	1593.9
MILCON	-	-	-	-	-
Total	1456.2	129.8	120.0	216.2	1922.2

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	FLYWAY FY 76 DOLLARS		Total Base Year$	THEN-YEAR DOLLARS $			Escl Rate
		Nonrec	Rec		Program	Obli-gated	Ex-pended	(%)
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				9.9	9.3	9.3	9.3	10.8
1976				22.3	22.3	22.3	22.3	7.0
197T				5.9	6.0	6.0	6.0	3.2
1977				35.1	37.6	37.6	37.6	3.8
1978				28.2	32.0	32.0	32.0	6.2
1979				21.5	27.5	27.5	27.5	8.4
1980				18.6	26.4	26.4	26.4	9.7
1981				11.7	18.5	18.5	18.5	11.9
1982				15.0	25.3	25.3	25.3	9.2
1983				24.7	43.7	43.7	43.7	4.9
1984				11.1	20.3	20.3	20.3	3.8
1985				5.1	9.7	9.7	9.6	3.4
1986				2.3	4.4	4.4	3.8	2.8
1987				3.5	7.0	7.0	5.5	2.7
1988				4.8	10.0	10.0	8.0	3.1
1989				2.0	4.3	0.3	0.1	4.0
1990				1.6	3.6			3.6
1991				2.1	4.7			3.3
1992				2.1	4.9			2.8
1993				2.1	5.0			2.3
Subtotal				236.6	328.3	306.1	301.7	
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			50.4	72.0	131.9	131.9	131.9	4.9
1984			39.0	57.7	109.1	109.1	109.1	3.8
1985		1.1	39.0	59.8	116.8	116.8	101.1	3.4
1986		3.6	32.5	79.1	159.1	159.1	101.6	2.8
1987		1.7	38.8	78.9	164.7	158.8	107.8	2.7
1988			28.9	68.4	147.6	103.7	9.8	3.1
1989			40.4	67.9	151.3	23.7		4.0
1990			32.0	54.9	126.2			3.6
1991			31.6	49.0	115.3			3.3
1992			8.7	42.8	102.6			2.8
1993				42.4	103.7			2.3
Subtotal		21.3	375.7	768.2	1593.9			
Total		21.3	375.7	1004.8	1922.2	968.7	726.9	

16. Program Funding Summary (Current Estimate in Millions of Dollars)
System: TRI-TAC (CNCE)

a. Program Status --

(1) Percent Program Completed: 100% (14/14 yrs)
(2) Percent Program Cost Appropriated: 100% ($442.6M/$442.6M)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

	Current & Prior Yrs (FY75-89)	Budget Year (FY-90)	Budget Year (FY 91)	Balance to Complete (FY92-93)	Total
RDT&E	149.3	-	-	-	149.3
Procurement	293.3	-	-	-	293.3
MILCON	-	-	-	-	-
Total	442.6	-	-	-	442.6

c. Annual Summary

FISCAL YEAR	QTY	FLYAWAY FY 76 DOLLARS		Total Base Year$	THEN-YEAR DOLLARS $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1975				1.9	1.8	1.8	1.8	10.8
1976				18.4	18.4	18.4	18.4	7.0
1977				3.7	3.8	3.8	3.8	3.2
1978				20.4	21.9	21.9	21.9	3.8
1979				12.9	14.7	14.7	14.7	6.2
1980				11.6	14.8	14.8	14.8	8.4
1981				8.5	12.1	12.1	12.1	9.7
1982				5.9	9.3	9.3	9.3	11.9
1983				8.1	13.7	13.7	13.7	9.2
1984				10.7	18.9	18.9	18.9	4.9
1985				5.5	10.0	10.0	10.0	3.8
1986				2.6	5.0	5.0	5.0	3.4
1987				1.4	2.7	2.7	2.5	2.8
1988				0.6	1.2	1.2	0.9	2.7
Subtotal	4			0.5	1.0	1.0	0.5	3.1
				112.7	149.3	149.3	148.3	

6. Program Funding Summary (Cont'd) (Current Estimate in Millions of Dollars)
System: TRI-TAC (CNCE)

c. Annual Summary (Cont'd) --

FISCAL YEAR	QTY	FLYAWAY FY 76 DOLLARS		Total Base Year$	THEN-YEAR DOLLARS			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: Procurement								
1983	3		20.5	20.7	37.9	37.9	37.9	4.9
1984	3		14.4	16.0	30.3	30.3	30.3	3.8
1985	19	1.1	39.0	43.4	84.9	84.9	80.9	3.4
1986	17	0.3	25.2	28.3	57.0	57.0	56.8	2.8
1987	26	0.3	34.2	39.8	83.2	82.5	77.8	2.7
Subtotal	68	1.7	133.3	148.2	293.3			
Total	72	1.7	133.3	260.9	442.6	292.6	283.7	

16. Program Funding Summary (Current Estimate in Millions of Dollars)
System: TRI-TAC (TROPO)

a. Program Status --

(1) Percent Program Completed: 83.3% (15/18 yrs)
(2) Percent Program Cost Appropriated: 71.6% ($471.9M/$659.4M)

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

	Current & Prior Yrs (FY75-89)	Budget Year (FY-90)	Budget Year (FY-91)	Balance to Complete (FY-92)	Total
RDT&E	57.7	-	-	-	57.7
Procurement	414.2	81.8	82.5	23.2	601.7
MILCON	-	-	-	-	-
	-	-	-	-	-
Total	471.9	81.8	82.5	23.2	659.4

c. Annual Summary

FISCAL YEAR	QTY	FLYAWAY FY 76 DOLLARS		Total Base Year$	THEN-YEAR DOLLARS			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
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	0.3	2.8
1987				2.4	4.8	4.8	3.7	2.7
1988				4.1	8.5	8.5	7.0	3.1
1989				-			-	-
1990				-			-	-
Subtotal	9			41.8	57.7	57.7	54.7	

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	Obli-gated	Ex-pended	
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	11.5	2.8
1987	10	1.4	4.6	6.7	14.0	11.5	2.2	2.7
1988	63		28.9	32.1	69.3	57.4	6.5	3.1
1989	91		40.4	44.9	100.1			4.0
1990	82		32.0	35.6	81.8			3.6
1991	77		31.6	35.1	82.5			3.3
1992	38		8.7	9.7	23.2			2.8
Subtotal	474	19.6	242.4	290.6	601.7			
Total	483	19.6	242.4	332.4	659.4	299.7	227.3	

16. Program Funding Summary (Current Estimate in Millions of Dollars)
System: TRI-TAC (Support/Systems Integration/Other)

a. Program Status --

(1) Percent Program Completed: 81.0% (17/21 yrs)
(2) Percent Program Cost Appropriated: 66.0% ($541.7M/820.2M)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

	Current & Prior Yrs (FY73-89)	Budget Year (FY-90)	Budget Year (FY-91)	Balance to Complete (FY92-93)	Total
RDT&E	103.1	3.6	4.7	9.9	121.3
Procurement	438.6	44.4	32.8	183.1	698.9
MILCON	-	-	-	-	-
Total	541.7	48.0	37.5	193.0	820.2

c. Annual Summary

FISCAL YEAR	QTY	FLYAWAY FY 76 DOLLARS		Total Base Year$	THEN-YEAR DOLLARS			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
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
1977T				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	3.6	3.4
1986				0.5	1.0	1.0	1.0	2.8
1987				0.5	1.0	1.0	0.9	2.7
1988				0.2	0.5	0.5	0.5	3.1
1989				2.0	4.3	0.3	0.1	4.0
1990				1.6	3.6			3.6
1991				2.1	4.7			3.3
1992				2.1	4.9			2.8
1993				2.1	5.0			2.3
Subtotal				82.1	121.3	99.1	98.7	

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	Obli-gated	Ex-pended	
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	20.2	3.4
1986				39.0	78.4	78.4	33.3	2.8
1987				32.4	67.5	64.8	27.8	2.7
1988				36.3	78.3	46.3	3.3	3.1
1989				23.0	51.2	23.7		4.0
1990				19.3	44.4			3.6
1991				13.9	32.8			3.3
1992				33.1	79.4			2.8
1993				42.4	103.7			2.3
Subtotal				329.4	698.9			
Total				411.5	820.2	376.4	215.9	

17. Production Rate Data

(1) CNCE

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 9 months).

Fiscal Year	Production Rates (Quantity Year)			
	Development Estimate	Production Estimate	Current Estimate	1/ Maximum Economic
1983/1984	11.0	11.0	11.0	11.0
1985	20.6	20.6	20.6	20.6
1986	30.0	30.0	30.0	30.0
1987	30.0	30.0	30.0	30.0

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 $)	262.7	-1.8	260.9	-	260.9
	(TY $)	449.8	-7.2	442.6	-	442.6
PAUC	(BY $)	3.649	-0.025	3.624	-	3.624
	(TY $)	6.247	-0.100	6.147	-	6.147

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)	8/86	-	8/86	-	8/86
Duration (in Months)	23	+ 2 mos	25	-	25
End Date (Mo/Yr)	6/88	+ 2 mos	8/88	-	8/88

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	4/4
Procurement	68/68

1/ Maximum economic rate assumes AFLC spares will be procured on the same production line.

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	72.0
1987	55.7	55.7	13.2	72.0
1988	50.7	50.7	60.0	72.0
1989	57.1	57.1	84.0	120.0
1990			67.2	120.0
1991			74.4	132.0
1992			33.6	144.0

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	-11.3	332.4	-160.8	493.2
	(TY $)	697.3	-37.9	659.4	-328.8	988.2
PAUC	(BY $)	0.957	-26.9	0.688	+0.014	0.674
	(TY $)	1.942	-57.7	1.365	+0.015	1.350

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	+24 mos	126	-	126
End Date (Mo/Yr)	4/93	+24 mos	5/95	-	5/95

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	9/9
Procurement V2	85/85
V3	28/28

1/ Maximum economic rate assumes Army/ Marine quantities will be procured on the same production line.

18. Operating and Support Costs:

a. N/A
b. N/A
c. Contractor Support Costs - N/A.

SAR-88-080

AF-32 WIS

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: WWMCCS INFORMATION SYSTEM (WIS)

AS OF DATE: December 31, 1988

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1. Designation/Nomenclature (Popular Name): Worldwide Military Command and Control System (WWMCCS) Information System (WIS)

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

WWMCCS Information System (WIS)
Joint Program Management Office (JPMO)
Washington, D.C. 20330-6600

JPM: Col W. J. Donahue
Assigned: March 14,1988
AUTOVON: 356-5053
Commercial:(703) 285-5053

4. Program Elements/Procurement Line Items:

RDT&E: 33152A/F/N/K, 33154F, 63735F
Procurement: 33152A/N/F/H/K, 33154F, 91119M
APPN 3080 ICN 834040 (Air Force)
APPN 2035 ICN BE4100 (Army)
APPN 1810 ICN 8210 (Navy and Marine Corps)
APPN 0300 ICN Unknown (DCA/DNA)
Operation and Maintenance: 33152F, 33152H

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AS AMENDED
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5. Related Programs: None

89-0036-T
#9

OASD(PA) DFOISR 88-T-0223

6. Mission and Description: The Worldwide Military Command and Control System (WWMCCS) Information System (WIS) 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, WIS, 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 the unified and specified commands, the Services, and other DoD components. WIS will interface with Nuclear Planning and Execution System, and the Tactical Warning/Space Defense Systems. This program will modernize and replace the existing standard WWMCCS ADP System.

7. Program Highlights:

a. Significant Historical Developments -- On November 5, 1982, the Deputy Secretary of Defense established the WIS Joint Program Manager (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 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 a 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.

7. Program Highlights: (Cont'd)

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, is allowing the WIS JPMO to address some key technical problems.

The main change considered in the overall system design is to retain 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 will also be available through the LAN gateway as the LAN is installed at each site. The LAN network access will use DoD protocols for communication between a WIS workstation on one LAN and a host on another LAN. This method of intersite communication will be able to operate in parallel with the primary means. This proposed change greatly reduces the operational impact and technical risks. It also avoids the risk of a system-wide cutover and eliminates the need for the Transition Component with its separate installation and maintenance. In addition to this restructuring, enhancements to the LAN and AMHS for Blocks A and B will be postponed in an effort to reduce near-term costs. The schedule in paragraph 9, below, reflects the restructuring.

b. Significant Developments Since Last Report -- As recommended in the FY88 Appropriations bill to improve management of the WWMCCS/WIS program, the Air Force decided to consolidate the management organizational structure and briefed the OSD/C3I Systems Committee in April 1988. However, OSD/C3I Systems committee met again on 23 December 1988 to review the restructuring of the WIS program. The committee agreed that DCA should prepare a restructure plan to transfer Executive Agency from the Air Force to DCA. The committee's recommendation will be briefed by DCA in early February to the Defense Acquisition Board for final approval.

7. Program Highlights: (Cont'd)

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, which is in coordination.

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 has 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 WIS is expected to meet mission requirements.

c. Changes Since December 31, 1988 -- None.

8. Threshold Breaches: As a result of the FY88 congressional reductions in RDT&E funding, an amended DCP was forwarded to OSD in conjunction with the April 1988 program review. While the proposed test and acquisition strategy was approved contingent upon the TEMP, subsequent problems with the AMHS software development have further slipped the program. Block A IOT&E is now scheduled for FY91, this constitutes a ten month breach in the Block A IOT&E milestone. Rebaselining of Block A has been put on hold pending OSD decision on our WIS program restructuring.

9. Schedule:

a. Milestones --

Block A	Development Estimate/ Approved Program 1/	Current Estimate
Integration Contract Award	Oct 83/NA	Oct 83
Common User Contract Award	Oct 84/NA	Oct 84
System Support Contract Award	Jul 85/NA	Jul 85
DSARC I/II	Jul 85/Jul 85	Jul 85
Start DT&E (Phase I) LAN	May 87/NA	Jun 88
Start DT&E (Phase I/II) System	May 87/NA	Aug 90(Ch-1)
Start System IOT&E	Nov 87/NA	Feb 91(Ch-1)
Start Low-rate Deployment (up to site #15)	Nov 87/NA	N/A
Start LAN Deployment	Nov 87/NA	Feb 90(Ch-2)
Initial Oper Capability System	Nov 87/May 89	May 91(Ch-1)
Deployment Approval LAN (sites 16 and on)	Nov 87/NA	N/A
Obligation Approval AMHS	Nov 87/NA	Aug 91(Ch-1)
Common User Contract Award		
WIS Workstation	NA / NA	Mar 89(Ch-3)
AMHS follow-on	NA / NA	Aug 91(Ch-1)
Transition Component (TC) Deployment Decision	NA / NA	N/A
Finish DT&E (Phase I/II System)	NA / NA	Dec 90(Ch-1)
Completion of Block A IOT&E	NA / Jul 90	Mar 91(Ch-1)

1/ Approved Program reflects DAE approved baseline.

Blocks B and C	Planning Estimate/ Approved Program	Current Estimate
DAB I/II (Block B)	NA / NA	* TBD(Ch-4)
**JMPE Contract Award	Jun 86/NA	***TBD
Start OT&E	NA	***TBD
Start Deployment	NA	***TBD
Initial Operational Capability	NA	***TBD
DAB I/II (Block C)	NA	***TBD

* The Office of the Assistant Secretary of Defense for C3I (ASD/C3I) is currently 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, will be the reporting responsibility of the successor executive agent for WIS.

** Joint Mission Processing Environment (JMPE)

*** These estimates will be established 180 days prior to their respective DAB review.

9. Schedule: (Cont'd)

b. Previous Change Explanations --

Block A

DSARC I/II slipped from May to July 1985; this slip was due to scheduling difficulties involved in presenting numerous prebriefs and working around the schedules of senior OSD, OJCS, and military department officials.

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 user interface and the AMPE interfaces. These required corrections have been documented in several ECPs.

9. Schedule: (Cont'd)

Block A (Cont'd)

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 eliminates the need for the Transition Component.

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.

c. Current Change Explanations --

Block A

(Ch-1) AMHS software development problems have been exacerbated by incorporation of user interface changes and integration and test activities have been slowed by an immature Ada environment on the IBM system.

(Ch-2) 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.

(Ch-3) 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.

(Ch-4) The Office of the Assistant Secretary of Defense for C3I (ASD/C3I) is currently reviewing the management structure for potential transfer of responsibility from the Air Force. Results of this effort, including a new Block B DAB date, will be shown in a future SAR.

9. Schedule: (Cont'd)

d. References --

Block A

Development Estimate: SDDM, dated September 11, 1985, subject "Decision Memorandum on the World-Wide Military Command and Control System (WWMCCS) Information System (WIS), Block A."

Approved Baseline: DAE baseline dated February 1988.

Block B and C

Planning Estimate: FY85 RDT&E Descriptive Summary.

Approved Program: NA

10. Technical/Operational Characteristics:

a. Technical--	Dev Estimate/ Appr Program*	Demonstrated Performance	Current Estimate
Block A			
Availability 1/			
Routine Oper Availability	95%/95%	NA	95%
Crisis Oper Availability	98%/98%	NA	98%
MTBF (Workstation/Printer)	1500hrs/1500 hrs	NA	1500 hrs
Diagnostics Automated Message Handling (AMH) Processor 2/	NA Det Rate/NA	NA NA	90% Fault Det Rate
Response Time			
Simple (Priority)	8-10 Sec/8-10 Sec	NA	8-10 Sec
Complex (Priority)	2-4 Min/2-4 Min	NA	2-4 Min

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 19 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 90% for the AMH processor.

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

Block B and C	Plan Estimate/ Appr Program*	Demonstrated Performance	Current Estimate
Availability 3/			
Routine Oper Availability	98%/98%	NA	98%
Crisis Operl Availability	99.8%/99.8%	NA	99.8%
MTBF (Workstation/Printer)	2000 Hrs/2000 Hrs	NA	2000 Hrs
MTBF (WIS System)	160 Hrs/160 Hrs	NA	160 Hrs
Diagnostics Automated Msg Handling (AMH) Processor 4/	NA Det Rate/NA	NA	95% Fault Det Rate
Response Time			
Simple (Priority)	2-5 Sec/2-5 Sec	NA	2-5 Sec
Complex (Priority)	1-3 Min/1-3 Min	NA	1-3 Min

3/ 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 19 and the JOPES ROC.

4/ 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.

b. Operational--	Dev Estimate/ Appr Program*	Demonstrated Performance	Current Estimate
Block A			
Security 5/	System High/ NA	NA	System High
Useability 6/	20 Hrs Training/ NA	NA	20 Hrs Trg
Automated Msg Handling (AMH) Peak MSG Rec/Day 7/	2000/2000	NA	2000
Automated Msg Handling (AMH) Peak MSG Rec/Hour	300/300	NA	300
Automated Message Handling (AMH) Peak MSG Trans/Hour	100/100	NA	100

5/ WIS will be secure from unauthorized access, data manipulation, or retrieval. The system hardware will be TEMPEST certified as required. For Block A, the system will operated in a ~~TOP SECRET~~ system high mode.

6/ Useability 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. For Block A threshold, 20 hours of training for an experienced workstation user, consisting of on-the-job-training (OJT), classroom, and computer-aided instructor courses, are anticipated to use basic automated message handling capabilities.

Blocks B and C (Cont'd)

7/ 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.

Block B and C	Plan Estimate/ Appr Program*	Demonstrated Performance	Current Estimate
Security 8/	Controlled Mode/ NA	NA	Control Mode
Useability 9/	8 Hrs Training/ NA	NA	8 Hrs Trg
Automated Msg Handling (AMH) Peak MSG Rec/Day 10/	3500/3500	NA	3500
Automated Msg Handling (AMH) Peak MSG Rec/Hour	500/500	NA	500
Automated Message Handling (AMH) Peak MSG Trans/Hour	150/150	NA	150

8/ WIS will be secure from unauthorized access, data manipulation, or retrieval. The system hardware will be TEMPEST certified as required. For Block B the system will operated in a ~~TOP SECRET~~ controlled mode with the goal to upgrade to multilevel security (MLS) in Block C if technology permits.

9/ Useability 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. For Block B and C, the useability goal will be 8 hours workstation OJT with the availability of a full help command function.

10/ 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.

* The goals and thresholds are identical in the Approved Program.

c. Previous Change Explanations --

Blocks A, B and C None.

d. Current Change Explanations --

Blocks A, B, and C None.

e. References --

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

Block A

Development Estimate: SDDM, dated 11 September 1985 subject "Decision Memorandum on the Worldwide Military Command and Control System (WWMCCS) Information System (WIS), Block A."

USD(A) Approved Program: DAE Baseline approved Aug 2, 1988.

Block B and C

Planning Estimate/Approved Program: Decision Coordinating Paper for Block A of the WIS, dated September 20, 1985.

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

	Development Estimate	Approved Program	Current Estimate
a. Cost--			
Development	$ 545.3	$1,226.3	$1,226.3
Procurement	642.3	305.6	305.6
MILCON	1.9	0	0
Oper and Maint (O&M)	237.5	107.0	107.0
Total FY82 Base-Year	$1,427.0	$1,638.9	$1,638.9
Escalation			
Development (RDT&E)	$ 132.3	$ 466.0	$ 466.0
Procurement	223.8	121.6	121.6
MILCON	.5	0	0
Oper and Maint (O&M)	73.4	36.2	36.2
Total Then-Year	$1,857.0	$2,262.7	$2,262.7
b. Quantities --			
Development (RDT&E)	1	1	1
Procurement	34	34	34
Total	35	35	35

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

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. 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: FY90-91 President's Budget.

12. Program Acquisition/Current Procurement Unit Cost Summary:

	Current Year		Budget Year
	Current Est Dec 88 SAR	UCR Baseline Dec 87 SAR	UCR Baseline Dec 88 SAR
a. Program Acquisition --			
(1) Cost	2262.7	1980.7	2262.7
(2) Quantity	35	35	35
(3) Unit Cost 1/	64.649	56.591	64.649
b. Current Procurement -- 2/	(FY 1989) N/A	(FY 1989) N/A	(FY1990) N/A

1/ Identification of Level I host sites, as a unit of measure for Unit Cost Reporting carries 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.

2/ The WIS unit will 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 is reported in total rather than incrementally phased by fiscal year. A Current Procurement Unit Cost (CPUC) is therefore determined not appropriate.

13. Cost Variance Analysis: WIS Total Program

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

	RDT&E	PROC	MILCON	O&M	TOTAL
Planning/Dev Estimate	677.6	866.1	2.4	310.9	1857.0
Previous Changes:					
Economic	-153.8	-34.4	-	-12.0	-200.2
Quantity	-	-	-	-	-
Schedule	+23.2	-	-	-	+23.2
Engineering	+30.9	-	-	-	+30.9
Estimating	+556.6	-122.8	-	-161.6	+272.2
Other	-	-	-	-	-
Support	-	-	-2.4	-	-2.4
Subtotal	+456.9	-157.2	-2.4	-173.6	+123.7
Current Changes:					
Economic	-0.6	-4.5	-	-0.6	-5.7
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	-	-	-	-	-
Estimating	+558.4	-277.2	-	+6.5	+287.7
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	+557.8	-281.7	0	+5.9	+282.0
Total Changes	+1014.7	-438.9	-2.4	-167.7	+405.7
Current Estimate	+1692.3	+427.2	0	+143.2	+2262.7

13. Cost Variance Analysis: WIS Total Program (Cont'd)

a. Summary -- (FY82 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	O&M	TOTAL
Planning/Dev Estimate	545.3	642.3	1.9	237.5	1427.0
Previous Changes:					
Economic	-	-	-	-	-
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	+25.7	-	-	-	+25.7
Estimating	+303.3	-142.1	-	-134.0	+27.2
Other	-	-	-	-	-
Support	-	-	-1.9	-	-1.9
Subtotal	+329.0	-142.1	-1.9	-134.0	+51.0
Current Changes:					
Economic	0	0	-	-	0
Quantity	-	-	-	-	-
Schedule	0	-	-	-	-
Engineering	-	-	-	-	-
Estimating	+352.0	-194.6	-	+3.5	+160.9
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	+352.0	-194.6	0	+3.5	+160.9
Total Changes	+681.0	-336.7	-1.9	-130.5	+211.9
Current Estimate	+1226.3	+305.6	0	+107.0	+1638.9

13. Cost Variance Analysis: WIS Total Program (Cont'd)

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.

PROCUREMENT

Economic: Revised OSD inflation indices.

13. Cost Variance Analysis: WIS Total Program (Cont'd)

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 PEs 11310F, 12322F, 27414F, 27415F, 27416F, 21131F, 41840F, and 33151F contains unique funds inappropriately charged to the WIS Program and have been removed per OSD approval. Impact due to congressional reductions in FY88 appropriation and outyear funding adjustments.

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) found in PEs 11310F, 27414F, 27415F, and 27416F. Adjustment for current and prior years escalation change. Deletion of PEs 21131F contains Air Force unique funds inappropriately charged to the WIS Program and have been removed per OSD approval. Impact due to procurement funding reductions in DNA.

13. Cost Variance Analysis: WIS Total Program (Cont'd)

MILCON

Support: Funding deleted due to reduced support requirements. Increase funding to meet additional procurement acquisition.

c. Current Change Explanation --

	(Dollars in Millions) Base-Year$	Then-Year$
(1) RDT&E		
Revised OSD Inflation Indices (Economic)	N/A	-0.6
Service/Agency adjustment due to program restructuring (Estimating)	N/A	+7.4
Rough Order Magnitude (ROM) Estimate for completion of Blocks B & C (Estimating)	+352.0	+551.0
(2) PROCUREMENT		
Revised OSD Inflation Indices (Economic)	N/A	-4.5
Service/Agency Adjustment due to Program restructuring (Estimating)	-194.6	-277.2
(3) OPERATIONAL AND MAINTENANCE		
Revised OSD Inflation Indices (Economic)	N/A	-0.6
Service/Agency Adjustment due to Program restructuring (Estimating)	+3.5	+6.5

d. References --

Planning/Development Estimate: Fiscal Year 1985 President's Budget; and SDDM, dated September 11, 1985, subject "Decision Memorandum on the World-Wide Military Command and Control System (WWMCCS) Information System (WIS), Block A."

13. Cost Variance Analysis: Block A

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

	RDT&E	PROC	MILCON	O&M	TOTAL
Development Estimate	309.2	457.4	0	0	766.6
Previous Changes:					
Economic	-7.1	-13.8	-	-	-20.9
Quantity	-	-	-	-	-
Schedule	+0.8	-	-	-	+0.8
Engineering	-	-	-	-	-
Estimating	-10.9	-158.4	-	-	-169.4
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	-17.2	-172.2	0	0	-189.4
Current Changes:					
Economic	+0.1	0	-	-	+0.1
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	-	-	-	-	-
Estimating	+0.3	-126.3	-	-	-126.0
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	+0.4	-126.3	0	0	-125.9
Total Changes	-16.8	-298.5	0	0	-315.3
Current Estimate	292.4	158.9	0	0	451.3

13. Cost Variance Analysis: Block A (Cont'd)

a. Summary -- (FY82 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	O&M	TOTAL
Development Estimate	254.3	334.7	0	0	589.0
Previous Changes:					
Economic	-	-	-	-	-
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	-	-	-	-	0
Estimating	-14.6	-128.3	-	-	-142.9
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	-14.6	-128.3	0	0	-142.9
Current Changes:					
Economic	-	-	-	-	-
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	-	-	-	-	-
Estimating	-	-88.9	-	-	-88.9
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	0	-88.9	0	0	-88.9
Total Changes	-14.6	-217.2	0	0	-231.8
Current Estimate	239.7	117.5	0	0	357.2

13. Cost Variance Analysis: Block A (Cont'd)

b. Previous Change Explanations --

RDT&E

Economic: Revised economic escalation indices.

Schedule: Technical problems have caused a schedule slip.

Estimating: Program related inflationary change (PRC) resulting from rephasing of approved funding. Reclassification of $15.0M (14.6M BY) of program Pre-FSED costs inadvertently included as Block A costs. Previous funding cuts added to outyears to meet requirements. Impact due to congressional reductions in FY88 appropriation and outyear funding adjustments.

PROCUREMENT

Economic: Revised economic escalation indices.

Estimating: Adjustment of cost estimate based upon better requirement definition, and Program Element Code realignment. Reclassification of prior year block A costs to reflect actual use. Previous funding cuts added to outyears to meet requirements. Adjustment for current and prior years escalation change. Deletion of PEs 11310F, 12322F, 27414F, 27415F, 27416F, 21131F, 41840F, and 33151F contain Air Force unique funds inappropriately charged to the WIS Program and have been removed per OSD approval. Impact due to congressional reductions in FY88 appropriation and outyear funding adjustments.

13. Cost Variance Analysis: Block A (Cont'd)

c. Current Change Explanations --

	(Dollars in Millions) Base-Year$	Then-Year$
(1) RDT&E		
Revised OSD Inflation Indices (Economic)	N/A	+0.1
Service/Agency adjustment due to program restructuring (Estimating)	N/A	+0.3
(2) PROCUREMENT		
Service/Agency adjustment due to program restructuring (Estimating)	-88.9	-126.3

13. Cost Variance Analysis: Blocks Other
(Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	O&M	TOTAL
Planning Estimate	368.4	408.7	2.4	310.9	1090.4
Previous Changes:					
Economic	-146.7	-20.6	-	-12.0	-179.3
Quantity	-	-	-	-	-
Schedule	+22.4	-	-	-	+22.4
Engineering	+30.9	-	-	-	+30.9
Estimating	+567.5	+35.6	-	-161.6	+441.5
Other	-	-	-	-	-
Support	-	-	-2.4	-	-2.4
Subtotal	+474.1	+15.0	-2.4	-173.6	+313.1
Current Changes:					
Economic	-0.7	-4.5	-	-0.6	-5.8
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	-	-	-	-	-
Estimating	+558.1	-150.9	-	+6.5	+413.7
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	+557.4	-155.4	0	+5.9	+407.9
Total Changes	+1031.5	-140.4	-2.4	-167.7	+721.0
Current Estimate	1399.9	268.3	0	143.2	1811.4

13. Cost Variance Analysis: Blocks Other (Cont'd)
(FY82 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	O&M	TOTAL
Planning Estimate	291.0	307.6	1.9	237.5	838.0
Previous Changes:					
Economic	-	-	-	-	-
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	+25.7	-	-	-	+25.7
Estimating	+317.9	-13.8	-	-134.0	+170.1
Other	-	-	-	-	-
Support	-	-	-1.9	-	-1.9
Subtotal	+343.6	-13.8	-1.9	-134.0	+193.9
Current Changes:					
Economic	-	-	-	-	-
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	-	-	-	-	-
Estimating	+352.0	-105.7	-	+3.5	+249.8
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	+352.0	-105.7	0	+3.5	+249.8
Total Changes	+695.6	-119.5	-1.9	-130.5	+443.7
Current Estimate	986.6	188.1	0	107.0	1281.7

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13. Cost Variance Analysis: Blocks Other

b. Previous Change Explanations --

RDT&E

Economic: Revised economic escalation indices.

Schedule: Deputy Secretary of Defense decision to delay deployment and acquisition by one year slip in the schedule due to current funding constraints.

Engineering: Support of Ada foundation effort, and product improvement into 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. Gramm-Rudman and other miscellaneous across-the-board reductions. Reclassification of $15.0M (14.6M) of Program FSED costs inadvertently included as Block A costs. Previous funding cuts added to outyears to meet requirements. Adjustment for current and prior years escalation change. Impact due to congressional reductions in FY88 appropriation and outyear funding adjustments.

PROCUREMENT

Economic: Revised economic escalation indices.

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13. Cost Variance Analysis: Blocks Other (Cont'd)

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 requirement; adjustment for difference between FY86 President's Budget and required funding; 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. Gramm-Rudman and other across-the-board reductions and reclassification of prior year Block A costs to reflect actual use. Additional funding in outyears to meet estimated Block B requirements. Adjustment for current and prior years escalation change. Deletion of PE's 11310F, 12322F, 27414F, 27415F, 27416F, 21131F, 41840F, and 33151F contain Air Force unique funds inappropriately charged to the WIS Program and have been removed per OSD approval. Impact due to congressional reductions in FY88 appropriation and outyear funding adjustments.

O&M

Economic: Revised economic escalation indices.

Estimating: Appropriation transfer of funds to RDT&E; additional year of cost added to the 5-year FYDP period; adjustment for difference between FY86 President's Budget and required funding; 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) found in PEs 11310F 11310F, 27414F, 27415 and 27416F. Increased funding in outyears to meet anticipated FYDP Procurement Acquisitions. Adjustment for current and prior years escalation change. Deletion of PEs 21131F contains Air Force unique funds inappropriately charged to the WIS Program and have been removed per OSD approval. Impact of procurement funding cuts in DNA.

13. Cost Variance Analysis: Blocks Other (Cont'd)

MILCON

Support: Funding deleted owing to reduced support requirements. Increased funding to meet procurement requirements.

c. Current Change Explanations --

	(Dollars in Millions) Base-Year$	Then-Year$
(1) RDT&E		
Revised OSD Inflation Indices (Economic)	N/A	-0.7
Service/Agency adjustment due to program restructuring (Estimating)	N/A	+7.1
Rough Order of Magnitude (ROM) estimate for completion of Blocks B & C (Estimating)	+352.0	+551.0

13. Cost Variance Analysis: Blocks Other

	(Dollars in Millions) Base-Year$	Then-Year$
(2) PROCUREMENT		
Revised OSD Inflation Indices (Economic)	N/A	-4.5
Service/Agency Adjustment due to Program restructuring (Estimating)	-105.7	-150.9
(3) OPERATIONAL AND MAINTENANCE		
Revised OSD Inflation Indices (Economic)	N/A	-0.6
Service/Agency Adjustment due to Program restructuring (Estimating)	+3.5	+6.5

d. References --

Planning Estimate: Fiscal Year 1985 President's Budget; and SDDM, dated September 11, 1985, subject "Decision Memorandum on the World-Wide Military Command and Control System (WWMCCS) Information System (WIS), Block A."

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

a. Initial SAR Planning Estimate (PE) to the Planning/Development Estimate

PAUC (Initial) SAR Est) 31 Dec 83	Changes (Then-Year Dollars in Millions)								PAUC (Plan/Dev Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
N/A 1/	--	--	--	--	--	--	--	--	53.057

b. Plan/Development Estimate (PE/DE) to the Current Estimate (CE)

PAUC (Plan/Dev Estimate)	Changes (Then-Year Dollars in Millions)								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
53.057	-5.882	--	+0.663	+.883	+15.997	-0.069	--	+11.592	64.649

1/ The appropriateness of defining a WIS unit was undetermined as of the December 30, 1983 SAR submission. The Program Acquisition Unit Cost (PAUC) baseline was established by the September 30, 1985 SAR submission.

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

a. RDT&E--

System Integration	Initial Contract Price Target Price	Ceiling	Qty
General Telephone & Electronics Corp (GTE) Strategic System Division Billerica, MA F19628-86-C-0053, FPIF Award: July 30, 1986 Definitized: July 30, 1986	$104.4	$118.6	N/A

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$119.5	$140.3	N/A	$133.9	$135.4

Variance	Cost Variance	Schedule
Previous Cumulative Variance	$+1.6	$-2.9
Cumulative Variances to Date (12/31/88)	-1.7	-3.5
Total	$-3.3	$-0.6

Explanation of Variance: The unfavorable schedule variance is due to unforeseen problems encountered, during the testing phase. Additional schedule slips were caused by delays in the Development and Evaluation Facility expansion construction and delays in the Software Development Maintenance Environment software. The negative cost variance is due to problems in software, updates to test procedures to get the test program back on schedule, and an accelerated effort on high-level design for Block B Release 1.

15. Contract Information: (Cont'd)

a. RDT&E

System Integration	Initial Contract Price Target Price	Ceiling	Qty
International Business Machines Corp (IBM) Gaithersburg, MD Federal System Division F19628-84-C-0159, FPIF Award: October 5, 1984 Definitized: October 5, 1984	$13.0	$15.0	N/A

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$35.1	$40.5	N/A	$41.0	$42.1

Variance:	Cost	Schedule
Previous Cumulative Variance	$-3.4	$-1.0
Cumulative Variance to Date(12/31/88)	-0.3	-0.4
Total	$+3.1	$+0.6

Explanation of Variance: Due to large cost and schedule variances the usefulness of the CPR was marginal. The SPO worked with the contractor to establish an Over-Target-Baseline. The cumulative variances this period are due to the gap in time between the contractor's estimate-to-Complete and the actual cost account close-out for the establishment of the Over-Target-Baseline.

b. Procurement --

System Integration	Initial Contract Price Target Price	Ceiling	Qty
International Business Machines Corp (IBM) Gaithersburg, MD Federal System Division F19628-84-C-0159, FFP Award: October 5, 1984 Definitized: October 5, 1984	$39.0	$39.0	1/

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$48.1	$48.1	1/	N/A	N/A

1/ This is a firm-fixed price contract with provisions for indefinite quantity and schedule - no cost/schedules performance reporting required.

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

a. Program Status --

(1) Percent Program Completed: 44% (8 years/18 years)

(2) Percent Program Cost Appropriated: 31.5% ($713.5/$2262.7)

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

Appropriation	Prior Years (FY82-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-99)	Total
RDT&E	$ 552.1	$ 108.9	$ 103.6	$ 927.7	$ 1692.3
Procurement	106.7	52.0	50.9	217.6	427.2
O&M	54.7	13.5	18.1	56.9	143.2
Total	$ 713.5	$ 174.4	$ 172.6	$ 1202.2	$ 2262.7

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

c. Annual Summary --

PROGRAM: WIS TOTAL PROGRAM

AS OF DATE: December 31, 1988
BASE-YEAR: FY 1982

FISCAL YEAR	QTY	BASE-YEAR DOLLARS FLYAWAY NONREC	FLYAWAY REC	TOTAL	THEN-YEAR DOLLARS ADVANCE PROC DEBIT	ADVANCE PROC CREDIT	TOTAL	ESCL RATE (%)
APPROPRIATION: RDT&E								
1982	-	-	-	13.7	-	-	14.0	9.2
1983	-	-	-	16.6	-	-	17.8	4.9
1984	-	-	-	41.8	-	-	46.5	3.8
1985	-	-	-	66.3	-	-	76.0	3.4
1986	-	-	-	87.9	-	-	103.4	2.9
1987	-	-	-	114.1	-	-	138.6	2.7
1988	-	-	-	48.6	-	-	61.3	3.1
1989	-	-	-	72.3	-	-	94.5	4.0
1990	-	-	-	80.6	-	-	108.9	3.6
1991	-	-	-	74.5	-	-	103.6	3.3
1992	-	-	-	64.2	-	-	91.5	2.8
1993	-	-	-	87.4	-	-	127.1	2.3
1994	-	-	-	72.2	-	-	106.9	1.8
1995	-	-	-	76.3	-	-	115.0	1.8
1996	-	-	-	83.4	-	-	128.0	1.8
1997	-	-	-	80.1	-	-	125.0	1.8
1998	-	-	-	76.7	-	-	122.0	1.8
1999	-	-	-	69.6	-	-	112.2	1.8
SUBTOTAL	1	0	0	1226.3	0	0	1692.3	-
APPROPRIATION: PROCUREMENT								
1983	-	-	-	.4	-	-	.5	4.9
1984	-	-	-	.1	-	-	.1	3.8
1985	-	-	-	15.1	-	-	17.8	3.4
1986	-	-	-	18.6	-	-	22.6	2.8
1987	-	-	-	20.6	-	-	26.0	2.7
1988	-	-	-	6.0	-	-	7.8	3.1
1989	-	-	-	23.7	-	-	31.9	4.0
1990	-	-	-	37.5	-	-	52.0	3.6
1991	-	-	-	35.8	-	-	50.9	3.3
1992	-	-	-	59.3	-	-	86.0	2.8
1993	-	-	-	62.2	-	-	91.9	2.3
1994	-	-	-	26.3	-	-	39.7	1.8
SUBTOTAL	34	0	0	305.6	0	0	427.2	-

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

c. Annual Summary --

PROGRAM: WIS TOTAL PROGRAM

AS OF DATE: December 31, 1988
BASE-YEAR: FY 1982

FISCAL YEAR	QTY	BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESCL RATE (%)
		FLYAWAY			ADVANCE PROC			
		NONREC	REC	TOTAL	DEBIT	CREDIT	TOTAL	
APPROPRIATION: O&M								
1986	-	-	-	8.4	-	-	9.8	2.8
1987	-	-	-	10.9	-	-	13.1	2.7
1988	-	-	-	13.6	-	-	16.9	3.1
1989	-	-	-	11.5	-	-	14.9	4.0
1990	-	-	-	10.1	-	-	13.5	3.6
1991	-	-	-	13.1	-	-	18.1	3.3
1992	-	-	-	15.2	-	-	21.5	2.8
1993	-	-	-	11.9	-	-	17.2	2.3
1994	-	-	-	12.3	-	-	18.2	1.8
SUBTOTAL	0	0	0	107.0	-	-	143.2	-
TOTAL	35	0	0	1638.9	0	0	2262.7	-

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

c. Annual Summary --

BLOCK A

AS OF DATE: December 31, 1988
BASE-YEAR: FY 1982

FISCAL YEAR	QTY	BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESCL RATE (%)
		FLYAWAY			ADVANCE PROC			
		NONREC	REC	TOTAL	DEBIT	CREDIT	TOTAL	
APPROPRIATION: RDT&E								
1984	-	-	-	7.5	-	-	8.3	3.8
1985	-	-	-	36.4	-	-	41.7	3.4
1986	-	-	-	67.7	-	-	79.6	2.8
1987	-	-	-	63.5	-	-	77.2	2.7
1988	-	-	-	7.9	-	-	10.0	3.1
1989	-	-	-	29.1	-	-	38.0	4.0
1990	-	-	-	17.8	-	-	24.0	3.6
1991	-	-	-	9.8	-	-	13.6	3.3
1992	-	-	-	-	-	-	-	2.8
1993	-	-	-	-	-	-	-	2.3
1994	-	-	-	-	-	-	-	1.8
SUBTOTAL	1	0	0	239.7	0	0	292.4	-
APPROPRIATION: PROCUREMENT								
1985	-	-	-	1.6	-	-	1.8	3.4
1986	-	-	-	11.8	-	-	14.3	2.8
1987	-	-	-	16.4	-	-	20.6	2.7
1988	-	-	-	2.2	-	-	2.9	3.1
1989	-	-	-	19.3	-	-	26.0	4.0
1990	-	-	-	33.9	-	-	47.0	3.6
1991	-	-	-	27.1	-	-	38.5	3.3
1992	-	-	-	5.2	-	-	7.8	2.8
1993	-	-	-	-	-	-	-	2.3
1994	-	-	-	-	-	-	-	1.8
SUBTOTAL	34	0	0	117.5	0	0	158.9	-
TOTAL	35	0	0	357.2	0	0	451.3	-

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

c. Annual Summary --

BLOCKS (OTHER)

AS OF DATE: December 31, 1988
BASE-YEAR: FY 1982

FISCAL YEAR	QTY	BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESCL RATE (%)
		FLYAWAY			ADVANCE PROC			
		NONREC	REC	TOTAL	DEBIT	CREDIT	TOTAL	
APPROPRIATION: RDT&E								
1982	-	-	-	13.7	-	-	14.0	9.2
1983	-	-	-	16.6	-	-	17.8	4.9
1984	-	-	-	34.3	-	-	38.2	3.8
1985	-	-	-	29.9	-	-	34.3	3.4
1986	-	-	-	20.2	-	-	23.8	2.8
1987	-	-	-	50.6	-	-	61.4	2.7
1988	-	-	-	40.7	-	-	51.3	3.1
1989	-	-	-	43.2	-	-	56.5	4.0
1990	-	-	-	62.8	-	-	84.9	3.6
1991	-	-	-	64.7	-	-	90.0	3.3
1992	-	-	-	64.2	-	-	91.5	2.8
1993	-	-	-	87.4	-	-	127.1	2.3
1994	-	-	-	72.2	-	-	106.9	1.8
1995	-	-	-	76.3	-	-	115.0	1.8
1996	-	-	-	83.4	-	-	128.0	1.8
1997	-	-	-	80.1	-	-	125.0	1.8
1998	-	-	-	76.8	-	-	122.0	1.8
1999	-	-	-	69.5	-	-	112.2	1.8
SUBTOTAL	1	0	0	986.6	0	0	1399.9	-
APPROPRIATION: PROCUREMENT								
1983	-	-	-	.4	-	-	.5	4.9
1984	-	-	-	.1	-	-	.1	3.8
1985	-	-	-	13.7	-	-	16.1	3.4
1986	-	-	-	6.8	-	-	8.3	2.8
1987	-	-	-	4.2	-	-	5.3	2.7
1988	-	-	-	3.8	-	-	4.9	3.1
1989	-	-	-	4.4	-	-	5.9	4.0
1990	-	-	-	3.6	-	-	5.0	3.6
1991	-	-	-	8.7	-	-	12.4	3.3
1992	-	-	-	53.9	-	-	78.2	2.8
1993	-	-	-	62.2	-	-	91.9	2.3
1994	-	-	-	26.3	-	-	39.7	1.8
SUBTOTAL	34	0	0	188.1	0	0	268.3	-

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

c. Annual Summary --

BLOCKS (OTHER)

AS OF DATE: December 31, 1988
BASE-YEAR: FY 1982

FISCAL YEAR	QTY	BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESCL RATE (%)
		FLYAWAY			ADVANCE PROC			
		NONREC	REC	TOTAL	DEBIT	CREDIT	TOTAL	
APPROPRIATION: O&M								
1986	-	-	-	8.4	-	-	9.8	2.8
1987	-	-	-	10.9	-	-	13.1	2.7
1988	-	-	-	13.6	-	-	16.9	3.1
1989	-	-	-	11.5	-	-	14.9	4.0
1990	-	-	-	10.1	-	-	13.5	3.6
1991	-	-	-	13.1	-	-	18.1	3.3
1992	-	-	-	15.2	-	-	21.5	2.8
1993	-	-	-	11.9	-	-	17.2	2.3
1994	-	-	-	12.3	-	-	18.2	1.8
SUBTOTAL	0	0	0	107.0	0	0	143.2	-
TOTAL	35	0	0	1281.7	0	0	1811.4	-

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

c. Annual Summary --

PROGRAM: WIS - ARMY

AS OF DATE: December 31, 1988
BASE-YEAR: FY 1982

FISCAL YEAR	QTY	BASE-YEAR DOLLARS FLYAWAY NONREC	FLYAWAY REC	TOTAL	THEN-YEAR DOLLARS ADVANCE PROC DEBIT	ADVANCE PROC CREDIT	TOTAL	ESCL RATE (%)
APPROPRIATION: RDT&E								
1984	-	-	-	11.9	-	-	13.2	3.8
1985	-	-	-	23.5	-	-	27.0	3.4
1986	-	-	-	24.3	-	-	28.6	2.8
1987	-	-	-	22.6	-	-	27.4	2.7
1988	-	-	-	25.1	-	-	31.6	3.1
1989	-	-	-	17.8	-	-	23.2	4.0
1990	-	-	-	19.2	-	-	26.0	3.6
1991	-	-	-	19.7	-	-	27.4	3.3
1992	-	-	-	26.8	-	-	38.2	2.8
1993	-	-	-	22.7	-	-	33.0	2.3
1994	-	-	-	-	-	-	-	1.8
SUBTOTAL	0	0	0	213.6	0	0	275.6	-
APPROPRIATION: PROCUREMENT								
1983	-	-	-	.4	-	-	.5	4.9
1984	-	-	-	.1	-	-	.1	3.8
1985	-	-	-	11.8	-	-	13.9	3.4
1986	-	-	-	7.7	-	-	9.4	2.8
1987	-	-	-	10.4	-	-	13.1	2.7
1988	-	-	-	4.9	-	-	6.4	3.1
1989	-	-	-	13.6	-	-	18.3	4.0
1990	-	-	-	23.1	-	-	32.0	3.6
1991	-	-	-	22.6	-	-	32.1	3.3
1992	-	-	-	35.4	-	-	51.3	2.8
1993	-	-	-	35.3	-	-	52.3	2.3
1994	-	-	-	-	-	-	-	1.8
SUBTOTAL	8	0	0	165.3	0	0	229.4.	-
TOTAL	8	0	0	378.9	0	0	505.0	-

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

c. Annual Summary --

PROGRAM: WIS - NAVY

AS OF DATE: December 31, 1988
BASE-YEAR: FY 1982

FISCAL YEAR	QTY	BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESCL RATE (%)
		FLYAWAY			ADVANCE PROC			
		NONREC	REC	TOTAL	DEBIT	CREDIT	TOTAL	
APPROPRIATION: RDT&E								
1984	-	-	-	7.4	-	-	8.3	3.8
1985	-	-	-	12.2	-	-	14.0	3.4
1986	-	-	-	12.0	-	-	14.1	2.8
1987	-	-	-	10.1	-	-	12.3	2.7
1988	-	-	-	4.4	-	-	5.5	3.1
1989	-	-	-	3.5	-	-	4.6	4.0
1990	-	-	-	4.7	-	-	6.4	3.6
1991	-	-	-	2.8	-	-	3.9	3.3
1992	-	-	-	3.6	-	-	5.1	2.8
1993	-	-	-	3.1	-	-	4.3	2.3
1994	-	-	-	0	-	-	0	1.8
SUBTOTAL	0	0	0	63.8	0	0	78.5	-
APPROPRIATION: PROCUREMENT								
1987	-	-	-	2.1	-	-	2.7	2.7
1988	-	-	-	0	-	-	0	3.1
1989	-	-	-	1.0	-	-	1.3	4.0
1990	-	-	-	3.5	-	-	4.9	3.6
1991	-	-	-	1.3	-	-	1.9	3.3
1992	-	-	-	4.1	-	-	5.9	2.8
1993	-	-	-	3.3	-	-	4.8	2.3
1994	-	-	-	6.1	-	-	9.1	1.8
SUBTOTAL	8	0	0	21.4	0	0	30.6	-
TOTAL	8	0	0	85.2	0	0	109.1	-

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

c. Annual Summary --

PROGRAM: WIS - AIR FORCE

AS OF DATE: December 31, 1988
BASE-YEAR: FY 1982

FISCAL YEAR	QTY	BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESCL RATE (%)
		FLYAWAY			ADVANCE PROC			
		NONREC	REC	TOTAL	DEBIT	CREDIT	TOTAL	
APPROPRIATION: RDT&E								
1983	-	-	-	4.6	-	-	5.0	4.9
1984	-	-	-	22.5	-	-	25.0	3.8
1985	-	-	-	30.5	-	-	35.0	3.4
1986	-	-	-	51.6	-	-	60.7	2.8
1987	-	-	-	81.4	-	-	98.9	2.7
1988	-	-	-	19.2	-	-	24.2	3.1
1989	-	-	-	51.1	-	-	66.7	4.0
1990	-	-	-	56.6	-	-	76.5	3.6
1991	-	-	-	52.0	-	-	72.2	3.3
1992	-	-	-	33.9	-	-	48.2	2.8
1993	-	-	-	61.8	-	-	89.8	2.3
1994	-	-	-	72.2	-	-	106.9	1.8
1995	-	-	-	76.3	-	-	115.0	1.8
1996	-	-	-	83.4	-	-	128.0	1.8
1997	-	-	-	80.1	-	-	125.0	1.8
1998	-	-	-	76.8	-	-	122.0	1.8
1999	-	-	-	69.2	-	-	112.3	1.8
SUBTOTAL	1	0	0	923.2	0	0	1311.4	-
APPROPRIATION: PROCUREMENT								
1985	-	-	-	1.9	-	-	2.2	3.4
1986	-	-	-	3.6	-	-	4.4	2.8
1987	-	-	-	6.4	-	-	8.1	2.7
1988	-	-	-	0	-	-	0	3.1
1989	-	-	-	8.2	-	-	11.0	4.0
1990	-	-	-	10.7	-	-	14.9	3.6
1991	-	-	-	10.6	-	-	15.0	3.3
1992	-	-	-	15.7	-	-	22.8	2.8
1993	-	-	-	17.6	-	-	26.0	2.3
1994	-	-	-	20.3	-	-	30.5	1.8
SUBTOTAL	14	0	0	95.0	0	0	134.9	-

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

c. Annual Summary --

PROGRAM: WIS - AIR FORCE

AS OF DATE: December 31, 1988
BASE-YEAR: FY 1982

FISCAL YEAR	QTY	BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESCL RATE (%)
		FLYAWAY			ADVANCE PROC			
		NONREC	REC	TOTAL	DEBIT	CREDIT	TOTAL	
APPROPRIATION: O&M								
1986	-	-	-	8.4	-	-	9.8	2.8
1987	-	-	-	10.6	-	-	12.8	2.7
1988	-	-	-	13.5	-	-	16.8	3.1
1989	-	-	-	11.5	-	-	14.9	4.0
1990	-	-	-	10.1	-	-	13.5	3.6
1991	-	-	-	13.1	-	-	18.1	3.3
1992	-	-	-	15.0	-	-	21.3	2.8
1993	-	-	-	11.8	-	-	17.0	2.3
1994	-	-	-	12.3	-	-	18.1	1.8
SUBTOTAL	0	0	0	106.3	0	0	142.3	
TOTAL	15	0	0	1124.5	0	0	1588.6	-

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

c. Annual Summary --

PROGRAM: WIS - MARINE CORPS

AS OF DATE: December 31, 1988
BASE-YEAR: FY 1982

FISCAL YEAR	QTY	BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESCL RATE (%)
		FLYAWAY			ADVANCE PROC			
		NONREC	REC	TOTAL	DEBIT	CREDIT	TOTAL	
APPROPRIATION: PROCUREMENT								
1985	-	-	-	.3	-	-	.3	3.4
1986	-	-	-	.5	-	-	.6	2.8
1987	-	-	-	.5	-	-	.7	2.7
1988	-	-	-	.2	-	-	.3	3.1
1989	-	-	-	.2	-	-	.2	4.0
1990	-	-	-	.2	-	-	.2	3.6
1991	-	-	-	.1	-	-	.2	3.3
1992	-	-	-	.1	-	-	.2	2.8
1993	-	-	-	-	-	-	-	2.3
1994	-	-	-	-	-	-	-	1.8
TOTAL	0	0	0	2.1	0	0	2.7	-

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

c. Annual Summary --

PROGRAM: WIS - DCA

AS OF DATE: December 31, 1988
BASE-YEAR: FY 1982

FISCAL YEAR	QTY	BASE-YEAR DOLLARS FLYAWAY NONREC	FLYAWAY REC	TOTAL	THEN-YEAR DOLLARS ADVANCE PROC DEBIT	ADVANCE PROC CREDIT	TOTAL	ESCL RATE (%)
APPROPRIATION: RDT&E								
1982	-	-	-	13.7	-	-	14.0	9.2
1983	-	-	-	12.0	-	-	12.8	4.9
SUBTOTAL	0	0	0	25.7	0	0	26.8	-
APPROPRIATION: PROCUREMENT								
1985	-	-	-	1.2	-	-	1.4	3.4
1986	-	-	-	5.7	-	-	6.9	2.8
1987	-	-	-	1.0	-	-	1.2	2.7
1988	-	-	-	0.2	-	-	0.3	3.1
1989	-	-	-	0.4	-	-	0.5	4.0
1990	-	-	-	0	-	-	0	3.6
1991	-	-	-	1.0	-	-	1.4	3.3
1992	-	-	-	3.0	-	-	4.4	2.8
1993	-	-	-	5.4	-	-	8.0	2.3
1994	-	-	-	-	-	-	-	1.8
SUBTOTAL	3	0	0	17.9	0	0	24.1	-
TOTAL	3	0	0	43.6	0	0	50.9	-

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

c. Annual Summary --

PROGRAM: WIS - DNA

AS OF DATE: December 31, 1988
BASE-YEAR: FY 1982

FISCAL YEAR	QTY	BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESCL RATE (%)
		FLYAWAY			ADVANCE PROC			
		NONREC	REC	TOTAL	DEBIT	CREDIT	TOTAL	
APPROPRIATION: PROCUREMENT								
1986	-	-	-	1.1	-	-	1.4	2.8
1987	-	-	-	0.1	-	-	0.1	2.7
1988	-	-	-	0.6	-	-	0.8	3.1
1989	-	-	-	0.4	-	-	0.6	4.0
1990	-	-	-	0	-	-	0	3.6
1991	-	-	-	0.2	-	-	0.3	3.3
1992	-	-	-	1.0	-	-	1.5	2.8
1993	-	-	-	0.6	-	-	0.8	2.3
1994	-	-	-	-	-	-	-	1.8
SUBTOTAL	1	0	0	4.0	0	0	5.5	-
APPROPRIATION: O&M								
1987	-	-	-	0.3	-	-	0.3	2.7
1988	-	-	-	0.1	-	-	0.2	3.1
1989	-	-	-	0	-	-	0	4.0
1990	-	-	-	0	-	-	0	3.6
1991	-	-	-	0	-	-	0	3.3
1992	-	-	-	0.1	-	-	0.2	2.8
1993	-	-	-	0.2	-	-	0.2	2.3
1994	-	-	-	-	-	-	-	1.8
SUBTOTAL	0	0	0	0.7	0	0	0.9	-
TOTAL	1	0	0	4.7	0	0	6.4	-

Program Funding Summary (Cont'd):

d. Obligations and Expenditures--Reflects program office records as of December 31, 1988.

AS OF DATE: December 31, 1988
BASE-YEAR: FY 1982

FISCAL YEAR	THEN-YEAR DOLLARS (Current Estimate in Millions) TOTAL	OBLIGATED	EXPENDED
	APPROPRIATION: RDT&E		
1982	14.0	14.0	14.0
1983	17.8	17.8	16.8
1984	46.5	46.5	46.4
1985	76.0	76.0	70.9
1986	103.4	103.4	100.4
1987	138.6	116.1	70.6
1988	61.3	45.0	9.6
1989	94.5	4.4	0
To Complete	1140.2	N/A	N/A
Total	1692.3	423.2	328.7
	APPROPRIATION: PROCUREMENT		
1983	.5	.5	.5
1984	.1	.1	.1
1985	17.8	17.8	17.8
1986	22.6	21.9	14.7
1987	26.0	18.8	14.3
1988	7.8	6.9	0.8
1989	31.9	0.1	0
To Complete	320.5	N/A	N/A
Total	427.2	66.1	48.2
	APPROPRIATION: O&M		
1986	9.8	9.8	9.8
1987	13.1	13.1	10.2
1988	16.9	16.9	8.5
1989	14.9	0	0
To Complete	88.5	N/A	N/A
Total	143.2	39.8	28.5

17. Productions Rate Data: N/A

18. Operating and Support Costs:

a. N/A

b. N/A

c. Contractor Support Costs - N/A

[redacted]

SAR-88-037

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

(b)(1)

PROGRAM: PHALANX CIWS

3 PHALANX

AS OF DATE: December 31, 1988

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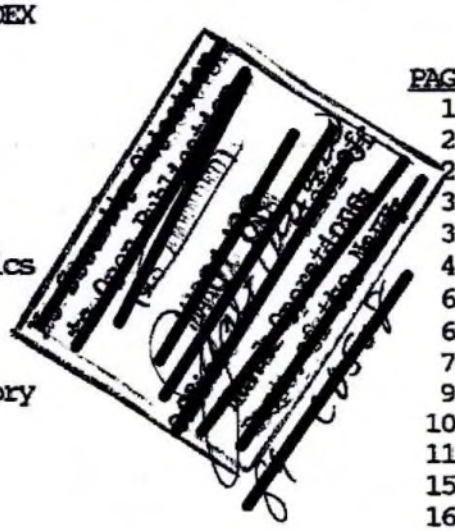

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1. Designation and Nomenclature (Popular Name): MK 15/Close-In Weapon System (PHALANX CIWS)

2. DoD Component: Department of the Navy

Responsible Office and Telephone Number:

PHALANX Close-In Weapon System
Program Office (PMS 413)
Naval Sea Systems Command
Washington, DC 20362-5101

PM: CAPT Jere G. Mackin, USN
ASSIGNED: April 1, 1987
AUTOVON: 222-7142
COMMERCIAL: (703) 692-7142

4. Program Elements/Procurement Line Items:

RDT&E:	PE 0604358N				
WPN:	0204229 Subhead 84E2		APPN 1507	ICN 4110	
SCN:	Ship Class:	BB	PE: 0204220N	APPN 1611	
		LSD/LHD	0204411N		
		FFG	0204224N		
		CG's & DDG's	0204292N		
		CVN/CV SLEP	0204112N		
		AO/AOE	0204441N		

~~AS AMENDED~~

~~MAR 02 1989~~

5. Related Programs: FFG-7, CG 47, LSD-41, LHD, DDG 51, CVN-70, and BB-61 Classes are SAR reportable related programs. CV-62, AE, AOE-6, and DD-989 are related programs not included in other SARS.

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OASD(PA) DFOISR 89-T-0573

(b)(1)c Mission and Description: Close-In Weapon System (CIWS) is designed as a fast action 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 all mounted in a single above deck structure requiring minimum interface with other ship systems. 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. (U) Significant Historical Developments - Six 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 ACIM sparing is being implemented. Comprehensive successful testing against real world 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. CTE of PHALANX Block I was conducted during the final quarter of 1984. NTE and a comprehensive 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. APL 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.

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8. Threshold Breaches: In Aug 1988 the NPDM granted BLK I ALP vice AFP for two years. BLK I AFP was rescheduled from Aug 1988 to Jan 1990 to accommodate Follow-on OT&E (OT-III) which resulted in a DAE baseline breach. There are no breaches in DCP #88, Rev. 1, approved 17 Nov 1977.

9. Schedule:

a. 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 Production 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	NA	NA	Aug 88
Block I Approval for Full Production	NA	May 88	Jan 90

b. Previous Change Explanations --

ALP Schedule slipped from Jan 84 to Dec 85 due to problem development including excessive TMI's and 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 Suitability Model, establishment of system sensitivity performance in at-sea environment, and lost range availability. Block I Approval for Full/Limited Production 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).

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c. Current Change Explanations -- None.

d. References --

Production Estimate: -- DCP #88, Rev 1, dated 17 Nov 1977.
Approved Program: -- DAE Baseline, 17 Feb 1988.
NPDM (Approval for Limited Production for two years) Aug 1988.

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e. References —
Production Estimate: DCP #88, Rev 1, dated 17 November 1977.
Approved Program: DAE Baseline, 17 Feb 1988.
TEMP No. 142-1 (Block I) dated 17 July 1987.

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

a. Cost —	Production Estimate	Approved Program	Current Estimate
Development	$ 154.8	$ 260.9	$ 260.9
Procurement	2021.4	2759.1	2759.1
M61A1 Gun/Barrel	(22.5)	(25.0)	(25.0)
Weapons Group	(1518.0)	(1756.5)	(1756.5)
Other (Proc Support)	(212.8)	(634.7)	(634.7)
TOTAL SAILAWAY	(1753.3)	(2416.2)	(2416.2)
Peculiar Support	(45.3)	(51.4)	(51.4)
Initial Spares	(222.8)	(291.5)	(291.5)
Construction	-	-	-
TOTAL: (CONSTANT FY 84$)	$ 2176.2	$ 3020.0	$ 3020.0
Escalation	305.5	45.9	45.9
Development	(3.2)	(- 47.6)	(- 47.6)
Procurement	(302.3)	(93.5)	(93.5)
Construction	-	-	-
Total Then-Year $	$ 2481.7	$ 3065.9	$ 3065.9
b. Quantities —			
Development (RDT&E)	3	3	3
Procurement	617	734	734
Total	620	737	737

c. 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 65, Cost $394.9M; Pakistan: Qty 7, Cost $26.9M; Portugal: Qty 3, Cost $29.3M; Saudi Arabia: Qty 14, Cost $108.9M; Taiwan: Qty 9, Cost $63.9M; United Kingdom: Qty 30, Cost $150.8M; and Special Defense Acquisition Fund: Qty 6, Cost $25.1M. Total sales are 166 units with total dollar sales of approximately $968M.

d. Nuclear Costs -- None.

e. References —
Production Estimate: DCP #88, Rev 1, dtd 17 November 1977.
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 88) Current Estimate Dec 88 SAR	Current Year (FY 88) UCR Baseline Dec 87 SAR	Budget Year (FY 89) UCR Baseline Dec 88 SAR
a. Program Acquistion —			
(1) Cost	3065.9	2608.5	3065.9
(2) Quantity	737	625	737
(3) Unit Cost	4.160	4.174	4.160

b. Current Procurement --	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	77.1	77.1	147.0
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	77.1	77.1	147.0
(2) Quantity	18		35
(3) Unit Cost	4.283	4.283	4.200

13. Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	158.0	2323.7	-	2481.7
Previous Changes:				
Economic	- 43.8	- 303.6	-	- 347.4
Quantity	-	+ 13.8	-	+ 13.8
Schedule	-	+ 33.7	-	+ 33.7
Engineering	-	+ 186.4	-	+ 186.4
Estimating	+ 89.2	+ 95.4	-	+ 184.6
Other	-	-	-	-
Support	-	+ 48.5	-	+ 48.5
Subtotal	+ 45.4	+ 74.2	-	+ 119.6
Current Changes:				
Economic	- .1	- 9.0		- 9.1
Quantity	-	+ 463.2	-	+ 463.2
Schedule	-	- 35.1	-	- 35.1
Engineering	-	-	-	-
Estimating	+ 10.0	- 18.8	-	- 8.8
Other	-	-	-	-
Support	-	+ 54.4	-	+ 54.4
Subtotal	+ 9.9	+ 454.7	-	+ 464.6
Total Changes	+ 55.3	+ 528.9	-	+ 584.2
Current Estimate	213.3	2852.6	-	3065.9

13. Cost Variance Analysis:
(FY 1984 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Estimate (PdE)	154.8	2021.4	-	2176.2
Previous Changes:				
Economic	-	-	-	-
Quantity	-	+ 10.5	-	+ 10.5
Schedule	-	-	-	-
Engineering	-	+ 147.3	-	+ 147.3
Estimating	+ 99.4	+ 176.0	-	+ 275.4
Other	-	-	-	-
Support	-	+ 28.6	-	+ 28.6
Subtotal	+ 99.4	+ 362.4	-	+ 461.8
Current Changes:				
Economic	-	-	-	-
Quantity	-	+ 348.6	-	+ 348.6
Schedule	-	- .3	-	- .3
Engineering	-	-	-	-
Estimating	+ 6.7	- 18.7	-	- 12.0
Other	-	-	-	-
Support	-	+ 45.7	-	+ 45.7
Subtotal	+ 6.7	+ 375.3	-	+ 382.0
tal Changes	+ 106.1	+ 737.7	-	+ 843.8
rrent Estimate	260.9	2759.1	-	3020.0

b. Previous Change Explanations --

(1) RDT&E
Economic: Revised escalation indices.
Estimating: Revised cost estimates to improve capability to counter lower altitude, high velocity targets with smaller cross sections.

(2) PROCUREMENT
Economic: Revised escalation indices.
Quantity: Requirements for 3 additional WPN units and 4 SCN units for a net increase of 7 units.
Schedule: Schedule shift of WPN and SCN to buyout CG units in FY 88 vice FY 89-90, deletion of DDG units in FY 88 and 1 ship in FY 89, shift in CVN units to FY 88 from FY 90 & 93, addition of LHD units in FY 84 and a shift in units from FY 90 to 91.
Estimating: Current hardware contracts allowed revised out year hardware estimates.
Support: Decrease in support costs due to associated overall estimating decrease in hardware contracts.

c. Current Change Explanations --

		Base-Year	Then-Year
(1)	RDT&E		
	Revised economic escalation indices. (Economic)	N/A	- .1
	Revised cost estimates due to congressional direction and the addition of two program years as a continuing program. (Estimating)	+ 6.7	+ 10.0
(2)	Procurement		
	Revised SCN and WPN economic escalation indices. (Economic)	N/A	- 9.0
	Increased total program costs due to the acceleration of 28 SCN units and 20 WPN units into FY 90-91, and the addition of two new program years, FY 93/94, providing 30 WPN and 38 SCN units. (Quantity)	+ 348.6	+ 463.2
	Decrease costs due to procurements occuring earlier than previously reported. (Schedule)	- .3	- 35.1
	Estimating changes due to increase in total quantity of units resulting in lower average unit costs and cost savings due to competition. (Estimating)	- 18.7	- 18.8
	Increase in support equipment costs due to greater quantity of units procured and the addition of two program years as a continuing program. (Support)	+ 45.7	+ 54.4

14. Program Acquistion Unit Cost (PAUC) History: (Millions of then-year dollars)
a. Initial SAR Estimate to Current Baseline Estimate -- N/A
b. Current Baseline Estimate to Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
4.003	-0.484	+0.008	+0.002	+0.253	+0.238	+0.140	0.000	+0.157	4.160

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

a. Procurement —

	Initial Contract Price		
FY 86 Production	Target	Ceiling	Qty
General Dynamics Pomona, California N00024-86-C-5412, FPI Awarded: 7 August 1986 Definitized: 8 July 1987	$188.2	$200.5	57

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$226.4	$254.3	58	$226.4	$254.3

	Cost Variance	Schedule Variance
Previous Cumulative Variance:	-10.7	-18.5
Cumulative Variance To Date: (11/88)	- 9.3	- 4.7
	+ 1.4	+13.8

Explanation of Change: General Dynamics reflects an unfavorable $ 4.7M schedule variance and an unfavorable $9.3M 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 82% complete. Estimate of cost at completion is estimated to overrun the contract budget baseline.

	Initial Contract Price		
FY 87 Production	Target	Ceiling	Qty
General Dynamics Pomona, California N00024-86-C-5456, FPI Awarded: 31 July 1987 Definitized: 31 July 1987	$154.1	$170.0	65

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$173.3	$190.2	66	$173.3	$190.2

	Cost Variance	Schedule Variance
Previous Cumulative Variance:	-1.6	- .4
Cumulative Variance To Date: (11/88)	+ .1	-17.1
	+1.7	-16.7

Explanation of Change: Quantity should be 66 vice 65. One FMS unit was erroneously left out. General Dynamics reflects an unfavorable $17.1M cost variance. Variance due to late completion of FY 86. This contract is approximately 43% complete. Estimate of cost at completion is within the contract budget baseline.

	Initial Contract Price		
FY 88 Production	Target	Ceiling	Qty
General Dynamics Pomona, California N00024-88-C-5443, FFP Awarded: 31 August 1988 Definitized: 31 August 1988	$119.6	N/A	36

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$119.6	N/A	36	$119.6	$119.6

Explanation of Change: New production contract.

b. RDT&E -- N/A

c. MILCON — N/A

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

a. Program Status --

(1) Percent Program Completed: 76% or 13 of 17 years

(2) Percent Program Cost Appropriated: 73% or $2,242.2/$3,065.9

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY7T-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-94)	Total
[redacted]T&E	162.4	4.4	6.3	40.2	213.3
[redacted]N	1327.5	60.7	62.5	140.9	1591.6
SCN	752.3	86.3	82.4	340.0	1261.0
TOTAL	2242.2	151.4	151.2	521.1	3065.9

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

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY 84 Dollars Nonrec	Sailaway FY 84 Dollars Rec	Total Base Year$	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: RDT&E								
1978	3			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	10.59
1981				2.3	2.1	2.1	2.1	10.61
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	4.2	4.2	2.8
1987				5.7	6.3	5.7	5.6	2.7
1988				6.4	7.4	5.9	5.2	3.1
1989				4.4	5.2	1.8	.2	4.0
1990				3.6	4.4			3.6
1991				4.9	6.3			3.3
1992				8.5	11.1			2.8
1993				14.0	18.7			2.3
1994				7.7	10.4			1.8
Subtotal	3			260.9	213.3	154.3	151.8	

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

c. Annual Summary —

Fiscal Year	Qty	Sailaway FY 84 Dollars Nonrec	Sailaway FY 84 Dollars Rec	Total Base Year$	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: WPN								
197T			48.9	48.9	26.8	26.8	26.8	3.56
1977			43.0	43.0	25.0	25.0	25.0	3.78
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	8.72
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
83	37		105.3	122.5	123.7	123.9	122.8	9.0
84	40		116.4	123.9	130.2	132.0	123.1	8.0
1985	36		140.2	145.0	157.2	157.2	147.8	3.4
1986	32		115.2	117.2	131.1	131.1	114.3	2.8
1987	24		77.3	79.5	92.0	86.6	37.3	2.7
1988	5		23.3	24.8	29.8	27.6	10.2	3.1
1989	5		13.4	14.7	18.2	8.4	0.7	4.0
1990	20		47.0	47.6	60.7			3.6
1991	19		47.4	47.8	62.5			3.3
1992	6		22.5	24.1	32.1			2.8
1993	15		37.8	38.2	51.9			2.3
1994	15		41.1	41.1	56.9			1.8
Subtotal	446		1499.4	1642.9	1591.6	1312.1	1177.7	

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

c. Annual Summary —

Fiscal Year	Qty	Sailaway FY 84 Dollars Nonrec	Sailaway FY 84 Dollars Rec	Total Base Year$	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
				Appropriation: SCN				
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		57.1	69.0	71.0	71.0	71.0	3.8
1984	19		49.3	59.8	62.9	53.6	52.0	3.6
1985	15		44.2	54.0	58.0	45.6	34.5	2.1
1986	17		51.2	62.1	68.8	50.2	29.4	1.0
[illegible]87	14		43.2	52.8	60.3	32.6	9.5	2.7
[illegible]88	24		81.0	97.9	115.6	34.2	0	3.1
1989	13		39.9	48.5	58.9	0	0	4.0
1990	15		56.9	69.4	86.3			3.6
1991	14		53.0	64.7	82.4			3.3
1992	17		64.1	78.1	101.2			2.8
1993	20		79.3	96.6	127.4			2.3
1994	18		67.8	82.9	111.3			1.8
Subtotal	288		916.8	1116.1	1261.0	544.1	453.3	
Total	737		2416.2	3020.0	3065.9	2010.5	1782.8	

17. Production Rate Data:

a. Annual Production Rates — (Note: The attainment of the maximum production rate may be limited by expected participation of FMS customers.)

Fiscal Year	Production Rates (Quantity/Year) Production Estimate	Current Estimate[1]	Maximum Economic
1978	22	37	
1979	64	44	
1980	72	75	84
1981	73	77	84
1982	90	74	84
1983	112	77	84
1984		95	84
1985		72	84
1986		63	84
1987		56	84
1988		29	132
1989		18	132
1990		35	132
1991		33	132
1992		23	-
1993		35	-
1994		33	-

[1]/Delivery period is 12 months from 1st delivery to last. Quantity shown is budget quantity, figures do not include lead time. Actual FMS quantities are shown but no projected FMS quantities are included.

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 $)	2176.2	+ 843.8	3020.0	0.000	3020.0
	(TY $)	2481.7	+ 584.2	3065.9	0.000	3065.9
PAUC	(BY $)	3.510	+ 0.588	4.098	0.000	4.098
	(TY $)	4.003	+ 0.157	4.160	0.000	4.160

c. Schedule Variance --

Item	Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	7/78	N/A	7/78	N/A	7/78
Duration (in Months)	86	-132	218	54	164
End Date (Mo/Yr)	9/85	N/A	9/98	N/A	3/92

d. Deliverables (Plan/Actual) --

	To Date
RDT&E	3/3
SCN	135/135
WPN	318/318

e. Approved Design to Cost-Goal -- 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:

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	4627.7	1663.0	2050.0	8340.7
Industrial Fund	N/A	N/A	N/A	N/A
Total	4627.7	1663.0	2050.0	8340.7

SAR-88-036

UNCLASSIFIED

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

2 P-3C

PROGRAM: P-3C ORION

AS OF DATE: DECEMBER 31, 1988

[redacted]

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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, LRAACA

[redacted]

UNCLASSIFIED

OASD(PA) DFOISR 88-T-0578

6. 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 are 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.

Excluded from this Selected Acquisition Report are the 237 P-3C aircraft procured in FY83 & prior & the $4,306.8M - FY83 & prior funding.

b. Significant Developments Since Last Report -- The fleet has reported a P-3C Mission Capability of 86.69% for operational squadrons for the period extending from Sep 86 thru Aug 87. 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.

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

8. Threshold Breaches: DCP thresholds were not established for this program. No DAE Baseline thresholds have been breached.

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 17 February 1988

. 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 17 February 1988

Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost	(1) Production Estimate (FY83-FY89)	(2) Approved Program	(3) Current Estimate (FY83-FY89)
Development	280.1	57.6	57.6
Procurement	3453.2	1252.6	1252.6
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)	(233.8)
TOTAL SUPPORT	(755.8)	(307.4)	(307.4)
Initial Spares	(63.6)	(20.8)	(20.8)
MILCON	2.6	9.0	9.0
TOTAL FY84 Base-Year $	3735.9	1319.2	1319.2
Escalation	1287.7	123.7	123.7
Development	(51.5)	(4.3)	(4.3)
Procurement	(1236.0)	(118.1)	(118.1)
MILCON	(.2)	(1.3)	(1.3)
TOTAL THEN-YEAR $	5023.6	1442.9	1442.9
b. Quantities --			
Development	0	0	0
Production	80	32	32
TOTAL	80	32	32

c. Foreign Military Sales: Sales to date total $772.0M. $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.

d. Nuclear Costs: None

e. References --

Production Estimate: FY85 Congressional Data Sheet dtd Jan '84
Approved Programs: FY-1990/91 President's Budget

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

		Current Year		Budget Year
		SAR Current Estimate DEC 88 SAR	UCR Baseline Estimate DEC 87 SAR	UCR Baseline Estimate DEC 88 SAR
A.	Program Acquisition			
(1)	Cost	1,442.9	1,769.4	1,442.9
(2)	Quantity	32	38	32
(3)	Unit Cost	45.091	46.563	45.091

		Current Year		Budget Year
B.	Current Procurement--	(FY 1989)	(FY 1989)	(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. 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	- 21.2	- 381.2		- 402.4
Schedule	+ 104.3	+ 212.0		+ 316.3
Quantity	-	-1,721.2		-1,721.2
Estimating	- 343.4	- 733.4		-1,076.8
Support	-	- 377.6	+ 7.5	- 370.1
Subtotal	- 260.3	-3,001.4	+ 7.5	-3,254.2
Current Changes:				
Economic	- .1	- 41.0		- 41.1
Quantity		- 176.0		- 176.0
Estimating	- 9.3			- 9.3
Support		- 100.1		- 100.1
Subtotal	- 9.4	- 317.1	-	- 326.5
TOTAL CHANGES	- 269.7	-3,318.5	+ 7.5	-3,580.7
Current Estimate	61.9	1,370.7	10.3	1,442.9

c. 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		-1,330.1		-1,330.1
Estimating	- 296.2	- 538.2		- 834.4
Support		- 241.3	+ 6.4	- 234.9
Subtotal	- 215.1	-1,948.4	+ 6.4	-2,157.1
Current Changes:				
Quantity		- 175.6		- 175.6
Estimating	- 7.4			- 7.4
Support		- 76.6		- 76.6
Subtotal	- 7.4	- 252.2	-	- 259.6
Total Changes	- 222.5	-2,200.6	+ 6.4	-2,416.7
Current Estimate	57.6	1,252.6	9.0	1,319.2

d. Previous Change Explanation

RDT&E
ECONOMIC -- Revised economic escalation indices
SCHEDULE -- Inclusion of FY92 funding
ESTIMATING Deletion of P-3G & UIV programs from the P-3C SAR. Cancellation of Avionics Improvement Program

PROCUREMENT
ECONOMIC -- Revised economic escalation indices
QUANTITY -- Shutdown of P-3C after FY 1987 reduced program by 48 a/c; Inclusion of 6 NGR&E FY88 P-3C a/c.
SCHEDULE -- Stretch-out of program by one year
ESTIMATING- Reprice of FY87-FY90 as Multi-year Program, cancellation of Multi-year Program, straight lining airframe/cfe costs FY86 93), & Congressional Recissions & Reductions
SUPPORT -- Stretch-out and increase in support/spares requirements. Reduction in support/spares requirements due to shutdown of P-3C program after FY87 procurement.

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)

Cost Variance Analysis (Cont'd):

c. Current Change Explanations --

	(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E		
Revised Jan 88 economic esc. rates (ECON)	N/A	- .1
Development costs for out-of-production a/c excluded from SAR reporting (EST)	- 7.4	- 9.4
(2) PROCUREMENT		
Revised Jan 88 economic esc. rates (ECON)	N/A	- 18.7*
Cancellation of 6 NGR&E FY88 A/C (QTY)	- 175.6	- 198.3*
Cancellation of Reprogramming Action for FY87 Support Requirements & Reduction in Support Requirements & Spares (SUPT)	- 76.6	- 100.1
(3) MILCON		
	-0-	-0-

orrection of Prior SAR (12/87)

	Then Year $
Economic	-22.3
Quantity	+22.3

Program Acquisition Unit Cost (PAUC) History:

A. Initial SAR Estimate

PAUC (Initial DE Est)			Changes (Then Year Dollars in Millions)						PAUC Baseline DE Est.
	ECON	QTY	SCH	ENG	EST	SPT	Other	Total	
62.795	-	-	-	-	-	-	-	-	62.795

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	-14.694	-	-17.704	45.091

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

Note: N0001984C0016 is 100% delivered and over 90% expended.
N0001985C0008 is 100% delivered and over 90% expended.

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% (1442.9/1442.9)

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	1,370.7				1,370.7
MILCON	10.3				10.3
TOTAL	1,442.9				1,442.9

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

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	5.3	2.7
1988				3.8	4.4	4.3	3.9	3.1
1989				4.1	4.9	3.8	-	4.0
Sub-total				57.6	61.9	60.6	55.1	

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				48.1	48.6	48.6	48.3	9.0
1984	5		170.8	277.0	290.8	290.8	277.0	8.0
1985	9		261.6	360.7	390.9	390.9	352.4	3.4
1986	9		254.9	319.2	355.3	355.3	304.3	2.8
1987	9	5.5	183.4	244.7	281.6	277.1	127.8	2.7
1988				2.4	2.9	2.9	1.2	3.1
1989				.5	.6	.1	-	4.0
Sub-total	32	5.5	870.7	1,252.6	1,370.7	1,365.7	1,111.0	

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	3.1
Sub-total				9.0	10.3	9.2	6.8	
[illegible]al	32	5.5	870.7	1,319.2	1,442.9	1,435.5	1,172.9	

1 Production Rate Data:

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
Acq. Cost (BY)	3,735.9	-2,416.7	1,319.2	N/A	N/A
(TY)	5,023.6	-3,580.7	1,442.9	N/A	N/A
PAUC (BY)	46.699	-5.474	41.225	N/A	N/A
(TY)	62.795	-17.704	45.091	N/A	N/A

c. Schedule Variance --

Production Estimate		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	26/26

e. Approved Design to Cost Goal -- Not Applicalbe

(Average Unit Flyaway Cost)

Development Estimate	Current Estimate	Latest Approved Threshold
N/A	N /A	N/A

16. 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)	15.5	8.6	8.7	N/A	32.8
Industrial Fund	4.6	3.3	3.4	N/A	11.3
Total	20.1	11.9	12.1	N/A	44.1

(2) N-14 E-2C

SAR-88-005

(b)(1)

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: E-2C

AS OF DATE: December 31, 1988

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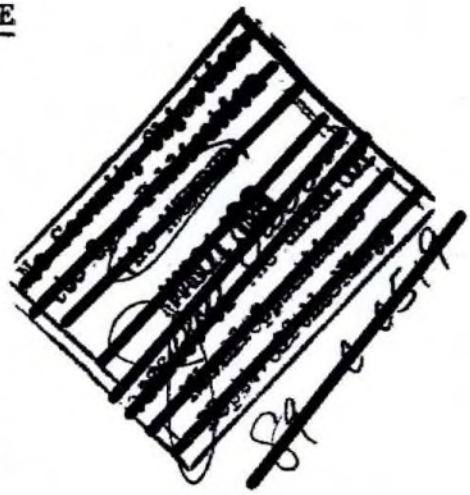

1. (U) Designation/Nomenclature (Popular Name): E-2C/Carrier Based All Weather Airborne Early Warning Command and Control System (Hawkeye)

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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OASD(PA) DFOISR 88-T-0583

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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.

b. Significant Developments Since Last Report -- OPTEVFOR evaluation report of OT-IIB testing concluded that the UDP Group II APS-145 radar:

1. Has potential to be operationally effective
2. Has potential to be operationally suitable
3. Findings support a recommendation for Update Development Program (UDP) Group I APS-139, commenced TECHEVAL on 19 October 1988.

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

8. (U) Threshold Breaches: There are currently no DAE threshold breaches.

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	CH-1

b. Previous Change Explanations -- None

c. Current Change Explanations --
CH-1 NDCP W0463 dated 27 Apr 1988 (Approved development of an increased range APS-145 radar.)

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 17 Feb 1988

(b)(1)

(b)(1)

(b)(1)

11. (U) 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 $156.3M; 8 for Japan for a total of $380.9M; 5 for Egypt for a total of $570.3M; and 4 for Singapore for a total of $334.3M. (Cutbacks due to program savings returned to the customer)

d. Nuclear Costs -- 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: FY 1990/1991 President's Budget

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

	Current Year (FY89)		Budget Year (FY90)
	Current Est (Dec 1988 SAR)	UCR Baseline (Dec 1987 SAR)	UCR Baseline (Dec 1988 SAR)
a. Program Acquisition --			
(1) Cost	7403.8	6824.3	7403.8
(2) Quantity	165	143	165
(3) Unit Cost	44.9	47.7	44.9
b. Current Procurement --	(FY 1989)	(FY 1989)	(FY 1990)
(1) Cost	366.8	366.8	520.8
Less CY Adv Proc	30.8	30.8	225.0
Plus PY Adv Proc	30.0	30.0	30.8
Net Total	366.0	366.0	326.6
(2) Quantity	6	6	4
(3) Unit Cost	61.000	61.000	81.650

13. (U) Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	706.0	5212.3	3.2	5921.5
Previous Changes:				
Economic	-4.7	-100.6		-105.3
Quantity	-	+622.7	-	+622.7
Schedule	-	-	-	-
Engineering	+24.6	+14.8	-	+39.4
Estimating	+81.1	+135.2	-	+216.3
Other	-	-	-	-
Support	-	+130.5	-.8	+129.7
Subtotal	+101.0	+802.6	-.8	+902.8
Current Changes:				
Economic	-1.0	-16.0	-	-17.0
Quantity	-	+761.8	-	+761.8
Schedule	-	+17.7	-	+17.7
Engineering	-	+21.9	-	+21.9
Estimating	-244.4	+92.7	-	-151.7
Other	-	-	-	-
Support	-	-53.2	-	-53.2
Subtotal	-245.4	+824.9	-	+579.5
Total Changes	-144.4	+1627.5	-.8	+1482.3
Current Estimate	561.6	6839.8	2.4	7403.8

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	-	+534.3	-	+534.3
Schedule	-	-	-	-
Engineering	+49.8	+11.9	-	+61.7
Estimating	+29.5	+129.2	-	+158.7
Other	-	-	-	-
Support	-	+108.7	-0.7	+108.0
Subtotal	+79.3	+784.1	-0.7	+862.7
Current Changes:				
Quantity	-	+578.4	-	+578.4
Schedule	-	+13.3	-	+13.3
Engineering	-	+13.3	-	+13.3
Estimating	-197.8	+73.4	-	-124.4
Other	-	-	-	-
Support	-	-47.9	-	-47.9
Subtotal	-197.8	+630.5	-	+432.7
Total Changes	-118.5	+1414.6	-0.7	+1295.4
Current Estimate	537.2	6153.8	2.4	6693.4

b. Previous Change Explanations --

(1) RDT&E
Engineering: Update of the Radar
Economic: Revised indices
Estimating: Revised production cost

(2) Procurement
Economic: Revised indices
Quantity: Addition of 16 aircraft
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		
Estimating	-197.8	-244.4
Economics: Current Revised escalation indices.	N/A	-1.0

(FY 1985 Constant Dollars (Base Year) in Millions)

	(Dollars in Millions) Base Year	Then Year
(2) Procurement		
Revised escalation indices (Economic)		-16.0
Increase is due to an additional 22 A/C procurement established through Multi-Year procurement (Quantity)	+578.4	+761.8
Schedule adjustment from 141 aircraft to 163 aircraft to meet inventory objective through FY 94. (Schedule)	+13.3	+17.7
Engineering changes due to increased quantity. (Engineering)	+13.3	+21.9
Repricing of A/C and GFE requirements (Estimating)	+32.8	+40.4
Adjustment of Grumman overhead due to A-6 cancellation (Estimating)	+40.6	+52.2
Revised estimate of support costs (Support)	-47.9	-53.2
(3) MILCON		
Revised Jan 89 economic escalation rates (Economic)		N/A

14. (U) 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) Pde
	Econ	Qty	Sch	Eng	Est	Sup	Other	Total	
--	--	--	--	--	--	--	--	--	--

b. Current Baseline Estimate to Current Estimate

PAUC Pde	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Sup	Other	Total	
46.626	-.741	-2.348	+.107	+.372	+.392	+.464	--	-1.754	44.872

15. (U) 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 January 9, 1987	$ 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	-0-	-0-
Net Change	-0-	-0-

b. Procurement -- Airframe

	Initial Contract Price Target	Ceiling	Qty
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

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-0-	-0-
Cumulative Variances to Date	-0-	-0-
Net Change	-0-	-0-

15. (U) Contract Information (Cont'd):

Airframe	Initial Contract Price Target	Ceiling	Qty
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

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-0-	-0-
Cumulative Variances to Date	-0-	-0-
Net Change	-0-	-0-

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

a. Program Status --

(1) Percent Program Completed: 80.8% (21 yrs/26 yrs)

(2) Percent Program Cost Appropriated: 69.3% ($5133.7/$7403.8)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY70-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-94)	Total
RDT&E	476.2	38.9	36.9	9.6	561.6
Procurement	4655.1	520.8	452.4	1211.5	6839.8
MILCON	2.4	-	-	-	2.4
Total	5133.7	559.7	489.3	1221.1	7403.8

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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
197T				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	33.7	33.7	3.4
1986				21.1	22.1	22.0	20.4	2.8
1987				30.7	33.0	32.9	26.2	2.7
1988				19.5	21.7	21.6	14.8	3.1
1989				19.7	22.8	18.1	0.0	4.0
1990				32.5	38.9	0.0	0.0	3.6
1991				30.0	36.9	0.0	0.0	3.3
1992				6.0	7.6	0.0	0.0	2.8
1993				1.6	2.0	0.0	0.0	2.3
1994				0.0	0.0	0.0	0.0	1.8
Sub-total	2			537.2	561.6	470.4	437.2	

16. (U) Program Funding Summary (Cont'd): (Current Estimated 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: 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	127.6	127.6	127.6	127.6	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	156.3	156.3	156.3	156.3	3.8
1978	6	0.0	132.4	192.6	192.6	192.6	192.6	6.8
1979	6	9.4	140.6	211.6	211.6	211.6	211.6	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	253.4	253.4	253.4	253.4	14.3
1983	6	0.0	187.3	288.6	288.6	288.6	288.6	9.0
1984	6	0.0	195.4	317.3	317.3	317.3	286.1	8.0
1985	6	30.2	186.9	302.4	318.2	318.2	285.6	3.4
1986	6	26.9	183.9	312.8	337.5	337.5	304.2	2.8
1987	10	7.2	342.3	395.1	440.6	437.8	273.9	2.7
1988	6	27.7	225.0	337.4	389.9	342.6	82.6	3.1
1989	6	0.0	224.9	306.8	366.8	16.5	0.0	4.0
1990	4	17.2	174.8	423.3	520.8	0.0	0.0	3.6
1991	9	0.0	309.2	357.3	452.4	0.0	0.0	3.3
1992	9	0.0	285.1	347.2	450.4	0.0	0.0	2.8
1993	9	0.0	292.6	298.5	393.4	0.0	0.0	2.3
1994	9	0.0	305.2	270.9	367.7	0.0	0.0	1.8
Sub-total	163	142.4	4439.1	6153.8	6839.8	4254.7	3717.2	
Appropriation: MILCON								
85 & Prior				2.4	2.4	2.4	2.4	
Sub-Total				2.4	2.4	2.4	2.4	
Total	165	142.4	4439.1	6693.4	7403.8	4727.5	4156.8	

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	9	18
1992	6	N/A	9	18
1993		N/A	9	18
1994		N/A	9	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	+1295.4	6693.4	-184.9	6878.3
(TY $)	5921.5	+1482.3	7403.8	-160.7	7564.5
PADC (BY $)	42.5	-1.9	40.6	-1.1	41.7
(TY $)	46.6	-1.7	44.9	-0.9	45.8

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	+170	326	+144	182
End Date (Mo/Yr)	9/92	N/A	9/96	N/A	9/94

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	2/2
Procurement	101/101

e. Approved Design to Cost Goal -- N/A

18. (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	65.8	25.1	20.1		111.0
Industrial Fund					
Total	65.8	25.1	20.1		111.0

N-8 ① BATTLESHIP REACT.

SAR-88-085

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

PROGRAM: BATTLESHIP REACTIVATION

AS OF DATE: December 31, 1988

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1. Designation and Nomenclature (Popular Name): IOWA-Class Battleship Reactivation/Modernization (NEW JERSEY, IOWA, MISSOURI, WISCONSIN)

2. DoD Component: U.S. Navy

3. Responsible Office and Telephone Number:

Battleship Reactivation Program (PMS-313)
Naval Sea Systems Command
Washington, DC 20362-5101

PM: CAPT Dennis Doyle
Assigned: Oct 15, 1985
(202)693-0554 AV: 222-0554

4. Program Elements/Procurement Line Items:

RDT&E: PE 0604567N, Project S1803 (Shared Funding)
PE 0603564N, Project S0408 (Shared Funding)

PROCUREMENT: APPN 1611 ICN 22420N

5. Related Programs:

TOMAHAWK
CIWS

6. Mission and Description: To conduct prompt and sustained combat operations at sea, worldwide, in support of national interests. The battleship will operate

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OASD(PA) DFOISR 88-T-0576

as an element of a carrier battle group or amphibious group. In areas of lesser threat, the battleship will be capable of surface action group operations with appropriate ASW- and AAW-capable escorts. The battleship will not replace any existing DOD system.

7. Program Highlights:

a. Significant Historical Developments -- The USS NEW JERSEY was delivered on schedule and subsequently recommissioned on 28 December 1982. Due to operational requirements in Central America and Lebanon, she did not complete her Post Shakedown Availability (PSA) until November 1984. Delivery of the USS IOWA was successfully accelerated in December 1983 to enable recommissioning on 28 April 1984. She completed her Post Shakedown Availability in July 1985. The USS MISSOURI was delivered on schedule in April 1986 and recommissioned in May 1986. She completed her PSA in May 1987. The production contract for the WISCONSIN was awarded in June 1986 with the Reactivation/Modernization Option exercised in July 1986.

b. Significant Developments Since Last Report --

(1) The USS WISCONSIN completed her Reactivation/Modernization in October 1988.

(2) This SAR will be the final report for the Battleship Reactiviation Program because 100 percent of expected deliveries have been made (all 4 ships), and at least 90 percent of planned expenditures have been made.

(3) The Battleship Reactivation has met its mission requirements.

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

8. Threshold Breaches: None

9. Schedule:

a. Milestones --	Production Estimate/ Approved Program	Current Estimate
Delivery of NEW JERSEY (BB-62)	Dec 82/Dec 82	Dec 82
Delivery of IOWA (BB-61)	Jan 85/Apr 84	Apr 84
Delivery of MISSOURI (BB-63)	Jul 86/Apr 86	Apr 86
Delivery of WISCONSIN (BB-64)	Jan 88/Oct 88	Oct 88

b. Previous Change Explanations — Reflects accelerated IOWA delivery; revised MISSOURI schedule; revised WISCONSIN schedule; and Corrected Production Estimate dates to reflect original schedule provided in Baseline Dec 82 SAR. The delivery date of the WISCONSIN changed from Aug 88 to Oct 88 due to increased scope in boiler repairs.

c. Current Change Explanations: None

d. References - -

Production Estimate: CNM Memo Ser 00/0547 of 8 Jun 1981 COMNAVSEASYSCOM, "Reactivation of NEW JERSEY (BB62)"; COMNAVSEASYSCOM ltr Ser 1035 of 16 Jul 1981, "Reactivation of NEW JERSEY (BB62)"; COMNAVSEASYSCOM ltr Ser 209 of 31 Dec 1981, "Reactivation and Modernization of IOWA (BB61)"; CNO Memo Ser 00/C30022 of 13 Jan 1982 to SECNAV, "IOWA (BB61) Reactivation/Modernization"

Approved Program: FY 1990/1991 President's Budget.

10. Technical/Operational Characteristics:

	Prod Estimate/ Appr Program*	Demonstrated Performance	Current Estimate
a. Technical			
Overall Length, ft.	887	887	887
Beam. ft.	108	108	108
Navigational Draft, ft.	38	38	38
Full Load Displacement, tons	58,000	58,000	58,000
Propulsion			
Type	600# stm turb	600# stm turb	600# stm turb
HP (4 shafts)	212,000	212,000	212,000
Accommodations			
BB-62 Officers	62/128	128	128
Enlisted	1,500/1,655	1,655	1,655
BB-61 Officers	131	131	131
Enlisted	1,588	1,588	1,588
BB-63 Officers	78	78	78
Enlisted	1,676	1,676	1,676
BB-64 Officers	78	78	78
Enlisted	1,676	1,676	1,676
b. Operational			
Sustained Speed (@ 80%), kts.	30	30	30
Endurance (@ 20 kts.), nm.	14,800	14,800	14,800
Armament			
Anti-Air Warfare			
PHALANX (CIWS)	MK-15 MOD-4	MK-16 MOD-2**	MK-16 MOD-2**
Electronic Warfare System	AN/SLQ-32(V)3	AN/SLQ-32(V)3	AN/SLQ-32(V)3
5"/38 Gun Mounts	6 MK-28	6 MK-28	6 MK-28
SRBOC Launch System	MK-36 MOD-7	MK-36 MOD-7	MK-36 MOD-7
2D Air Search Radar	AN/SPS-49(V)1	AN/SPS-49(V)5**	AN/SPS-49(V)5**
Anti-Surface Warfare			
Surface Search Radar***	AN/SPS-10B	AN/SPS-10B	AN/SPS-10B
Surface Search Radar****	AN/SPS-67(V)	AN/SPS-67(V)	AN/SPS-67(V)
TOMAHAWK Weapon System	EX-32 MOD-5	EX-32 MOD-5	EX-32 MOD-5
HARPOON Weapon System	AN/SWG-1(V)21	AN/SWG-1A(V)21**	AN/SWG-1A(V)21**

* Unless dual entries are provided, Approved Program values are the same as Production Estimate values.

** BB-64 Only

*** BB-62 Only

**** BB-61, BB-63, and BB-64

c. Previous Change Explanations - - Revised accommodation estimates.

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

d. Current Change Explanations - - None

e. References —

Production Estimate: OPNAV INSTRUCTION C9010., Ser 03C/502 of 13 Jan 1982, "IOWA-Class (BB-61) Top Level Requirements (TLR): Promulgation of,"

Approved Program: FY 1990/1991 President's Budget.

11. Program Acquisition Cost: (In Millions of Dollars)

	Production Estimate (FY81-88)	Approved Program	Current Estimate (FY81-89)
a. Cost —			
Development	19.4	21.5	21.5
Procurement	1,457.3	1,518.3	1,518.3
Basic Ship	(696.4)	(887.9)	(887.9)
GFE	(532.2)	(499.1)	(499.1)
Other	(148.4)	(14.6)	(14.6)
Subtotal Procurement	(1,377.0)	(1,401.6)	(1,401.6)
Outfitting/Post Delivery	(80.3)	(104.6)	(104.6)
Battle Spares	—	(12.1)	(12.1)
Construction	—	—	—
Total FY82 Base-Year $	1,476.7	1,539.8	1,539.8
Escalation	399.9	201.3	201.3
Development	(1.9)	(1.7)	(1.7)
Procurement	(398.0)	(199.6)	(199.6)
Construction	—	—	—
Total Then-Year $	1,876.6	1,741.1	1,741.1
b. Quantities —			
Development	-	-	-
Procurement	4	4	4
Total	4	4	4

d. Foreign Military Sales — None

e. Nuclear Costs -- None

f. References —

Production Estimate: OPNAV INSTRUCTION C9010., Ser 03C/502 of 13 Jan 1982, "IOWA-Class (BB-61) Top Level Requirements (TLR): Promulgation of,"

Approved Program: FY 1990/1991 President's Budget.

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

		Current Year		Budget Year
		Current Est (Dec 88 SAR)	UCR Baseline (Dec 87 SAR)	UCR Baseline (Dec 88 SAR)
a.	Program Acquisition			
	(1) Cost	1,741.1	1,763.3	1,741.1
	(2) Quantity	4	4	4
	(3) Unit Cost	435.275	440.825	435.275
b.	Current Procurement	(FY 1989)	(FY 1989)	(FY 1990)
	(1) Cost	1.8	1.8	-
	Less CY Adv Proc	- -	-	-
	Plus PY Adv Proc	+ -	-	-
	Less OF/PD	- 1.8	1.8	-
	Net Total	0	0	0
	(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
Production Estimate	21.3	1,855.3	-	1,876.6
Previous Changes:				
Economic	-0.5	-197.5	-	-198.0
Quantity	-	-	-	-
Schedule	+4.3	+133.1	-	+137.4
Engineering	-	-	-	-
Estimating	-1.9	-64.4	-	-66.3
Other	-	-	-	-
Support	-	+13.6	-	+13.6
Subtotal	+1.9	-115.2	-	-113.3
Current Changes:				
Economic	-	-7.5	-	-7.5
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-15.5	-	-15.5
Other	-	-	-	-
Support	-	+.8	-	+.8
Subtotal	-	-22.2	-	-22.2
Total Changes	+1.9	-137.4	-	-135.5
Current Estimate	23.2	1,717.9	-	1,741.1

13. Cost Variance Analysis (Cont'd):

(FY 1982 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	19.4	1,457.3	-	1,476.7
Previous Changes:				
Quantity	-	-	-	-
Schedule	+3.5	+102.0	-	+105.5
Engineering	-	-	-	-
Estimating	-1.4	-39.9	-	-41.3
Other	-	-	-	-
Support	-	+11.4	-	+11.4
Subtotal	+2.1	+73.5	-	+75.6
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-13.2	-	-13.2
Other	-	-	-	-
Support	-	+.7	-	+.7
Subtotal	-	-12.5	-	-12.5
Total Changes	+2.1	+61.0	-	+63.1
Current Estimate	21.5	1,518.3	-	1,539.8

b. Previous Change Explanations --

RDT&E

Economic: Revised escalation indices
Schedule: Accelerated IOWA delivery; reflects WISCONSIN authorization as a FY86 ship
Estimating: Updated program funding profile to reflect IOWA actuals and MISSOURI acceleration; updated program funding profile

Procurement

Economic: Revised escalation indices
Schedule: Accelerated IOWA delivery; reflects WISCONSIN authorization as a FY86 ship; transferred $73.4 million FY85 FF to FY84 AP to facilitate advanced MISSOURI delivery and the later planned delivery of the WISCONSIN
Estimating: Updated program funding profile to reflect NEW JERSEY & IOWA actuals and MISSOURI acceleration; updated program funding profile to reflect appropriation of entire WISCONSIN funding in FY86 and Congressional reduction on MISSOURI; and refined estimates
Support: Procurement of selected equipments as Battle Spares

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanations --

	(Dollars in Millions) Base-Year $	Then-Year $
(1) RDT&E	-	-
(2) Procurement		
Economic: Revised escalation indices	-	-7.5
Estimating: Decrease reflects refined estimates for GFE; partially offset by an increase for production change orders.	-13.2	-15.5
Support: Increase reflects revised estimate for procurement of selected equipments as Battle Spares.	+.7	+.8

14. Program Acquisition Unit Cost (PAUC) History:

a. Initial SAR Estimate is the same as Current Baseline Estimate (PdE).

b. Current Baseline Estimate to Current Estimate --

PAUC Baselne Estimte (PdE)	Changes (Then-Year Dollars in Millions)								PAUC Current Estimte
	Econ	Qty	Sched	Eng	Est	Support	Other	Total	
469.150	-51.375	-	+34.350	-	-20.450	+3.600	-	-33.875	435.275

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

a. RDT&E -- N/A

b. Procurement --

WISCONSIN:

Litton Systems Inc., Ingalls Shipbuilding Div.
N00024-86-C-2043, FPPI,
Award: July 1986*

Initial Contract Price Target	Ceiling	Qty
210.3	N/A**	1

Current Contract Price Target	Ceiling	Qty
256.9	N/A**	1

Estimated Price At Completion Contractor	Program Mgr
261.2	262.6

	Cost Var	Schedule Var
Previous Cumulative Variances	-	-
Cumulative Variances To Date	-	-
Net Change	-	-

* 1.0M planning contract awarded in June 1986
** Contract is firm fixed price, therefore Ceiling Price is not applicable.

15. Contract Information (Cont'd)

Explanation of Change: N/A because contract is firm fixed price.

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

a. Program Status --

(1) Percent Program Completed: 100% (9 of 9 years)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 100.0% ($1,741.1/$1,741.1)
(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 (FY92-95)	Total
RDT&E	23.2	-	-	-	23.2
Procurement	1,717.9	-	-	-	1,717.9
Total	1,741.1	-	-	-	1,741.1

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								
1981				3.2	3.1	3.1	3.0	10.61
1982				3.8	3.9	3.7	3.5	7.60
1983				5.3	5.7	5.6	5.4	4.90
1984				2.9	3.2	3.2	3.1	3.80
1985				4.3	4.9	4.9	4.0	3.40
1986				2.0	2.4	2.1	2.1	2.80
Subtotal				21.5	23.2	22.6	21.1	

16. 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 $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Expended	
Appropriation: Procurement-SCN								
1981			83.3	83.3	88.1	88.1	86.7	9.60
1982	1		294.4	301.0	327.8	327.3	318.8	7.50
1983	1		270.6	303.9	336.4	336.1	325.6	3.80
1984	1		388.2	394.3	445.4	442.8	432.2	3.60
1985				11.6	13.4	13.4	13.0	2.10
1986	1		365.1	397.0	472.4	427.3	367.9	1.00
1987				4.8	5.9	5.9	4.6	1.50
1988				21.0	26.7	10.3	2.0	2.60
1989				1.4	1.8	0.0	0.0	4.00
1990								3.60
Subtotal	4		1,401.6	1,518.3	1,717.9	1,651.2	1,550.8	

17. Production Rate Data: N/A

18. Operating and Support Costs:

a. N/A
b. N/A
c. Contractor Support Costs:

(The Year Dollar in Millions)

	FY1989 &Prior	FY1990 Year	FY1991 Year	Balance To Complete	Total
O&M,N	—	.3	.2	.8	1.3
Industrial Fund	—	—	—	—	—
Total	—	.3	.2	.8	1.3

SAR-88-029

(b)(1)

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

25 LRAACA

AS AMENDED

PROGRAM: LRAACA

AS OF DATE: DECEMBER 31, 1988

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1. Designation/Nomenclature (Popular Name): 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 0185,0
   MILCON: 0204613N

5. Related Programs: Harpoon, Update IV

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(b)(1)

OASD(PA) DFOISR 88-T-0583

Mission and Description: The Long Range Air Antisubmarine Warfare Capability Aircraft (LRAACA) 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, LRAACA's other missions include Antisurface Warfare (ASUW), mining, surveillance and reconnaissance. LRAACA 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, LRAACA 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. LRAACA with UIV Avionics will be required to operate with the Antisubmarine Warfare Operations Control Center (ASWOC)

7. Program Highlights:

a. Significant Historical Developments -- The LRAACA 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 LRAACA mission requirements determination study in May 1987 and a draft Request for Proposal was released to industry soliciting comments on operational potential of commercial derivative aircraft to perform the LRAACA mission. A LRAACA 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 was announced on 18 October, 1988. The LRAACA 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 program is currently scheduled for the Defense Acquisition Board on January 4, 1989.

The LRAACA Program is expected to meet its assigned missions.

b. Significant Developments Since Last Report -- This is the first SAR.

c. Changes Since "As of" Date: -- The Defense Acquisition Board convened on 4 January 1989 resulting in the award of an FSED contract to Lockheed Aeronautical Systems Company on 5 January 1989 in advance of an Acquisition Decision Memorandum (ADM). The ADM is expected to be signed by 1 March 1989.

8. Threshold Breaches: -- Decision Coordinating Paper dated Nov 23, 1988 DAE Baseline Approval Pending. No DAE Baseline thresholds have been breached.

(b)(1)

(b)(1)

(b)(1)

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 Approval Pending.

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

a. Cost	(1) Development Estimate (FY86-FY99)	(2) Approved Program	(3) Current Estimate (FY86-FY99)
Development	848.9	848.9	848.9
Procurement	5,709.0	5,709.0	5,709.0
Flyaway:			
Airframe & Changes	(2,774.2)	(2,774.2)	(2,774.2)
Engine & Accessories	(555.4)	(555.4)	(555.4)
Electronics & Comm	(1,220.6)	(1,220.6)	(1,220.6)
Armament & Other GFE	(10.8)	(10.8)	(10.8)
TOTAL FLYAWAY	(4,561.0)	(4,561.0)	(4,561.0)
Ground Support Equip.	(160.4)	(160.4)	(160.4)
Training Equip. & Other	(418.7)	(418.6)	(418.6)
TOTAL SUPPORT	(579.1)	(579.0)	(579.0)
Initial Spares	(568.9)	(568.9)	(568.9)
MILCON	4.8	4.8	4.8
TOTAL FY89 Base-Year $	6,562.7	6,562.7	6,562.7
Escalation	1,327.1	1,327.1	1,327.1
Development	(65.6)	(65.6)	(65.6)
Procurement	(1,260.9)	(1,260.9)	(1,260.9)
MILCON	(.6)	(.6)	(.6)
TOTAL THEN-YEAR $	7,889.8	7,889.8	7,889.8
b. Quantities --			
Development	2		2
Production	123		123
TOTAL	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: FY-1990/91 President's Budget.

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

		Current Year		Budget Year
		SAR Current Estimate DEC 88 SAR	UCR Baseline Estimate DEC 87 SAR	UCR Baseline Estimate DEC 88 SAR
A.	Program Acquisition			
(1)	Cost	7,889.8	-0-	7,889.8
(2)	Quantity	125	-0-	125
(3)	Unit Cost	63.118	-0-	63.118

		Current Year		Budget Year
B.	Current Procurement--	(FY 1989)	(FY 1989)	(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. Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
evelopment Estimate	914.5	6,969.9	5.4	7,889.8
Previous Changes Economic Quantity Schedule Engineering Estimating Support				
Subtotal				
Current Changes: Economic Quantity Schedule Engineering Estimating Support				
Subtotal				
TOTAL CHANGES				
Current Estimate	914.5	6,969.9	5.4	7,889.8

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				
Subtotal				
Current Changes: Quantity Schedule Engineering Estimating Support				
Subtotal				
TAL CHANGES				
Current Estimate	848.9	5,709.0	4.8	6,562.7

b. Previous Change Explanation - None.

RDT&E

PROCUREMENT

MILCON:

Cost Variance Analysis (Cont'd):

c. Current Change Explanations - None.

	(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E		
(2) PROCUREMENT		
(3) MILCON		

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	
63.118	-	-	-	-	-	-	-	-	63.118

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

	Initial Target	Contract Ceiling	Price Qty

A. RDT&E - None.

B. PROCUREMENT - None.

AIRFRAME

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

B. PROCUREMENT (cont'd) - None.

	Initial Contract Price		
	Target	Ceiling	Qty
AIRFRAME			

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

a. Program Status --

(1) Percent Program Completed: 29.0% (4/14 yrs)

(2) Percent Program Cost Appropriated: .85% (67.1M/7889.8M)

b. Appropriation Summary --

Appropriation	Prior Years (FY86-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-99)	Total
RDT&E	67.1	205.1	231.6	410.7	914.5
PROCUREMENT	0.0	0.0	19.9	6,950.0	6,969.9
MILCON	0.0	0.0	0.0	5.4	5.4
Total	67.1	205.1	251.5	7,366.1	7,889.8

10. 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				1.4	1.3	1.3	1.0	3.1
1989	2			65.8	65.8	5.3	.1	4.0
1990				198.0	205.1			3.6
1991				216.4	231.6			3.3
1992				168.8	185.7			2.8
1993				124.8	140.5			2.3
1994				73.7	84.5			1.8
Sub-total	2			848.9	914.5	6.6	1.1	

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				17.5	19.9			3.3
1992	3	6.2	174.9	334.2	380.7			2.8
1993	8	5.8	381.2	557.1	646.4			2.3
1994	15	1.4	600.0	703.6	830.5			1.8
1995	19	1.1	701.0	907.7	1,090.5			1.8
1996	19	1.1	671.9	833.0	1,018.9			1.8
1997	19	1.1	656.9	822.1	1,023.8			1.8
1998	20	.9	683.9	810.1	1,026.9			1.8
1999	20	.9	672.8	723.7	932.3			1.8
Sub-total	123	18.5	4,542.6	5,709.0	6,969.9			

10. 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				2.2	2.4			2.3
1994				2.6	3.0			1.8
Sub-total				4.8	5.4			
Total	125	18.5	4,542.6	6,562.7	7,889.8	6.6	1.1	

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	1	N/A	1	N/A
1992	1	N/A	1	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 LRAACA 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 LRAACA is currently a development program only.			

d. Deliveries (Plan/Actual) --

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

e. Approved Design to Cost Goal-- Not Applicable. DAE Baseline Approval Pending.

	(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 -- N/A

SAR-88-058

N-46 UHF FOLLOW-ON UNCLASSIFIED

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

Program: UHF FOLLOW-ON

AS OF DATE: December 31, 1988

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1. Designation and Nomenclature (Popular Name): UHF Follow-on

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:
1 FEB 1988
AV 222-4781:
COMM (202) 692-4781

4. Program Elements/Procurement Line Items:
Procurement: APPN 1507N ICN 30243000 (Shared Funding)

5. Related Programs: None.

CLEARED
MAR 03 1989
UNCLASSIFIED
OASD(PA) DFOISR 88-T-0562

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 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 -- None, this is the Initial SAR.

(c) Changes since "As of " Date -- None.

8. **Threshold Breaches:** There is no approved DAE baseline.

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	N/A	JUL 88
Contract Award	JUL 88	N/A	JUL 88
Systems Requirements Review	OCT 88	N/A	OCT 88
Start Production, Acceptance, Test & Evaluation (Ground Testing)	NOV 88	N/A	NOV 88
Preliminary Design Review	MAR 89	N/A	MAR 89
DAB - Milestone IIIB Decision	AUG 89	N/A	AUG 89
Critical Design Review	JAN 90	N/A	JAN 90
Start Production, Acceptance, Test & Evaluation (In-orbit Testing)	SEP 92	N/A	SEP 92
IOC (First spacecraft fully operational)	NOV 92	N/A	NOV 92

b. Previous Change Explanations -- None, Initial SAR.

c. Current Change Explanations -- None, Initial SAR.

d. References --

Production Estimate: ADM dated 29 July 1988, subject "UHF Follow-on Milestone IIIA Decision Memorandum."

Approved Program: DAE baseline not established. ADM dated 29 July 1988, subject "UHF Follow-on Milestone IIIA Decision Memorandum."

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
Mean mission duration: (years) (Based on 14 yr design life)	10	N/A	N/A	10
Hardening: (Comply with SM-416-84)	YES	N/A	N/A	YES
Anti-jam broadcast capacity (# channels per satellite):	3	N/A	N/A	3
Effective Isotropic Radiated Power (EIRP) and capacity:				
- (number of 25 KHz channels with 28 dBW (decibels relative to one watt)):	3	N/A	N/A	3
- (number of 25 KHz channels with 26 dBW):	15	N/A	N/A	15
- (number of 5 KHz channels with 20 dBW):	21	N/A	N/A	21
Interoperability (Compatible with all existing UHF terminals except frequency hoppers):	YES	N/A	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	N/A	N/A	95
Fuel Quantity (yrs of station keeping and one 15 degree/day move):	14	N/A	N/A	14
Successful Cryptographically secure command execution and telemetry reception using NSA approved devices:	YES	N/A	N/A	YES
DIA validated anti-jam broadcast and command (NISC threat level, which is classified):	YES	N/A	N/A	YES
Autonomy (probability of reacquisition up to one month):	95%	N/A	N/A	95%
Frequency plans required by MJCS 48-87:	YES	N/A	N/A	YES
Constellation size * (# of satellites including 1 in-orbit spare):	9	N/A	N/A	9

c. Previous Change Explanations -- None, Initial SAR.
d. Current Change Explanations -- None, Initial SAR.
e. References --
Production Estimate: ADM dated 29 July 1988, subject "UHF Follow-on Milestone IIIA Decision Memorandum."

Approved Program: DAE baseline not established. ADM dated 29 July 1988, subject "UHF Follow-on Milestone IIIA Decision Memorandum."

* Contract and budget provides for an optional tenth spacecraft to be procured as a contingency in the event of a launch failure.

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

	Production Estimate	Approved Program	Current Estimate
a. Cost --			
Procurement			
Total Flyaway	$1,322.0	$1,322.0	$1,322.0
Other Weapon Cost	0.0	0.0	0.0
Initial Spares	0.0	0.0	0.0
Total FY88 Base-Year $	1,322.0	1,322.0	1,322.0
Escalation Procurement	209.1	209.1	209.1
Total Then-year $	$1,531.1	$1,531.1	$1,531.1
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: FY 90-91 President's Budget.

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

	Current Estimate	UCR Baseline	UCR Baseline
a. Program Acquisition	(Dec 88 SAR)	(Dec 88 SAR)	(Dec 88 SAR)
(1) Cost	$1,531.1	$1,531.1	$1,531.1
(2) Quantity	10	10	10
(3) Unit Cost	153.1	153.1	153.1

b. Current Procurement* --	Current Year (FY89)	Current Year (FY89 APPN)	Budget Year (FY90)
(1) Cost	173.6	173.6	287.8
Less CY Adv Proc	77.0	77.0	141.0
Plus PY Adv Proc	0.0	0.0	54.0
Net Total	96.6	96.6	200.8
(2) Quantity	0	0	2
(3) Unit Cost	N/A	N/A	100.4

* The Current Procurement Unit Cost, shown above in (b), does not accurately reflect the unit costs for the UHF Follow-On satellites due to the structure of the multiyear procurement contract and the method of funding launch services. For example, the funding for the first satellite was funded over two fiscal years (FY88 & FY89). The contract costs and its share of non-recurring and launch costs results in a unit cost for the first satellite of $199.2M. That same logic yields a unit cost for the second and third satellites (procured in FY90) of $165.5M and $160.3M respectively.

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 Quantity Schedule Engineering Estimating Other Support		
Subtotal	0	0
Total Changes	0	0
Current Estimate	$ 1,531.1	$ 1,531.1

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: Economic Quantity Schedule Engineering Estimating Other Support		
Subtotal	0	0
Current Changes: Economic Quantity Schedule Engineering Estimating Other Support		
Subtotal	0	0
Total Changes	0	0
Current Estimate	$ 1,322.0	$ 1,322.0

b. Previous Change Explanations -- None, Initial SAR.

c. Current Change Explanations -- None, Initial SAR.

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 (Prod Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
153.1	-	-	-	-	-	-	-	-	153.1

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
$1,374.7	N/A	10	$1,374.7	$1,374.7

*Represents Firm Fixed Priced contract including options.

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

a. Program Status --

(1) Percent Program Completed: 30% (3 yrs/10 yrs)

(2) Percent Program Cost Appropriated: 20.9% ($319.3/$1,531.1)

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	287.8	152.0	772.0	1,531.1

c. Annual Summary --

Appropriation: Weapons Procurement, Navy

Fiscal Year	Qty	Flyaway FY88 $ Nonrec	Flyaway FY88 $ Rec	Total Base Year $	Total Then-Year $ Program	Obligated	Expended	Escal Rate (%)
1987				21.2	21.8	21.8	2.5	2.7
1988	1	88.7	178.3	116.2	123.9	123.9	4.4	3.1
1989				157.7	173.6	55.9	1.8	4.0
1990	2	0.0	267.7	253.9	287.8			3.6
1991	3	0.0	356.5	130.9	152.0			3.3
1992	3	0.0	321.7	164.3	194.8			2.8
1993	1*	0.0	109.1	465.5	562.0			2.3
1994				5.9	7.2			1.8
1995				4.0	5.0			1.8
1996				2.4	3.0			1.8
Total	10	88.7	1233.3	1322.0	1531.1	201.6	8.7	-

* Spacecraft #10 is an option item.

Note: The Navy plans to incorporate an EHF capability on spacecraft number four and subsequent spacecraft. Funds are budgeted in the following years in the following amounts:

(in millions of then-year $)

FY90	FY91	FY92	FY93	Total
25.0	49.0	63.0	48.0	185.0

While this report does not include these budgeted amounts for EHF, the SAR baseline will be revised upon approval of 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. Contractor Support Costs: Not applicable -- No Operations and Maintenance nor Industrial Fund appropriations are used for Contractor Support Costs within the UHF Follow-on program.

(3)

SAR-88-042

N-36 SLAT

UNCLASSIFIED

SELECTED ACQUISITION REPORT
RDT&E - ONLY SAR
PROGRAM: SUPERSONIC LOW ALTITUDE TARGET (AQM-127A)

AS OF DATE: December 31, 1988

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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



CLEARED
MAR 05 1989
UNCLASSIFIED

OASD(PA) DFOISR SEPT. 0563

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 incorporating target unique payload to satisfy projected antiship missile defense. Does not replace existing system.

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 engineering development phase for 15 supersonic low altitude targets. The first flight test was conducted at Pacific Missile Test Center in July 1988 with OPEVAL schedule to conclude in June 1990. This is the initial SAR submission. The program is expected to satisfy mission requirements.

b. Significant Developments since last report: Initial submission

c. Changes Since As of Date: None

8. Threshold Breaches: No DCP breaches. A DAE baseline has not been approved for this program.

9. Schedule:

a. Milestones	Development Estimate	Approved Program	Current Estimate
Milestone 0 (Program Init)	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 IIIA Low Rate Production	Nov 89	N/A	Nov 89
Milestone IIIB Full Production	Jan 90	N/A	Jan 91
IOC T&E	Jul 90	N/A	Jul 90
IOC Fleet Training	Feb 93	N/A	Feb 93

b. Previous Change Explanation - N/A

c. Current Change Explanations - N/A

d. References - -

Development Estimate: 1990-1991 President's Budget.

Approved Program: A DAE baseline has not been approved for this program.

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 -- Initial SAR

d. Current Change Explanations -- None

e. Reference: Dev Est: 1990-91 President's Budget
Approved Program: A DAE baseline has not been approved for this program.

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

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (See Note)	$372.4	$372.4	$372.4
Procurement	0	0	0
Construction (MILCON)	0	0	0
Total FY 89 Base-Year $	0	0	0
	$372.4	$372.4	$372.4
Escalation			
Development (RDT&E)	(4.5)	(4.5)	(4.5)
Procurement	0	0	0
Construction (MILCON)	0	0	0
Total Then-Year $	$367.8	$367.8	$367.8

NOTE: Includes procurement of 30 LRIP and 14 Lot I targets with RDT&E for Weapons Systems T&E use.

b. Quantities --

Development (RDT&E)	59	59	59
Procurement	0	0	0
Total	59	59	59

c. Foreign Military Sales -- N/A

d. Nuclear Costs -- N/A

e. References: Approved Program/Dev Est: FY 1990/1991 President's Budget.

12. Program Acquisition/Current Procurement Unit Cost Summary: N/A

13. Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	$367.8	-0-	-0-	$367.8
Previous Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	$367.8	-0-	-0-	$367.8
Development Estimate	-0-	-0-	-0-	-0-
Current Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Total Changes	$367.8	-0-	-0-	$367.8
Current Estimate				

(FY 1989 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	$372.4	-0-	-0-	$372.4
Previous Changes:	None			None
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	$372.4	-0-	-0-	$372.4
Development Estimate	-0-	-0-	-0-	-0-
Current Changes:	None			None
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	-0-	-0-	-0-	-0-
Total Changes	-0-	-0-	-0-	-0-
Current Estimate	$372.4	-0-	-0-	$372.4

b. Previous Change Explanation --

RDT&E: None. This is the initial SAR.

PROCUREMENT: None. This is the initial SAR

MILCON: None. This is the initial SAR

c. Current Change Explanations --

RDT&E: None.

PROCUREMENT: None

MILCON: None

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

a. Initial Devlopment Estimate to Current Baseline Estimate --

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
$128.2	$146.5	15	$176.3	$183.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date	-$56.8	-$3.3
Net Change	0	0

Explanation of Change: This is the first SAR submitted by PMA-208. The current variances are the result of contractor test and evaluation (CTE) flight anomalies at PMTC. The governments liability is the ceiling price already funded. The program manager's funding assessment is the ceiling price.

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: 58.3% (7 yrs/12 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 54.4% ($200.1/$367.8)
(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	$200.1	$57.0	$67.1	$43.6	$367.8

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY87 Dollars		Total Base Year $	Total Then-Year $			Esc Rate (%)
		Nonrec	Rec		Progm	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1983				8.0	6.5	6.5	6.3	4.9
1984	15			5.6	4.8	4.8	4.8	3.8
1985				25.7	22.5	22.5	21.9	3.4
1986				48.1	43.4	43.3	43.0	2.8
1987				49.0	45.7	45.7	41.9	2.7
1988				39.1	37.6	37.5	29.5	3.1
1989	30			38.8	39.6	7.8	.1	4.0
1990				55.3	57.0			3.6
1991	14			63.0	67.1			3.3
1992				32.5	35.4			2.8
1993				4.2	4.7			2.3
1994				3.1	3.5			1.8
Sub Total				$372.4	$367.8	$168.1	$147.5	

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: --

a. Assumptions and Ground Rules -- N/A

b. Costs -- N/A

c. Contractor Support Costs: None

A-10 FAADS C^2I

(b)(1)

SAR-88-097

December 31, 1988

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

PROGRAM: FORWARD AREA AIR DEFENSE COMMAND, CONTROL, AND INTELLIGENCE (FAAD C^2I)

AS OF DATE: December 31, 1988

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1. [U] Designation and Nomenclature (Popular Name): Forward Area Air Defense System (FAADS) Command, Control, and Intelligence (FAAD C^2I). (Includes FAAD C^2, Ground Based Sensor (GBS), and Non Cooperative Target Recognition-Positive Hostile Identification/Identification Friend or Foe/Aerial Sensor (Masked Target Sensor) (NCTR-PHID/IFF/Aerial Sensor (MTS)))

2. [U] DoD Component: Department of the Army

3. [U] Responsible Office and Telephone Number:

[FAAD C^2I]

Air Defense Command and Control Systems Project Office	Project Manager:	COL David R. Taylor
Program Executive Office, Command and Control Systems	Assigned:	April 18, 1988
Redstone Arsenal, AL 35898-5600	Autovon:	742-3441
	Commercial:	(205) 895-3441

[FAAD C^2]

Air Defense Command and Control Systems Project Office	Product Manager:	LTC David M. Noe
Program Executive Office, Command and Control Systems	Assigned:	June 15, 1988
Redstone Arsenal, AL 35898-5600	Autovon:	742-3515
	Commercial:	(205) 895-3515

[GBS]

FAAD Sensor Target Identification Product Office	Product Manager:	LTC Gregory A. Stolt
Program Executive Office, Air Defense	Assigned:	August 17, 1987
Redstone Arsenal, AL 35898-5600	Autovon:	788-4470
	Commercial:	(205) 895-4470

[redacted]

(b)(1)

OASD(PA) DFOISR 89-T-0635

3. [U] Responsible Office and Telephone Number (cont):

[NCTR-PHID/IFF/Aerial Sensor (MTS)]

Project Manager RADAR	Product Manager:	LTC Tommy R. Wallace (Acting)
Program Executive Office, Intelligence, Electronic Warfare	Assigned:	October 1, 1987
Fort Monmouth, NJ 07703-5000	Autovon:	996-5324
	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 64709	Project 530 (Coop IFF) (Shared Funding)

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))

MILCON: 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.

6. [U] Mission and Description (cont):

[U] As the air defense node of the Army Tactical Command and Control Systems (ATCCS), the FAAD C²I System ties weapons together by a C²I network and integrates FAADS into the Army Command and Control Systems (ACCS) architecture. The C²I 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 battery, platoon and fire unit levels.

[U] The FAAD C²I System also provides track information to the Combined Arms Initiative (armor, infantry and aviation). The FAAD C²I 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 C² 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 C² become a subsystem of the FAAD system and that SHORAD C² be redesignated FAAD C²I. 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 C²I:

[U] (1) Full scale development (beginning with a Build I demonstration) of the FAAD C²I 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.

[U] Aerial sensor decisions will be requested upon completion of the ongoing systems definition phase. Much of the data associated with the balance of the FAAD C²I program remains to be determined (TBD).

[U] The FAADS, to include the FAAD C²I component, is expected to satisfy mission requirements.

b. [U] Significant Developments Since Last Report --

[U] FAAD C²I 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.

7. [U] Program Highlights (cont):

[U] GBS Program: A Request for Proposal (RFP) was released in April 1988 for a Firm Fixed Price contract for GBS. Offerors 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 best value system which met initial requirements. Only one proposal was received in response to the solicitation. This proposal is being evaluated and the offeror's sensor is undergoing tests at the government test facility.

[U] Masked Target Sensor Program: Nondevelopment Item (NDI) market evaluation preliminary report has been completed. Full scale development begins in FY92.

c. [U] Changes Since "As of" Date -- None

8. [U] Threshold Breaches: There are currently no breaches of the Decision Coordination Paper (DCP) (dated July 15, 1986), or of the Secretary of Defense Decision Memorandum (SDDM) (dated August 14, 1986). No DAE Baseline has been established for this program.

9. [U] Schedule:

a. [U] Milestones --

[FAAD C²]

	Development Estimate	Approved Program	Current Estimate	
Milestone II DAB	Aug 86	NA	Jul 86	(Ch1)
Contract Award (Build I)	Sep 86	NA	Sep 86	
Contract Award (Build II)	Jun 88	NA	Aug 89	(Ch2)
Contract Award (GBS LRIP)	Jun 88	NA	Jan 90	
Begin Technical Test (Build I)	Jun 89	NA	Nov 90	(Ch2)
Complete Technical Test (Build I)	Jun 90	NA	Jan 91	(Ch2)
Begin Technical Test/IOTE	Sep 90	NA	Feb 92	(Ch2)
Complete Technical Test/IOTE	Jun 91	NA	Nov 92	(Ch2)
FUE	Jun 91	NA	Apr 93	(Ch3)

9. [U] Schedule (cont):

a. [U] Milestones -- (cont)

	Development Estimate	Approved Program	Current Estimate	
[GBS][1]				
Milestone IIIA (JRMB)	Jul 86	NA	Jul 86	
Candidate Evaluation Contract Award	Aug 88	NA	Aug 88	
Candidate Evaluation Complete	Mar 89	NA	Mar 89	
Contract Award (Pre-Prod)	May 89	NA	May 89	
Contract Award (LRIP)	Jun 88	NA	Jan 90	
1st Delivery - Pre-Production Contract	Apr 91	NA	Apr 91	
Technical Test Start	May 91	NA	May 91	
Technical Test Complete	Oct 91	NA	Oct 91	
IOT&E Start	Nov 91	NA	Nov 91	
IOT&E Complete	Dec 91	NA	Dec 91	
Milestone III (DAB) FSP Decision	Jan 92	NA	Jan 92	
1st Delivery - LRIP Contract	Jan 92	NA	Jan 92	
Contract Award (FSP)	Feb 92	NA	Feb 92	
FUE	Jun 93	NA	Jun 93	
1st Delivery - FSP Contract	May 93	NA	May 93	

[1] Values not separately displayed in 31 Dec 87 SAR

	Planning Estimate	Approved Estimate	Current Estimate	
[Aerial Sensor (MTS)]				
Start Advanced Development	Dec 87	NA	Dec 87	
Complete Advanced Development	Dec 90	NA	Dec 92	(Ch4)
[NCTR-PHID][1]				
Contract Award (FSD)	Aug 88	NA	Aug 88	(Ch5)
Begin Development Test	May 90	NA	May 90	(Ch5)
Complete Development Test	Aug 90	NA	Aug 90	(Ch5)
Milestone III IPR	Jan 91	NA	Jan 91	(Ch5)
Begin Technical Test/ Operational Test (with GBS)	Feb 92	NA	Feb 92	(Ch5)
Complete Technical Test/ Operational Test (with GBS)	May 92	NA	May 92	(Ch5)
1st Delivery - LRIP Contract	Feb 93	NA	Feb 93	(Ch5)
FUE	May 93	NA	May 93	(Ch5)

[1] 31 Dec 87 SAR displayed TBDs for Schedule Milestones.

9. [U] Schedule (cont):

a. [U] Milestones -- (cont)

	Planning Estimate	Approved Program	Current Estimate
[IFF] [1]			
Program Initiated	Jun 80	NA	Jun 80 (Ch-5)
Initial PMD	Nov 81	NA	Nov 81 (Ch-5)
DAB I	Jul 84	NA	Jul 84 (Ch-5)
DAB II	Dec 88	NA	Dec 88 (Ch-5)
FSD Contract Award	Jan 89	NA	Jan 89 (Ch-5)
Critical Design Review	Dec 90	NA	Dec 90 (Ch-5)
DAB IIIA	Jan 93	NA	Jun 93 (Ch-5)
First Production Contract Award	Jul 93	NA	Jul 93 (Ch-5)
DAB IIIB	Nov 94	NA	Nov 94 (Ch-5)
IOC	Sep 94	NA	Sep 94

[1] 31 Dec 87 SAR displayed TBDs for Schedule Milestones.

b. [U] Previous Change Explanations --

FSD C2 Build II contract award slipped from June 1988 to January 1989 due to non availability of GFE and budget reductions. Corresponding slip occurred to remainder of FAAD C2 program.

c. [U] Current Change Explanations --

Ch1 - ASARC/JRMB changed from August 86 to July 86 to reflect accurate date.
Ch2 - Schedule slippage of approximately 7 months due to funding constraints.
Ch3 - FUE date slipped from Jan 83 to Apr 83.
Ch4 - Schedule delayed Dec 90 to 92 due to resource deferrals.
Ch5 - NCTR-PHID and IFF milestone estimates added for information only; not a separate SAR system.

d. [U] References --

Development Estimate: DCP dated July 15, 1986; SDDM dated August 14, 1986.
Approved Program: A DAE Baseline has not been established for this program.

10. [U] **Technical/Operational Characteristics:**

[FAAD C²]

a. [U] Technical --

	Development Estimate	Goal/ Threshold	Demo Perf	Cur Est
[U] RAM -- FAAD C² 1/				
Sensor MTBOMF	125 hrs	NA/NA	NA	325 hrs (Ch1)
Generator MTBOMF	425 hrs	NA/NA	NA	500 hrs (Ch1)
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. [U] Operational --

[U] ABMOC/C² Node, 90% of the time, will be capable of:				
Target Correlation reports true position	w/i 1 km	NA/NA NA/NA	NA	w/i 1 km
Target Information to fire unit after report entry	w/i 12 sec	NA/NA 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%
[U] 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 (Ch-1)
Manual Acknowledgement of ABMO from time of receipt	w/i 90 sec	NA/NA NA/NA	NA	w/i 90 sec
[U] FAAD C²I Ground Based Sensor w/FAAD C²I subsystem will be capable of march order and emplacement 85% of the time	w/i 30 min	NA/NA NA/NA	NA	w/i 30 min

1/ Values included for first time.

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

b. [U] Operational -- (cont)

[GBS (See following page)]

[NCTR-PHID/IFF/Aerial Sensor (MTS)]

TBD	TBD/TBD	NA	TBD

c. [U] Previous Change Explanations -- None.

d. [U] Current Change Explanations --

Ch1 - Current estimate based on information received from respective Project/Product Managers.

e. [U] References --

Development Estimate: ROC, July, 1986.
Approved Program: A DAE Baseline has not been established for this program.

(b)(1)

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

	[FAAD C²] Development Estimate*	Approved Program	Current Estimate
a. [U] Cost --			
Development (RDT&E)	$ 474.3	$ 571.4	$ 571.4
Procurement	331.1	262.8	262.8
Construction (MILCON)	0.0	0.0	0.0
Total FY87 Base Year $	805.4	834.2	834.2
Escalation	88.6	123.7	123.7
Development (RDT&E)	(27.0)	(60.3)	(60.3)
Procurement	(61.6)	(63.4)	(63.4)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Total FAAD C² Then-Year $	$894.0	$ 957.9	$ 957.9

*The Development Estimate in the December 31, 1987 SAR included both FAAD C² and GBS.

b. [U] 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 defined for the FAAD C²I Program.

c. [U] Foreign Military Sales -- None.

d. [U] Nuclear Costs -- None.

e. [U] References --

Development Estimate: SDDM, August 14, 1986, subject "Forward Area Air Defense"; FY89-90 President's Budget.
Approved Program: SDDM, August 14, 1986, subject "Forward Area Air Defense"; FY90-91 President's Budget.

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

[GBS]

	Development Estimate	Approved Program	Current Estimate
a. [U] Cost --			
Development (RDT&E)	$ 31.8	$103.6*	$ 93.2
Procurement	452.3	445.5	445.5
Construction (MILCON)	0.0	0.0	0.0
Total FY87 Base Year $	484.1	549.1	538.7
Escalation	84.0	120.8	119.4
Development (RDT&E)	(3.3)	(12.5)	(11.1)
Procurement	(80.7)	(108.3)	(108.3)
Construction (MILCON)	(0.0)		(0.0)
Total Then-Year $	$ 568.1	$ 669.9	$ 658.1

*Approved Program includes $11.8M considered critical to program.

b. [U] Quantities -- NA

c. [U] Foreign Military Sales -- None.

d. [U] Nuclear Costs -- None.

e. [U] References --

Development Estimate: SDDM, August 14, 1986, subject "Forward Area Air Defense"; FY89-90 President's Budget.
Approved Program: SDDM, August 14, 1986, subject "Forward Area Air Defense"; FY90-91 President's Budget.

[NCTR-PHID/IFF/Aerial Sensor (MTS)]

	Planning Estimate	Approved Program	Current Estimate
a. [U] Cost --			
Development (RDT&E)	$ 227.3	$ 184.4	$ 184.4
Procurement	0.0	178.0	178.0
Construction (MILCON)	0.0	0.0	0.0
Total FY87 Base Year $	227.3	362.4	362.4
Escalation	18.1	78.2	78.2
Development (RDT&E)	(18.1)	(31.9)	(31.9)
Procurement	(0.0)	(46.3)	(46.3)
Construction (MILCON)	(0.0	(0.0)	(0.0)
Total Then-Year $	$ 245.4	$ 440.6	$ 440.6

b. [U] Quantities -- NA

c. [U] Foreign Military Sales -- None

d. [U] Nuclear Costs -- None

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

[NCTR-PHID/IFF/Aerial Sensor (MTS)] (cont)

e. [U] References --

Development Estimate: SDDM dated August 14, 1986, and FY88 - 89 President's Budget.
Approved Program: FY90-91 President's Budget.

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

[FAAD C2/GBS]

	Current Est	Current Year UCR Baseline	Budget Year UCR Baseline
a. [U] Program Acquisition --	(Dec 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	1616.0	1501.7	1616.0
FAAD C2	(957.9)		(957.9)
GBS	(658.1)		(658.1)
(2) Quantity	NA	NA	NA
(3) Unit Cost	NA	NA	NA

b. [U] Current Procurement -- NA

[NCTR-PHID/IFF/Aerial Sensor (MTS)]

a. [U] Program Acquisition -- NA

b. [U] 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	+6.5	+14.1		+20.6
Quantity				
Schedule	-2.2			-2.2
Engineering				
Estimating	+1.4			+1.4
Other				
Support				
Subtotal	+5.7	+14.1		+19.8
Current Changes:				
Economic	-2.9	-5.6		-8.5
Quantity				
Schedule				
Engineering				
Estimating	+127.6	-75.0		+52.6
Other				
Support				
Subtotal	+124.7	-80.6		+44.1
Total Changes	+130.4	-66.5		+63.9
Current Estimate	631.7	326.2		957.9

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				
Other				
Support				
Subtotal	-2.1			-2.1
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	+99.2	-68.3		+30.9
Other				
Support				
Subtotal	+99.2	-68.3		+30.9
Total Changes	+97.1	-68.3		+28.8
Current Estimate FY87$	571.4	262.8		834.2

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

[FAAD C²] (cont)

b. [U] Previous Change Explanations --

(1) RDT&E

Economic - Revised escalation indices
Estimating - Adjustment for budget reduction
Schedule - Schedule adjustment

(2) Procurement

Economic - Revised escalation indices

c. [U] Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Economic - Revised escalation indices		-2.9
Estimating -	+99.2	+127.6
• Appropriation change from OPA to RDTE for Initial Operation Test and Evaluation (IOTE) (Heavy Division), plus additional GFE required		
• Resource constraints in FY88, 89 and 90, and delays in GFE deliveries resulted in delay of FUE by two years		
(2) Procurement		
Economic - Revised escalation indices		-5.6
Estimating -	-68.3	-75.0
• Appropriation change from OPA to RDTE for Initial Operation of Test and Evaluation (IOTE) Heavy Division		
• Resource decrements (FY88 and FY90 deletion); delayed deployment two years		

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

[GBS]

a. [U] Summary --

(Current (Then-year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	35.1	533.0		568.1
Previous Changes:				
Economic	+0.5	+19.2		+19.7
Quantity				
Schedule				
Engineering				
Estimating	+0.1			+0.1
Other				
Support				
Subtotal	+0.6	+19.2		+19.8
Current Changes:				
Economic	+3.6	-0.8		+2.8
Quantity				
Schedule				
Engineering				
Estimating	+65.0	+2.4		+67.4
Other				
Support				
Subtotal	+68.6	+1.6		+70.2
Total Changes	+69.2	+20.8		+90.0
Current Estimate	104.3	553.8		658.1

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				
Other				
Support				
Subtotal	0.0	0.0		0.0
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	+61.4	-6.8		+54.6
Other				
Support				
Subtotal	+61.4	-6.8		+54.6
Total Changes	+61.4	-6.8		+54.6
Current Estimate FY87$	93.2	445.5		538.7

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

[GBS] (cont)

b. [U] Previous Change Explanations --

(1) RDT&E

Economic - Revised escalation indices
Estimating - Adjustment for budget reduction

(2) Procurement

Economic - Revised escalation indices

c. [U] Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Economic - Revised escalation indices	+3.6	- 0.8
Estimating - Revised estimate based on actual contract proposals and definitized test plans.	+61.4	+68.6
(2) Procurement		
Estimating - Revision due to additional data available from actual contract proposals.	-6.8	+1.6

[NCTR-PHID/IFF/Aerial Sensor (MTS)]

a. [U] Summary --

(Current (Then-year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	245.4	TBD		245.4
Previous Changes:				
Economic	+8.0			+8.0
Quantity				
Schedule	-13.9			-13.9
Engineering				
Estimating	+17.4			17.4
Other				
Support				
Subtotal	+11.5			+11.5
Current Changes:				
Economic	-1.2			-1.2
Quantity				
Schedule				
Engineering				
Estimating	-39.4			-39.4
Other				
Support				
Subtotal	-40.6	-		-40.6
Total Changes	-29.1	-		-29.1
Baseline Adjustment		+224.3		+224.3
Current Estimate	216.3	224.3		440.6

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

[NCTR-PHID/IFF/Aerial Sensor (MTS)] (cont)

FY87 (Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	227.3	TBD		227.3
Previous Changes:				
Quantity				
Schedule	-13.5			-13.5
Engineering				
Estimating	+10.2			+10.2
Other				
Support				
Subtotal	-3.3			-3.3
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	-39.6			-39.6
Other				
Support				
Subtotal	-39.6	-		-39.6
Total Changes	-42.9	-		-42.9
Baseline Adjustment		+178.0*		+178.0
Current Estimate FY87$	184.4	-		362.4

b. [U] Previous Change Explanations --

(1) RDT&E

Economic - Revised escalation indices
Schedule - IFF schedule extended two years to accommodate low funding amounts in FY86 PB; advanced to reflect increased funding in FY87 PB; delayed to reflect decreased funding in FY89 PB.
Estimating - IFF required to fund prime contract to ceiling

(2) Procurement - None

c. [U] Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Economic - Revised escalation indices		-1.2
Estimating -	-39.6	-39.4
• Transfer of non-core IFF platform integration from RDT&E to Procurement		
• Deletion of FY90-91 RDTE for Aerial Sensor		
(2) Procurement - none		

* Includes transfer of non-core IFF from RDT&E to procurement.

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

a. [U] Summary --

[FAAD C²I SUMMARY]

(Current (Then-year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development/Planning Estimate	781.8	925.7		1707.5
Previous Changes:				
Economic	+15.0	+33.3		+48.3
Quantity				
Schedule	-16.1			-16.1
Engineering				
Estimating	+18.9			+18.9
Other				
Support				
Subtotal	+17.8	+33.3		+51.1
Current Changes:				
Economic	-0.5	-6.4		-6.9
Quantity				
Schedule				
Engineering				
Estimating	+153.2	-72.6		+80.6
Other				
Support				
Subtotal	+152.7	-79.0		+73.7
Total Changes	+170.5	-45.7		+124.8
Baseline Adjustment		+224.3		+224.3
Current Estimate	952.3	1104.3		2056.6

FY87 (Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development/Planning Estimate	733.4	783.4		1516.8
Previous Changes:				
Quantity				
Schedule	-15.6			-15.6
Engineering				
Estimating	+10.2			+10.2
Other				
Support				
Subtotal	-5.4			-5.4
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	+120.7	-75.1		+45.6
Other				
Support				
Subtotal	+120.7	-75.1		+45.6
Total Changes	+115.3	-75.1		+40.2
Baseline Adjustment		+178.0		+178.0
Current Estimate FY87$	848.7	886.3		1735.0

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

**FAAD C², GBS, NCTR-PHID/IFF/Aerial Sensor quantities have not been identified.

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	58.1

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
81.6	NA	81.6	$87.4	$93.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-4.2	$-0.4
Cumulative Variances to Date (10/30/88)	$-8.9	$-2.9
Net Change	$-4.7	$-2.5

Explanation of Change: Under-estimation of design requirements, change in test philosophy, increase in simulator complexity, and delay in GFE delivery has caused unfavorable cost and schedule variances. Contract may be rebaselined.

b. [U] Procurement -- None

c. [U] MILCON -- NA

[GBS, NCTR-PHID/IFF/Aerial Sensor (MTS)]

a. [U] RDT&E -- None (No major contracts awarded)

b. [U] Procurement -- None

c. [U] MILCON -- None

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

a. [U] Program Status --

[FAAD C²]

(1) Percent Program Completed: 66.7% (10 years/15 years)

(2) Percent Program Cost Appropriated: 27.2% ($260.6/$957.9)

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

a. [U] Program Status -- (cont)

[GBS]

(1) Percent Program Completed: 28.6% (2 years/7 years)

(2) Percent Program Cost Appropriated: 7.8% ($51.1/$658.1)

[NCTR-PHID/IFF/Aerial Sensor (MTS)]

(1) Percent Program Completed: 37.5% (3 years/8 years)

(2) Percent Program Cost Appropriated: 16.0% ($94.6/$591.7)

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

[FAAD C²]

Appropriation	Prior Yrs (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Bal To Comp (FY92-94)	Total
RDT&E	$ 260.6	$ 71.7	$ 75.7	$ 223.7	$ 631.7
Procurement	$ 0.0	$ 0.0	$ 56.1	$ 270.1	$ 326.2
MILCON	0.0	0.0	0.0	0.0	0.0
Total	$ 260.6	$ 71.7	$ 131.8	$ 493.8	$ 957.9

[GBS]

Appropriation	Prior Yrs (FY88-89)	Budget Year (FY90)	Budget Year (FY91)	Bal To Comp (FY92-94)	Total
RDT&E	$ 51.1	$ 17.2	$ 20.3	$ 15.7	$ 104.3
Procurement	$ 0.0	$ 52.8	$ 52.8	$ 448.2	$ 553.8
MILCON	0.0	0.0	0.0	0.0	0.0
Total	$ 51.1	$ 70.0	$ 73.1	$ 463.9	$ 658.1

[NCTR-PHID/IFF/Aerial Sensor (MTS)]

Appropriation	Prior Yrs (FY87-89)	Budget Year (FY90)	Budget Year (FY91)	Bal To Comp (FY92-94)	Total
RDT&E	$ 52.7	$ 25.2	$ 21.3	$ 117.1	$ 216.3
Procurement	$ 0.0	$ 0.0	$ 2.3	$ 222.0	$ 224.3
MILCON	0.0	0.0	0.0	0.0	0.0
Total	$ 52.7	$ 25.2	$ 23.6	$ 339.1	$ 440.6

[FAAD C²I SUMMARY]

Appropriation	Prior Yrs (FY80-89)	Budget Year (FY90)	Budget Year (FY91)	Bal To Comp (FY92-94)	Total
RDT&E	$ 364.4	$ 114.1	$ 117.3	$ 356.5	$ 952.3
Procurement	$ 0.0	$ 52.8	$ 111.2	$ 940.3	$1104.3
MILCON	0.0	0.0	0.0	0.0	0.0
Total	$ 364.4	$ 166.9	$ 228.5	$1296.8	$2056.6

16. [U] **Program Funding Summary (cont):**

c. [U] Annual Summary --

[FAAD C²]

Fiscal Year	Qty	Flyaway FY87 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Expended	
Appropriation: RDT&E (D126)								
1980				4.0	3.0	2.9	2.9	5.9
1981				12.3	10.0	9.9	9.7	6.1
1982				15.2	13.2	13.1	12.8	7.6
1983				1.1	1.0	1.0	1.0	4.9
1984				33.2	31.2	31.2	30.7	3.8
1985				18.7	18.1	15.5	15.5	3.4
1986				20.2	20.1	19.6	19.3	2.8
1987				36.5	37.2	37.2	33.2	2.7
1988				55.9	59.1	55.3	35.4	3.1
1989				61.8	67.7	22.5	0.3	4.0
1990				63.3	71.7			3.6
1991				64.9	75.7			3.3
1992				81.0	96.9			2.8
1993				71.1	86.8			2.3
1994				32.2	40.0			1.8
Subtotal				571.4	631.7	208.2	160.8	
Appropriation: Procurement (AD5050 & BA9620)								
1991				46.6	56.1			3.3
1992				88.1	108.2			2.8
1993				55.8	69.8			2.3
1994				72.3	92.1			1.8
Subtotal				262.8	326.2			
Total				834.2	957.9	208.2	160.8	

16. [U] **Program Funding Summary (cont):**

c. [U] 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		26.0		26.0	27.5	12.9	8.3	3.1
1989		21.5		21.5	23.6	0.1	0.0	4.0
1990		15.2		15.2	17.2			3.6
1991		17.4		17.4	20.3			3.3
1992		9.2		9.2	11.0			2.8
1993		3.9		3.9	4.7			2.3
Subtotal		93.2		93.2	104.3	13.0	8.3	
Appropriation: Procurement (WK5053)								
1990				44.9	52.8			3.6
1991				43.9	52.8			3.3
1992				72.9	89.6			2.8
1993				125.5	157.0			2.3
1994				158.3	201.6			1.8
Subtotal				445.5	553.8			
Total				538.7	658.1	13.0	8.3	

[NCTR-PHID]

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)								
1987				0.4	0.4	unk	unk	2.7
1988				14.4	15.2	13.8	3.9	3.1
1989				18.2	20.7	2.5	0.1	4.0
1990				14.3	16.2			3.6
1991				6.2	7.3			3.3
1992				5.6	6.7			2.8
1993				3.9	4.7			2.3
1994				3.0	3.7			1.8
Subtotal				66.0	74.9	16.3	4.0	
Appropriation: Procurement (AD5051)								
1991				1.9	2.3			3.3
1992				29.2	35.9			2.8
1993				33.6	42.0			2.3
1994				48.3	61.5			1.8
Subtotal				113.0	141.7			
Total				179.0	216.6	16.3	4.0	

16. [U] **Program Funding Summary (cont):**

c. [U] Annual Summary -- (cont)

[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	3.6	2.7
1988				4.3	4.6	4.5	1.1	3.1
1989				1.0	1.2			4.0
1990				0.0	0.0			
1991				0.0	0.0			
1992				7.6	9.2			2.8
1993				16.2	19.9			2.3
1994				19.9	25.1			1.8
Subtotal				53.0	64.1	8.6	4.7	
Appropriation: Procurement (AD5052)								
1994				16.9	21.6			1.8
Subtotal				16.9	21.6			
Total				69.9	85.7	8.6	4.7	

[IFF]

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 (D530)								
1988				1.4	1.5	1.5	0.2	3.1
1989				4.5	5.0	2.4	0.0	4.0
1990				7.9	9.0			3.6
1991				12.0	14.0			3.3
1992				20.9	25.0			2.8
1993				13.1	15.9			2.3
1994				5.6	6.9			1.8
Subtotal				65.4	77.3	3.9	0.2	
Appropriation: Procurement (AD5053)								
1993				10.4	13.0			2.3
1994				37.7	48.0			1.8
Subtotal				48.1	61.0			
Total				113.5	138.3	3.9	0.2	

16. [U] **Program Funding Summary (cont)**:

c. [U] Annual Summary -- (cont)

[FAAD C²I SUMMARY]

Fiscal Year	Qty	Flyaway FY87 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Expended	
Appropriation: RDT&E								
1980				4.0	3.0	2.9	2.9	5.9
1981				12.3	10.0	9.9	9.7	6.1
1982				15.2	13.2	13.1	12.8	7.6
1983				1.1	1.0	1.0	1.0	4.6
1984				33.2	31.2	31.2	30.7	3.8
1985				18.7	18.1	15.5	15.5	3.5
1986				20.2	20.1	19.6	19.3	2.8
1987				40.9	41.7	41.3	36.8	2.7
1988				102.0	107.9	88.0	48.9	3.1
1989				107.0	118.2	27.5	0.4	4.0
1990				100.7	114.1			3.6
1991				100.5	117.3			3.3
1992				124.3	148.8			2.8
1993				108.3	132.0			2.3
1994				60.7	75.7			1.8
Subtotal				848.8	952.3	250.0	178.0	
Appropriation: Procurement								
1990				44.9	52.8			3.6
1991				92.4	111.2			3.3
1992				190.2	233.7			2.8
1993				225.3	281.8			2.3
1994				333.5	424.8			1.8
To Compl								
Subtotal				886.3	1104.3			
Total				1735.1	2056.6	250.0	178.0	

17. [U] **Production Rate Data**:

[FAAD C², GBS, NCTR-PHID/IFF/Aerial Sensor (MTS)]

a. [U] Annualized Production Rates -- NA

b. [U] Cost Variance -- NA

c. [U] Schedule Variance -- NA

d. [U] Deliveries (Plan/Actual) -- NA

e. [U] Approved Design-to-Cost Goal -- NA (primarily NDI).

18. [U] Operating and Support Costs:

[FAAD C^2, GBS, NCTR-PHID/IFF/Aerial Sensor (MTS)]

a. [U] Assumptions and Ground Rules -- NA

b. [U] Costs -- NA

c. [U] Contractor Support Costs --

(Then Year Dollars in Millions)

	FY89 and Prior	Budget FY90	Budget FY91	Balance to Complete	Total
O&M	1.0*	9.9	19.3	--	30.2

*Includes FY88 and FY89

A-6 ATM

SAR-88.082

UNCLASSIFIED

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
RDT&E-ONLY SAR

PROGRAM: JOINT TACTICAL MISSILE DEFENSE (JTMD/ATM)

AS OF DATE: December 31, 1988

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1. (U) **Designation and Nomenclature (Popular Name)**: Anti-Tactical Missile (ATM), Joint Tactical Missile Defense (JTMD), Tactical Missile Defense (TMD).

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

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

Joint Tactical Missile Defense Project Office	Project Manager:	COL Thomas E. Smalls
Air Defense Program Executive Ofc	Assigned:	November 3, 1988
Redstone Arsenal, AL 35898-5750	Autovon:	788-3330
	Commercial:	(205) 895-3330

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

RDT&E: PE 63302, Project D099 (Shared Funding)
RDT&E-Only SAR

5. (U) **Related Programs**: Army-Tactical Missile System (ATACMS), PATRIOT, Defense Advanced Research Projects Agency Programs (DARPA), Theater High Altitude Air Defense (THAAD), Technology Exchange (TECHNEX), Joint Tactical Fusion Program, Extended Range Interceptor Technology Program (ERINT-1)

6. (U) **Mission and Description**: Army led joint program designed to counter the tactical missile threat through passive measures, attack operations (counterforce), active defense, and command and control. Even after ratification of the Intermediate Nuclear Forces (INF) Treaty a significant

UNCLASSIFIED

OASD(PA) DFOISR 88-T-0501

6. (U) **Mission and Description (Cont.)**:

threat still prevails. Tactical Missile Defense is a concept for a balanced and integrated system of systems designed to counter enemy tactical missiles including both ballistic and air breathing missiles (cruise, anti-radiation and tactical air-to-surface missiles). Program initiative is divided into near-term and long-term objectives. Both phases should build on existing systems, leverage off emerging advanced technology, such as Strategic Defense Initiative Programs, and be compatible with growth to full theater defense.

Near-term program emphasis is on active self defense against tactical missiles armed with conventional warheads by modifying the existing PATRIOT system. The near-term effort includes the development of a multimode seeker for PATRIOT. This effort provides for development of an advanced missile to include a guidance and control system with associated warhead and fuze and command, control, communication and intelligence (C^3I) for improved acquisition and destruction of Tactical Ballistic Missiles (TBM). This capability will be integrated with the PATRIOT Missile System and forms the basis for a capability to counter the growing TBM threat. The near-term effort will also examine options and develop concepts for improvements in passive measures, active defense, attack operations, and C^3I for TMD, which will lead to product improvement of selected systems to provide a phased response to the tactical missile threat.

The long-term program provides for an overall concept for countering the tactical missile threat. This approach will encompass all active options, passive countermeasures, and offensive counterstrike measures. It will also examine ground/airborne sensor systems, satellite surveillance, and C^3I considerations. Development of new or evolutionary systems will be examined, evaluated, and developed as required.

7. (U) **Program Highlights**:

a. (U) Significant Historical Development: In January 1982, OSD directed Army to be lead service in a joint anti-tactical missile program. A Justification for Major System New Start (JMSNS) was developed and approved in April 1982. Army established a Joint Anti-Tactical Missile Special Study Group (JATM SSG) in February 1983. In 1984, the Army's initial focus for ATM development was to provide self defense for PATRIOT; upgrade HAWK to counter Cruise Threat; continue ATM assessment; and pursue ATACMS as a potential for the ATM counterforce role. A joint draft operational concept for ATM was developed in January 1985. In September 1986, a Joint Tactical Missile Defense (JTMD) project office was provisionally established by the Army.

In January 1987, a Joint Tactical Missile Defense Special Task Force (TMDSTF) was formed. A Tactical Missile Defense cooperative development program with the Federal Republic of Germany was initiated in June 1987. On August 25, 1987 a Tactical Missile Defense Program Review was provided to the Defense Acquisition Board (DAB). All actions associated with the Special Task Force have been completed except for an action plan which is being staffed.

Self defense for PATRIOT fire units and co-located critical assets will be provided in two phases known as PATRIOT Anti-Tactical Missile (ATM) capabilities, Phase I (PAC-1) and Phase II (PAC-2). These ongoing active

7. (U) **Program Highlights (Cont.)**:

defense programs, when deployed as modifications to PATRIOT System, establish the baseline for the development of systems to counter the TBM threat.

Milestone Decision Reviews for Active Defense, Attack Operations, Battle Management (BM)/C3I and passive contermeasures elements of JTMD are not currently planned. As the programs for each of these elements are defined, appropriate SAR updates will be submitted.

b. (U) Significant Developments Since Last Report: On June 27, 1988 the Under Secretary of the Army directed PEO High Medium Air Defense (HIMAD) (PEO - Air Defense) to (1) coordinate and conclude the Memorandum of Understanding with the Federal Republic of Germany, (2) conduct a Demonstration of the Advanced Tactical PATRIOT, and (3) prepare for a Decision Milestone upon completion of the Demonstration for entry into Full Scale Engineering Development.

c. (U) Changes Since "As of" Date: It is expected in the near term that the scope of this program will be reduced below the SAR dollar thresholds and that it will be removed from the Major Defense Acquisition Program List. This will be the final SAR.

8. (U) **Threshold Breaches**: There is no DAE baseline, DCP or SDDM for the JTMD program.

9. (U) **Schedule**:

a. (U) Milestones --

	Planning Estimate	Approved Program	Current Estimate	
Milestone 0 (JMNS)	Apr 82	TBD	Apr 82	(CH-1)
Milestone I (DAB)	Jun 88	TBD	TBD	(CH-2)
Milestone II (DAB)	TBD	TBD	TBD	
FSD Contract Award	TBD	TBD	TBD	
Critical Design Review	TBD	TBD	TBD	
FSD Hardware Test Firing	TBD	TBD	TBD	
Milestone III Decision	TBD	TBD	TBD	
IOC	TBD	TBD	TBD	

b. (U) Previous Change Explanations -- None

c. (U) Current Change Explanations --

[CH-1] -- Milestone 0 (JMNS) added.

[CH-2] -- Planning Estimate changed from 3d Quarter FY88 to June 88. Current Estimate changed from 3d Quarter FY88 to TBD.

d. (U) References -

Planning Estimate: Justification for Major System New Start, April 1982.
Approved Program: No DAE Baseline has been approved for this program.

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

	Planning Est/ Appr Program	Demo Perf	Cur Est/ Dev Est
a. (U) Technical --	TBD/TBD		TBD
b. (U) Operational --	TBD/TBD		TBD

c. (U) Previous Change Explanations -- None

d. (U) Current Change Explanations -- None

e. (U) References --

Planning Estimate: TBD
Approved Program: No DAE Baseline has 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)	$264.2	$294.5	$294.5
Active Defense System			
Total FY88 Base Year $	264.2	294.5	294.5
Escalation			
Development (RDT&E)	10.8	17.5	17.5
Total Then-Year $	$275.0	$312.0	$312.0
b. (U) Quantities			
Development (RDT&E)	TBD	TBD	TBD

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References -- Planning Estimate: FY89 President's Amended Budget
Approved Program: FY90-91 President's Budget

12. (U) **Program Acquisition/Current Procurement Unit Cost Summary**: (Current (Then Year) Dollars in Millions) 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 Estimate	275.0	--	--	275.0
Previous Changes:				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	--	--	--
Current Changes:				
Economic	-.1			-.1
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+37.1	--	--	+37.1
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+37.0	--	--	+37.0
Total Changes	+37.0	--	--	+37.0
Current Estimate	312.0	--	--	312.0

(FY88 (Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	264.2	--	--	264.2
Previous Changes:				
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	--	--	--
Current Changes:				
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+30.3	--	--	+30.3
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+30.3	--	--	+30.3
Total Changes	+30.3	--	--	+30.3
Current Estimate	294.5	--	--	294.5

b. (U) Previous Change Explanations -- None.

13. (U) **Cost Variance Analysis (Cont.)**:

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
RDT&E		
Revised Escalation Indices (Economic)	N/A	-.1
Higher R&D (FSD) Costs (Estimating)	+30.3	+37.1

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

15. (U) **Contract Information**: (Then-Year Dollars in Millions) -- No major contracts have been awarded.

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

a. (U) Program Status --

(1) Percent Program Completed: TBD.

(2) Percent Program Cost Appropriated: TBD.

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

Appropriation	Prior Years (FY83-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-95)	Total
RDT&E	$130.4	$20.3	$28.8	$132.5	$312.0

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

c. (U) Annual Summary --

Fiscal Year[1]	Qty	Flyaway FY 88 Dollars		Total Base Year $	Total Then Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1983				11.6	10.0	10.0	10.0	4.9
1984				18.9	17.2	17.2	16.9	3.8
1985				31.8	29.2	29.2	28.7	3.4
1986				58.4	56.3	56.3	55.6	2.8
1987				4.9	4.8	4.8	4.6	2.7
1988				0.3	0.3	0.3	0.3	3.1
1989				12.0	12.7	6.3	0.4	4.0
1990				18.5	20.3			3.6
1991				25.4	28.8			3.3
1992				39.2	45.5			2.8
1993				73.5	87.0			2.3
Subtotal				294.5	312.0	124.1	116.5	

17. (U) **Production Rate Data**: N/A

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

a. (U) Assumptions and Ground Rules -- N/A

b. (U) Costs -- N/A

c. (U) Contractor Support Cost -- N/A

[1] FY86 and prior funding contains funds for PAC I and PAC II ($64M), HAWK ($7M), ATM ($21M), and Classified Programs ($20M); FY87 and out will fund the JTMD program.

SAR-88-096

A-11 FAADS-LOS-F-H

(b)(1)

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, 1988

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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: Assigned: Autovon: Commercial:	COL John M. Gamino December 15, 1986 742-4449 (205) 895-4449

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

RDT&E:	PE 63757A	Project 463 (LOS AD SYS FWD-HVY)
	PE 23801A	Project 683 (FAAD PIP)
PROCUREMENT:	APPN 2032	SSN H01600 (AIR DEFENSE SYS HVY)
	APPN 2032	SSN HO1700 (AIR DEFENSE SYS HVY)
	APPN 2032	SSN CJ8001 (Initial Spares)
MILCON:	None	

5. (U) **Related Programs:** Line of Sight-Rear; Non-Line of Sight; and Forward Area Air Defense Command, Control, and Intelligence.

(b)(1)

OASD(PA) DFOISR 88-T-0502

6. (U) **Mission and Description**: The LOS-F-H component is a Non-Development Item (NDI) air defense system designed to maneuver with combined arms elements and defeat fixed wing and stand off line of sight helicopter threat.

(U) The LOS-F-H consists of an armored tracked vehicle that integrates a missile system; communications equipment; and detection, identification, and tracking sensors. To field an air defense capability as soon as possible, the Army has chosen an NDI acquisition strategy combined with preplanned product improvements (P3I) to overcome current air defense deficiencies and keep pace with advancing threat. The system to be initially deployed meets or exceeds initial system ROC requirements. An active P3I program is planned to bring the full system requirements to meet the mid to late nineties threat. The initial P3I will focus on inclusion of a gun, integrated weapons display, mission processor, and other Required Operational Capability (ROC) requirements into the weapon system. The LOS-F-H will be located in forward battle areas 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 find targets and is line-of-sight in the sense that it can only fire at targets within its view. The system will operate autonomously or using FAAD C2I data (when available) in day or night, in adverse weather, and in battlefield environment where electronic and physical countermeasures are prevalent. The system is integrated into the overall FAAD architecture to improve low-altitude counter-air operations.

7. (U) **Program Highlights**:

a. (U) Significant Historical Developments -- On July 29, 1986, the Defense Acquisition Board 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 include 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.

b. (U) Significant Developments Since Last Report -- A firm fixed price contract covering test program option was signed February 10, 1988. The contract also includes 5 options of production and 7 options of integrated contractor support (ICS). These options are also contracted as firm fixed price. The amended FY88/89 President's Budget and Congressional language require a restructuring of the test program. The production and ICS contract options also require restructuring due to funding constraints.

(U) On August 4, 1988, the DAB approved a restructured LOS-F-H test program, which satisfies congressional concerns. This report rebaselines the program from a planning estimate to a development estimate.

(U) 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 breaches of the DAE Baseline, dated March 1989.

9. (U) **Schedule**:

a. (U) Milestones --

	Plng Est	Approved Program	Cur Est/ Dev Est
(U) Milestone II (DAB)	N/A	Nov 86	Nov 86
(U) SDDM	N/A	Dec 86	Dec 86
(U) ROC Approved	N/A	Mar 87	Mar 87
(U) RFP Release	TBD	Mar 87	Mar 87
(U) Candidate Evaluation (CE) Contract Awarded	N/A	Jun 87	Jun 87
(U) CE Testing Begin*	TBD	Jul 87	Jul 87
(U) CE Testing Complete	N/A	Nov 87	Nov 87
(U) Award Test Phase Contract Option (RDT&E)	Dec 87	Feb 88	Feb 88
(U) FDTE (I) Begin	N/A	May 88	May 88
(U) IPR	N/A	Jun 88	Jun 88
(U) FAADS ASARC (Test Restructure)	N/A	Jun 88	Jun 88
(U) FDTE (I) Complete	N/A	Jul 88	Jul 88
(U) Technical Test (A) Begin - Fire Control	N/A	Jul 88	Jul 88
(U) FAADS DAB (LLI Revalidation)	N/A	Aug 88	Aug 88
(U) Award FY88 Advance Procurement Option - LLI	N/A	Oct 88	Oct 88
(U) Technical Test (B) Begin - Durability	N/A	Feb 89	Feb 89
(U) Award FY89 Production Option	N/A	Mar 89	Mar 89
(U) Technical Test (A) Complete - Fire Control	N/A	Apr 89	Apr 89
(U) Technical Test (B) Complete - Durability	N/A	May 89	May 89
(U) Award FY89 Advance Procurement Option - LLI	N/A	Jul 89	Jul 89
(U) FDTE (II) Begin	N/A	Jul 89	Jul 89
(U) FDTE (II) Complete	N/A	Aug 89	Aug 89
(U) Technical Test (C) Begin - European Environment	N/A	Oct 89	Oct 89
(U) IOT&E Begin	N/A	Oct 89	Oct 89
(U) Technical Test (C) Complete - European Environment	N/A	Dec 89	Dec 89
(U) IOT&E Complete	N/A	Jan 90	Jan 90
(U) Technical Test (C) Begin - Signature/Missile Firings	N/A	Jan 90	Jan 90
(U) Technical Test (D) Complete - Signature/Missile Firings	N/A	Feb 90	Feb 90
(U) Milestone III (DAB)	N/A	Apr 90	Apr 90
(U) Award FY90 Production Option	N/A	May 90	May 90
(U) Production Verification - Test (PVT) Begin	N/A	Jan 91	Jan 91

* Previous SAR (December 31, 1987) labeled Competitive Test Start

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

b. (U) Milestones -- (Cont.)

	Plng Est	Approved Program	Cur Est/ Dev Est
(U) PVT Complete	N/A	Nov 91	Nov 91
(U) Operational Test	TBD	N/A	N/A
(U) First Unit Equipped (FUE)	TBD	Jul 92	Jul 92

c. (U) Previous Change Explanations --

The RFPs were released March 16, 1987 (vs TBD)

Competitive Test started July 10, 1987 (vs TBD)

Program funding not released by OMB. Base contract award was rescheduled from December 1987 to February 1988

d. (U) Current Change Explanations -- None

e. (U) References --

Planning Estimate: FY88-89 President's Budget
Approved Program: DAE Baseline, dated March 1989; FY 90/FY 91 President's Budget
Development Estimate: DAE Baseline, dated March 1989; FY 90/FY 91 President's Budget

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

a. (U) Technical -- None

(b)(1)

(b)(1)

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

	Planning Estimate	[1]Approved Program	Dev Estimate/ Cur Estimate
a. (U) Cost --			
Development (RDT&E)	$95.6	$276.9	$259.2
Procurement	1358.0	4452.0	4452.0
Total Flyaway	TBD	(3898.0)	(3898.0)
Other Wpn Sys Cost	TBD	(180.2)	(180.2)
Initial Spares	0	(373.8)	(373.8)
Construction (MILCON)	0	0	0
Total FY87 Base Year $	1453.6	4728.9	4711.2
[2]Adjustment in FY87$ to FY89$		341.4	340.1
RDT&E		(20.0)	(18.7)
Procurement		(321.4)	(321.4)
Total FY89 Base Year $		5070.3	5051.3
Escalation	239.7	975.4	974.4
Development (RDT&E)	(3.2)	(4.7)	(3.7)
Procurement	(236.5)	(970.7)	(970.7)
Construction (MILCON)	0	0	0
Total Then-Year $	$1693.3	$6045.7	$6025.7
b. (U) [3] Quantities (Fire Units/Missiles)			
Development (RDT&E)	TBD	4/14	4/14
Procurement	TBD	562/10078	562/10078
Total	TBD	566/10092	566/10092

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References --

Planning Estimate:. FY89 Amended President's Budget Submission.
Approved Program: DAE Baseline, dated March 1989.

Development Estimate: FY90-91 President's Budget.

[1] $20M has been added to the President's Budget submittal to execute the total test requirements and satisfy congressional language.

[2] Adjustment factor used to rebaseline from FY87 to FY89: 1.0722 (OSD Inflation) Indices, dated December 22, 1988).

[3] 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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1)	Cost	$ 6025.7	$ 1625.9	$ 6025.7
(2)	Quantity (Fire Units)	566	114	566
(3)	Unit Cost	$ 10.7	$ 14.3	$ 10.7
b. (U)	Current Procurement --	(FY89)	(FY89 Appn)	(FY90)
(1)	Cost	$ 108.5	$ 108.5	$ 429.6
	Less CY Adv Proc	23.8	23.8	51.6
	Plus PY Adv Proc	30.8	30.8	26.5
	Net Total	$ 115.5	$ 115.5	$ 404.5
(2)	Quantity[1]	60MSL	60MSL	18FU
(3)	Unit Cost[2]	$ 1.9	$ 1.9	$ 22.5

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

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

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	98.8	1594.5	--	1693.3
Previous Changes:				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+113.7	-181.1	--	-67.4
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+113.7	-181.1	--	-67.4
Current Changes:				
Economic	-1.0	-1.3	--	-2.3
Quantity	--	+3902.5	--	+3902.5
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+70.1	-57.5	--	+12.6
Other	--	--	--	--
Support	--	+487.0	--	+487.0
Subtotal	+69.1	+4330.7	--	+4399.8
Total Changes	+182.8	+4149.6	--	+4332.4
Development Estimate/ Current Estimate	281.6	5744.1	--	6025.7

[1] CPUC Baseline for FY90 will be changed from missiles (MSL) to fire units (FU)

[2] The December 1988 validated Baseline Cost Estimate indicated the quantity of fire units/missiles procured being adjusted from five/sixty to four/forty-eight pending negotiation of contract restructure scheduled for third quarter FY89.

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

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

(FY87/FY89 (Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	95.6	1358.0	--	1453.6
Previous Changes:				
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+105.0	-176.9	--	-71.9
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+105.0	-176.9	--	-71.9
Current Changes:				
Quantity	--	+2945.1	--	+2945.1
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+58.6	-48.0	--	+10.6
Other	--	--	--	--
Support	--	+373.8	--	+373.8
Subtotal	+58.6	+3270.9	--	+3329.5
Total Changes	+163.6	+3094.0	--	+3257.6
Development Estimate/ Current Estimate FY87$	259.2	4452.0	--	4711.2
Adjustments from FY87$ to FY89$	+18.7	+321.4	--	+340.1
Current Estimate/ Development Estimate FY89$	277.9	4773.4	--	5051.3

b. (U) Previous Change Explanations --

(1) RDT&E

Estimating: Reprogramming of funds to support FY88/89 Congressional action to replace procurement funds with RDT&E funds; FY87 FAAD Integration effort; FY86 Part I Candidate Evaluation; and FY86 inflation adjustments.

(2) Procurement

Estimating: Reprogramming of funds to support FY88/89 congressional action to replace procurement funds with RDT&E funds and revised program assumption due to reduction of FY89 funding.

13. (U) **Cost Variance Analysis (Cont.)**:

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Dec 88 economic escalation rates (Economic)	N/A	-1.0
Reprogramming of funds (Estimating)	+58.6	+70.1
- For FY90 Additional test requirements to meet congressional language	(+17.8)	(+20.2)
- For FY90-94 P3I program	(+42.4)	(+51.5)
- Department of Army programming action (FY86-88)	(-1.6)	(-1.6)
(2) Procurement		
Revised Dec 88 economic escalation rates (Economic)	N/A	-1.3
Reprogramming of funds due to DOD decrement (FY89/92) (Estimating)	-48.0	-57.5
Adjustment of quantities to total Army Acquisition Objective (AAO) (Quantity)	+2945.1	+3902.5
Inclusion of initial spares not reported in prior SARs (Support)	+373.8	+487.0

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

a. (U) Planning Estimate to Development Estimate --

PAUC* (Planning Est)	Changes								PAUC (Dev/Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
14.262	-.004	-4.375	--	--	-.097	--	+.860	-3.616	10.646

*First SAR reporting quantities (December 31, 1987)

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

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

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
10.646	--	--	--	--	--	--	--	--	10.646

15. (U) **Contract Information**: (Then-Year Dollars in Millions)[1]

a. (U) RDT&E --

Martin Marietta Missile Systems, Orlando Fl
DAAH01-87-C-A049, FFP
Award: February 10, 1988
Definitized Date: N/A

Initial Target	Contract Ceiling	Price Qty
100.4	N/A	4

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
106.4	N/A	4	$106.4	$106.4

NOTE: Cost Performance Report (CPR) data is not required on FFP contract.

b. (U) Procurement --

Martin Marietta Missile Systems, Orlando Fl
DAAH01-87-C-A049, FFP
Award: February 10, 1988
Definitized Date: N/A

Initial Target	Contract Ceiling	Price Qty
27.2	N/A	5

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
27.2	N/A	5	$27.2	$27.2

NOTE: Cost Performance Report (CPR) data is not required on FFP contract.

c. (U) MILCON -- None

[1] No cost performance data is required under the provisions of the competitively awarded FFP contract. Negotiated value of the competitively awarded FFP contract of exercised CLINS is $99.2M in RDT&E funds. $6M in RDT&E has been awarded since the initial contract and remains to be definitized. Negotiated value of the competitively awarded FFP of exercised CLINS for advanced procurement is $7.6M. $19.6M of advanced procurement from the initial contract remains to be definitized.

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

a. (U) Program Status --

(1) Percent Program Completed: 28.6% (4/14) (1986/1999)
(2) Percent Program Cost Appropriated: 5.7% (344.9/6025.7)

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

Appropriation	Prior Years (FY86-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-99)	Total
RDT&E	$202.9	$20.2	8.9	49.6	281.6
Procurement	$142.0	$429.6	393.8	4778.7	5744.1
MILCON	0.0	0.0	0.0	0.0	0.0
Total	$344.9	$449.8	$402.7	$4828.3	$6025.7

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 $ Obligated	Total Then Year $ Expended	Escl Rate (%)
Appropriation: RDT&E								
1986				35.8	33.1	32.9	30.6	N/A
1987				23.9	22.8	22.8	18.5	2.7
1988				99.2	97.8	94.8	37.9	3.1
1989	4/14			48.0	49.2	28.7	0	4.0
1990[3]				19.1	20.2			3.6
1991				8.1	8.9			3.3
1992				17.8	19.9			2.8
1993				17.4	19.8			2.3
1994				8.6	9.9			1.8
To Compl				TBD	TBD			--
Subtotal	4/14			277.9	281.6	179.2	87.0	--
Appropriation: Procurement								
1988				32.3	33.5	17.4	0	3.1
1989	4/60			101.6	108.5			4.0
1990	18/424			391.5	429.6			3.6
1991	28/669			340.6	393.8			3.3
1992	43/806			383.2	439.0			2.8
1993	45/782			407.4	475.4			2.3
1994	42/688			389.0	462.0			1.8
To Compl	382/6649			2727.8	3402.3			--
Subtotal	562/10078			4773.4	5744.1	17.4	0	--
Total	566/10092			5051.3	6025.7	196.6	87.0	--

1 Quantities shown are missiles/fire units.

2 Under the NDI acquisition strategy for this competitively awarded FFP contract breakout of nonrecurring cost is not required.

3 An additional $20M is required in FY90 to meet test requirements to satisfy congressional language.

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	424	N/A
1991	669	N/A	669	N/A
1992	806	N/A	806	N/A
1993	782	N/A	782	N/A
1994	688	N/A	688	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	18	N/A
1991	28	N/A	28	N/A
1992	43	N/A	43	N/A
1993	45	N/A	45	N/A
1994	42	N/A	42	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	5051.3	N/A	N/A
	(TY $)	N/A	N/A	6025.7	N/A	N/A
PAUC[1]	(BY $)	N/A	N/A	8.9	N/A	N/A
	(TY $)	N/A	N/A	10.7	N/A	N/A

c. (U) Schedule Variance -- (NOTE: Subject to Limitations on production rates above.)[2]

	Production Estimate	Variance (CE vs PdE)	Current Estimate	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	78	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	9/95	N/A	N/A

1 Fire units are assumed to be the unit of measure for LOS-F-H.

2 Schedule start/end dates are based on procurement budget year data.

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 -- N/A

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules -- O&S costs are based on OPTEMP of 1,022 miles/year, 20 year system life and 10 year missile shelf life then overhaul and OCONUS 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.

b. (U) Costs --

(FY 1989 Constant (Base-Year) Dollars in Millions)

Cost Element	Total Cost	Cost Per Antecedent
Personnel	3134.3	
O&S Consumables	112.0	
Direct Depot Maintenance	2100.7	
Sustaining Investment	1549.3	
Other Direct Costs	409.0	
Indirect Costs	106.7	
Total	7412.0	

c. (U) Contractor Support Costs -- None

SAR-88-023

(b)(1)

FDS

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
RDT&E Only SAR

PROGRAM: FIXED DISTRIBUTED SYSTEM (FDS)

AS OF DATE: December 31, 1988

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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:

Integrated Undersea Surveillance System(IUSS) Program Office	CAPT R.C. Witter, USN Assigned: January 23, 1986
FDS Project Director Space and Naval Warfare Systems Command Washington, D.C. 20363-5100	CAPT K.E. Evans, USN AV 222-1120; COMM (202) 692-1120

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 & Prior)

5. (U) Related Programs: Deleted AN/UYS-2 Enhanced Modular Signal Processor (EMSP) and AN/UYK-43 computer programs referenced in FDS SAR dated 31 December 1986. Non-Development Items (NDI) now takes precedence (see paragraph 6.g).



[redacted]

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OASD(PA) DFOISR 88-T-0582

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

		Planning Estimate	Approved Program	Current Estimate
a. (U)	Cost --			
	Development (RDT&E,N)	674.7	784.4	784.4
	Procurement (OPN)	TBD	TBD	TBD
	Construction (MILCON)	TBD	TBD	TBD
	Total FY86 Base-Year	TBD	TBD	TBD
	Escalation	102.3	130.3	130.3
	Development (RDT&E,N)	(102.3)	(130.3)	(130.3)
	Procurement (OPN)	N/A	N/A	N/A
	Construction (MILCON)	N/A	N/A	N/A
	Total Then-Year	777.0	914.7	914.7
b. (U)	Quantities --			
	Development (RDT&E,N)	1	1	1
	Procurement (OPN)	TBD	TBD	TBD
	Total	1	1	1

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References --

Planning Estimate: NDCP dated 13 May 1986 and TEMP No. 1009 FDS dated 13 May 1986.

Approved Program: FY 1990-91 President's Budget.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: N/A (RDT&E,N program only).

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	777.0
Previous Changes				
Economic	-0.7	-	-	-0.7
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+3.4	-	-	+3.4
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+2.7	-	-	+2.7
Current Changes				
Economic	-1.8	-	-	-1.8
Quantity		-	-	-
Schedule	-	-	-	-
Engineering (1)	+61.7	-	-	+61.7
Estimating (2)	+26.4	-	-	+26.4
Other	-	-	-	-
Support (3)	+48.7	-	-	+48.7
Subtotal	+135.0	-	-	+135.0
Total Changes	+137.7	-	-	+137.7
Current Estimate	914.7	0	0	914.7

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

(FY 1986 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	674.7	0	0	674.7
Previous Changes				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering (1)	+49.7	-	-	+49.7
Estimating (2)	+20.7	-	-	+20.7
Other	-	-	-	-
Support (3)	+39.3	-	-	+39.3
Subtotal	+109.7	-	-	+109.7
Total Changes	+109.7	-	-	+109.7
Current Estimate	784.4	0	0	784.4

b. (U) Previous Change Explanations --

RDT&E

Economic: Revised escalation indices.

Estimating: Budget reductions of $11.4M ($6.0M has since been restored) in FY88 and $7.1M in FY89 have caused program increase due to funding shift from FY88/89 to FY93.

(b)(1)

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

Appropriation	Prior Years (FY84-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-96)	Total
RDT&E,N	261.2	160.2	204.6	288.7	914.7

c. (U) Annual Summary --

Fiscal Year	Qty	Flyaway FY86 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: RDT&E								
1984				14.6	14.0	14.0	14.0	3.8
1985				16.1	15.9	15.9	15.9	3.4
1986				23.1	23.5	23.5	19.2	2.8
1987				31.8	33.3	33.2	28.1	2.7
1988				65.2	70.6	70.6	58.0	3.1
1989				92.4	103.9	23.3	0.7	4.0
1990				137.8	160.2			3.6
1991				170.9	204.6			3.3
1992				139.0	170.7			2.8
1993				55.3	69.3			2.3
1994				38.2	48.7			1.8
Subtotal				784.4	914.7	180.5	135.9	

17. (U) Production Rate Data: N/A

18. (U) Operating and Support (O&S) Costs:

a. (U) Assumptions and Ground Rules -- N/A

b. (U) Costs -- N/A

c. (U) Contractor Support Costs -- N/A

SAR-88-013

(UNCLASSIFIED)

1 MAR 1989

A-1 ACCS

PROGRAM: Army Tactical Command and Control Systems (ATCCS) Common Hardware/Software (CHS)

AS OF DATE: 31 December 1988

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1. Designation and Nomenclature (Popular Name): Army Tactical Command and Control Systems (ATCCS), Common Hardware/Software (CHS).

2. DoD Component: U.S. Army.

3. Responsible Office and Telephone Number:

Project Manager
Common Hardware/Software Programs Office
ATTN: SPIS-CC-CHS-P
Fort Monmouth, NJ 07703-5203

PM: COL Archie B. Taylor, Jr.
Assigned: 18 Sep 87
AV: 995-4679
COMM: (201) 544-4679

4. Program Elements/Procurement Line Items:

RDT&E: PE 6.47.79A Project D323 converts to PE 6.48.18 in FY90 Project D323
PROCUREMENT: 0
MILCON: 0

5. Related Programs: Funding for CHS is provided by the following nodal PM's: Maneuver Control System (MCS); Field Artillery Tactical Data Systems (FATDS); Air Defense Command and Control Systems (ADCCS); Combat Service Support Control System (CSSCS); All Source Analysis System (ASAS).

(UNCLASSIFIED)

OASD(PA) DFOISR 88-T-0628

6. Mission and Description: The Project Manager, Common Hardware/Software's mission is to provide standard common hardware/software for the Army Tactical Command and Control Systems (ATCCS) which will consist of the five Battlefield Functional Areas (BFAs). Each BFA Project Manager will be provided CHS as building blocks for ATCCS. These Command and Control Systems are in various states of completion, i.e., from a definition phase (CSSCS) to fielded phase (MCS) with planned evolutionary changes for all the systems. Emphasis is being placed on minimizing the number of unique C2 hardware and software systems that are being fielded by the Army. This procurement is unique in that hardware and software will be procured and provided to other programs for use in their system development and acquisition. In order to field fully integrated command and control systems, it is necessary to procure common hardware/software and the underlying Ada programming support environments for software development. Specifically, software must be standardized and ported to the common hardware and placed under configuration management so that future generations of equipment can replace the existing hardware as technology improves without having to redevelop the software.

7. Program Highlights:

a. Significant Historical Developments - Project Manager (PM), Common Hardware Software (CHS) was provisionally established on 8 June 1987. On 18 September 1987, Colonel Archie B. Taylor, Jr. was officially designated as Project Manager. PM, CHS reporting responsibility is to the Program Executive Office (PEO) for Command and Control Systems under the direction of Major General Peter A. Kind. On 25 July 1988 the Defense Acquisition Board (DAB) conducted a review of the CHS Program and approved the initial procurement of the required hardware to allow each of the BFAs to conduct developmental testing. On 19 Aug 1988 the Common Hardware Software contract was awarded to MILTOPE Corporation.

b. Significant Developments Since Last Report -- Initial Submission.

The ATCCS-CHS is expected to satisfy the mission requirement.

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

8. Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DAE baseline breaches or DCP (dated 28 June 1988) threshold breaches.

9. Schedule:

a. Milestones	Dev Est Estimate	Approved Program	Current Estimate
Program Initiated	Dec 85	Dec 85	Dec 85
ATCCS CHS ROC	Dec 86	Dec 86	Dec 86
Issue Request for Proposal	May 87	May 87	May 87
Proposals Received	Sep 87	Sep 87	Sep 87
In-Plant Testing Completed	Nov 87	Nov 87	Nov 87
User Demo Test	Jan 88	Jan 88	Jan 88
Army Sys & Acq Review Council (ASARC)	Apr 88	Apr 88	Apr 88
OSD C3I (DAB) Review	Jul 88	Jul 88	Jul 88
Award Common HW/SW Contract	Aug 88	Aug 88	Aug 88
Initial Del, V1, SW, PSE, V2 Prototypes	Nov 88	Nov 88	Nov 88
User Check Test (Prototype Version) Begin	Jan 89	Jan 89	Jan 89
User Check Test (Prototype Version) Cmpt	Jun 89	Jun 89	Jun 89
Initial Deliveries V2 Units	Jun 89	Jun 89	Jun 89
User Check Test (Production Version) Begin	Aug 89	Aug 89	Aug 89
User Check Test (Production Version) Cmpt	Dec 89	Dec 89	Dec 89
OSD C3I Production Review	May 90	May 90	May 90
Production Award (FED)	Jun 90	Jun 90	Jun 90
Production Delivery (FED)	Oct 90	Oct 90	Oct 90
Production Award (ADCCS)	Jan 91	Jan 91	Jan 91
Production Delivery (ADCCS)	May 91	May 91	May 91
Production Award (FATDS)	Jun 91	Jun 91	Jun 91
Production Delivery (FATDS)	Oct 91	Oct 91	Oct 91
*FUE-First Deployed System (W/CHS) (MCS)	Nov 91	Nov 91	Nov 91
Production Award (CSSCS)	Jan 92	Jan 92	Jan 92
Production Delivery (CSSCS)	May 92	May 92	May 92
Production Award (MCS)	Aug 92	Aug 92	Aug 92
Production Delivery (MCS)	Dec 92	Dec 92	Dec 92
Follow On Contract Award	Sep 93	Sep 93	Sep 93

b. Previous Change Explanations -- Initial Submission.

c. Current Change Explanations -- None.

d. References --

Development Estimate: Decision Coordinating Paper, approved 28 Jun 88.

Approved Program: DAE Baseline approved March 1989

* MCS to field with developmental (prototype) quantities.

10. Technical/Operational Characteristics: *

a. Technical --	Dev Est	Approved Program Goal/Threshold	Demo Perf	Current Estimate
MIPS				
TCU V1	4	4/3	TBD	4
TCU V2	4	4/3	TBD	4
PCU V1	2	2/1	TBD	2
PCU V2	2	2/1	TBD	2
HTU	0.7	0.7/0.5	TBD	0.7
Internal Memory				
TCU V1	4-16 MB	4-16 MB/2-16 MB	TBD	4-16 MB
TCU V2	4-16 MB	4-16 MB/2-16 MB	TBD	4-16 MB
PCU V1	4-20 MB	4-20 MB/2-10 MB	TBD	4-20 MB
PCU V2	4-20 MB	4-20 MB/2-10 MB	TBD	4-20 MB
HTU	4 MB	4 MB/MINIMUM 512 KB	TBD	4 MB
Weight				
TCU V1	51 LBS	51 LBS/TWO-MAN LIFT	TBD	51 LBS
TCU V2	58 LBS	58 LBS/TWO-MAN LIFT	TBD	58 LBS
PCU V1	62 LBS	62 LBS/ONE-MAN CARRY	TBD	62 LBS
PCU V2	67 LBS	67 LBS/ONE-MAN CARRY	TBD	67 LBS
HTU	8 LBS	6 LBS/6 LBS	TBD	8 LBS
MTBF				
TCU V1	6930 HRS	6930 HRS/2311 HRS	TBD	6930 HRS
TCU V2	6930 HRS	6930 HRS/2311 HRS	TBD	6930 HRS
PCU V1	2587 HRS	2587 HRS/ 862 HRS	TBD	2587 HRS
PCU V2	2587 HRS	2587 HRS/ 862 HRS	TBD	2587 HRS
HTU	10672 HRS	10672 HRS/3557 HRS	TBD	10672 HRS
MTRR				
TCU V1	20 MIN	20 MIN/23 MIN	TBD	20 MIN
TCU V2	20 MIN	20 MIN/23 MIN	TBD	20 MIN
PCU V1	20 MIN	20 MIN/23 MIN	TBD	20 MIN
PCU V2	20 MIN	20 MIN/23 MIN	TBD	20 MIN
HTU	19 MIN	19 MIN/22 MIN	TBD	19 MIN
MTBMA				
TCU V1	652 HRS	652 HRS/549 HRS	TBD	652 HRS
TCU V2	652 HRS	652 HRS/549 HRS	TBD	652 HRS
PCU V1	563 HRS	563 HRS/392 HRS	TBD	563 HRS
PCU V2	563 HRS	563 HRS/392 HRS	TBD	563 HRS
HTU	**	**/***	TBD	**

* TCU = Transportable Computer Unit
PCU = Portable Computer Unit
HTU = Handheld Terminal Unit
V1 = Version 1 (Commercial)
V2 = Version 2 (Ruggedized)
** 24 HRS (BATTERY REPLACEMENT) 10672 W/O BATTERY
*** 23 HRS (BATTERY REPLACEMENT) 3557 W/O BATTERY

10. Technical/Operational Characteristics:

a. Technical (Cont'd)	Dev Est	Program Goal/Threshold	Demo Perf	Current Estimate
Diagnostic Accuracy				
TCU V1	95%	95%/90%	TBD	95%
TCU V2	95%	95%/90%	TBD	95%
PCU V1	95%	95%/90%	TBD	95%
PCU V2	95%	95%/90%	TBD	95%
HTU	98%	98%/95%	TBD	98%
b. Operational				
Orientation				
TCU V1	ALL POSITIONS	ALL POS/10°INCLINE	TBD	ALL POSITIONS
TCU V2	ALL POSITIONS	ALL POS/10°INCLINE	TBD	ALL POSITIONS
PCU V1	ALL POSITIONS	ALL POS/10°INCLINE	TBD	ALL POSITIONS
PCU V2	ALL POSITIONS	ALL POS/10°INCLINE	TBD	ALL POSITIONS
HTU	ALL POSITIONS	ALL POS/ALL POS	TBD	ALL POSITIONS
Temperature				
Operational				
TCU V1	0° TO 120°	0° TO 120°/40° TO 95°	TBD	0° TO 120°
TCU V2	0° TO 120°	0° TO 120°/ 0° TO 110°	TBD	0° TO 120°
PCU V1	0° TO 120°	0° TO 120°/40° TO 95°	TBD	0° TO 120°
PCU V2	0° TO 120°	0° TO 120°/ 0° TO 110°	TBD	0° TO 120°
HTU	-25° TO 120°	-25° TO 120°/-25° TO 110°	TBD	-25° TO 120°
Storage				
TCU V1	-25° TO 150°	-25° TO 150°/ 0° TO 110°	TBD	-25° TO 150°
TCU V2	-25° TO 150°	-25° TO 150°/ 0° TO 110°	TBD	-25° TO 150°
PCU V1	-25° TO 150°	-25° TO 150°/ 0° TO 110°	TBD	-25° TO 150°
PCU V2	-25° TO 150°	-25° TO 150°/ 0° TO 110°	TBD	-25° TO 150°
HTU	-25° TO 150°	-25° TO 150°/-25° TO 150°	TBD	-25° TO 150°
Power Interrupt				
TCU V1	≤ 10 MIN	≤ 10 MIN/≤ 10 MIN	TBD	≤ 10 MIN
TCU V2	≤ 10 MIN	≤ 10 MIN/≤ 10 MIN	TBD	≤ 10 MIN
PCU V1	≤ 10 MIN	≤ 10 MIN/≤ 10 MIN	TBD	≤ 10 MIN
PCU V2	≤ 10 MIN	≤ 10 MIN/≤ 10 MIN	TBD	≤ 10 MIN
HTU	N/A	N/A/N/A	N/A	N/A
Power				
TCU V1	*	*/*	TBD	*
TCU V2	*	*/*	TBD	*
PCU V1	*	*/*	TBD	*
PCU V2	*	*/*	TBD	*
HTU	**	**/***	TBD	**
Secure Lighting				
HTU	****	****/****	TBD	****

* 28VDC, 110/220 VAC 50 OR 60 HZ
** 28VDC & STANDARD ARMY BATTERIES
*** INTERNAL BATTERIES OR 28VDC
**** WITHOUT COMPROMISE UP TO 50 METERS

10. Technical Characteristics (Continued):

c. Previous Change Explanations: Initial submission.

d. Current Change Explanations: None.

e. References --

Development Estimate: Decision Coordinating Paper, approved 28 Jun 88.

Approved Program: DAE Baseline approved March 1989.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)
Note: Funds identified (Project D323) are for management, P3I and support of PM CHS. The dollars to procure common hardware/software will be provided by the Battlefield Functional Area (BFA) programs.

	Development Estimate	Approved Program	Current Estimate
a. Cost *			
RDT&E	116.3	116.3	116.3
System Cost (CHS)	0	0	0
In-House	(116.3)	(116.3)	(116.3)
TOTAL (Base-Year FY88 $)	116.3	116.3	116.3
Escalation	31.9	31.9	31.9
RDTE	(31.9)	(31.9)	(31.9)
Total Then Year Dollars	148.2	148.2	148.2

b. Quantities -- N/A

c. Foreign Military Sales -- None

d. Nuclear Cost -- None

e. References --

Development Estimate: Decision Coordinating Paper, approved 28 Jun 88.

Approved Program: FY-90/FY 91 President's Budget.

12. Program Acquisition/Current Procurement Unit Cost Summary:
Common unit of measure does not exist. The average unit cost of common hardware/software varies according to configuration required by BFA and the economy at the time of procurement. Procurement dollars for this program are under the control of the nodal BFA systems.

* See section 16C for non-additive ATCCS-CHS procurement and RDT&E.

13. Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	148.2	0	0	148.2
Previous Changes:				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	148.2	0	0	148.2
Current Changes:				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	148.2	0	0	148.2
Total Changes	0	0	0	0
Current Estimate	148.2	0	0	148.2

FY-88 Constant Base-Year Dollars in Millions

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	116.3	0	0	116.3
Previous Changes:				
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	116.3	0	0	116.3
Current Changes:				
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	116.3	0	0	116.3
Total Changes	0	0	0	0
Current Estimate	116.3	0	0	116.3

13. Cost Variance Analysis: (Continued)

b. Previous Change Explanation: N/A.

c. Current Change Explanations: None.

14. Program Acquisition Unit Cost (PAUC) History: N/A

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

a. RDT&E --
Common Hardware Software
Miltope Corporation
1770 Walt Whitman Road
Melville, NY 11747-3020
Contract #: DAAB07-88-C-J015
Firm Fixed Price
Awarded: 19 August 1988
Definitized: 19 August 1988

b. Initial Contract:

Target	Ceiling	Quantity
37.6	N/A	970*

c. Current Contract:

Target	Ceiling	Quantity
37.6	N/A	970

d. Estimated Price at Completion: N/A

NOTE: For firm fixed price contract cost and schedule variance information is not required.

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

a. Program Status:

(1) Percent RDTE Program Completed: 11% (2 Yr/19 Yrs)

(2) Percent RDTE Program Cost Appropriated: 10% ($15.4/$148.2)

* Quantities are made up of various different computers such as HTUs, PCUs and TCUs.

16. Program Funding Summary: (Continued)

b. Appropriation Summary --

Appropriation	Current & Prior Yrs (FY88-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-06)	Total
RDTE	15.4	4.9	6.0	121.9	148.2
Procurement	0	0	0	0	0
MILCON	0	0	0	0	0
Total	15.4	4.9	6.0	121.9	148.2

c. Annual Summary --

Fiscal Year	Qty	Flyaway FY88 Dollars		Total Base Year $	Total Then-Year $			Esc Rate
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E PE 6.47.79 - PE 6.48.18 Project D323								
FY-88	13	0	7.2	7.2	7.4	7.4	5.4	3.1
FY-89	21	0	7.5	7.5	8.0	1.4	.1	4.0
FY-90	0	0	4.5	4.5	4.9	N/A	N/A	3.6
FY-91	0	0	5.3	5.3	6.0	N/A	N/A	3.3
FY-92	0	0	5.2	5.2	6.0	N/A	N/A	2.8
FY-93	0	0	5.0	5.0	5.9	N/A	N/A	2.3
FY-94	0	0	4.8	4.8	5.8	N/A	N/A	1.8
FY-95	0	0	5.0	5.0	6.1	N/A	N/A	1.8
FY-96	0	0	6.8	6.8	8.5	N/A	N/A	1.8
FY-97	0	0	6.8	6.8	8.6	N/A	N/A	1.8
FY-98	0	0	6.6	6.6	8.6	N/A	N/A	1.8
FY-99	0	0	6.6	6.6	8.7	N/A	N/A	1.8
TO CMPLT	0	0	45.0	45.0	83.7	N/A	N/A	1.8/yr
TOTAL	34	0	116.3	116.3	148.2	8.8	5.5	

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

BFAs FUNDING SUMMARY

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

c. Annual Summary --

Fiscal Year	Qty	FY-88 Base-Year Dollars			Then-Year Dollars			Esc Rate
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
*Appropriation: RDT&E (Non-Additive)								
FY-88	6	0	0	3.4	0	0	4.1	3.1
FY-89	15	0	0	5.6	0	0	6.0	4.0
FY-90	40	0	0	3.5	0	0	3.8	3.6
FY-91	22	0	0	2.8	0	0	3.2	3.3
FY-92	20	0	0	2.7	0	0	3.1	2.8
FY-93	0	0	0	0	0	0	0	2.3
FY-94	0	0	0	0	0	0	0	1.8
FY-95	0	0	0	0	0	0	0	1.8
FY-96	0	0	0	0	0	0	0	1.8
FY-97	0	0	0	0	0	0	0	1.8
FY-98	0	0	0	0	0	0	0	1.8
FY-99	0	0	0	0	0	0	0	1.8
TOTAL	103	0	0	18.0	0	0	20.2	
*Appropriation: Procurement (Non-Additive)								
FY-88	911	0	0	26.9	0	0	28.9	3.1
FY-89	162	0	0	0	0	0	0	4.0
FY-90	1355	0	0	17.2	0	0	19.6	3.6
FY-91	1567	0	0	22.8	0	0	26.6	3.3
FY-92	2353	0	0	72.5	0	0	86.4	2.8
FY-93	2436	0	0	90.4	0	0	109.8	2.3
FY-94	3152	0	0	114.8	0	0	141.9	1.8
FY-95	1488	0	0	65.3	0	0	82.3	1.8
FY-96	284	0	0	14.2	0	0	18.5	1.8
FY-97	260	0	0	13.8	0	0	18.0	1.8
FY-98	0	0	0	0	0	0	0	1.8
FY-99	0	0	0	0	0	0	0	1.8
TOTAL	13968**	0	0	437.9	0	0	532.0	

* Funds identified are to procure common hardware/software only. Total funding will be identified in nodal systems baselines/SARs.

** Quantities are based on 17 May 1988 DCSOPS Guidance Letter (14071 BFA Requirements, 12903 ULC Requirements). The quantities do not reflect the BFA's current program. PEO CCS and PM CHS are currently updating requirements for each BFA for revalidation. Once revalidation occurs, documentation will be updated to reflect current requirements.

FIELD ARTILLERY TACTICAL DATA SYSTEM (FATDS)

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

c. Annual Summary --

Fiscal Year	Qty	FY-88 Base-Year Dollars			Then-Year Dollars			Esc Rate
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
*Appropriation: Procurement SSN B28600 (Non-Additive)								
FY-88	529	0	0	26.9	0	0	28.9	3.1
FY-89	68	0	0	0	0	0	0	4.0
FY-90	0	0	0	0	0	0	0	3.6
FY-91	84	0	0	3.0	0	0	3.5	3.3
FY-92	645	0	0	26.1	0	0	31.1	2.8
FY-93	1060	0	0	43.5	0	0	52.8	2.3
FY-94	1277	0	0	53.3	0	0	65.8	1.8
FY-95	375	0	0	16.0	0	0	20.0	1.8
FY-96	0	0	0	0	0	0	0	1.8
FY-97	0	0	0	0	0	0	0	1.8
FY-98	0	0	0	0	0	0	0	1.8
FY-99	0	0	0	0	0	0	0	1.8
TOTAL	4038	0	0	168.8	0	0	202.1	

* Funds identified are to procure common hardware/software only. Total funding will be identified in nodal systems baseline/SARs.

FORWARD ENTRY DEVICE (FED)

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

c. Annual Summary --

Fiscal Year	Qty	FY-88 Base-Year Dollars			Then-Year Dollars			Esc Rate
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
*Appropriation: Procurement SSN BZ9851 (Non-Additive)								
FY-88	0	0	0	0	0	0	0	3.1
FY-89	0	0	0	0	0	0	0	4.0
FY-90	1355	0	0	17.2	0	0	19.6	3.6
FY-91	1159	0	0	14.7	0	0	17.2	3.3
FY-92	618	0	0	7.8	0	0	9.3	2.8
FY-93	0	0	0	0	0	0	0	2.3
FY-94	0	0	0	0	0	0	0	1.8
FY-95	0	0	0	0	0	0	0	1.8
FY-96	0	0	0	0	0	0	0	1.8
FY-97	0	0	0	0	0	0	0	1.8
FY-98	0	0	0	0	0	0	0	1.8
FY-99	0	0	0	0	0	0	0	1.8
TOTAL	3132	0	0	39.7	0	0	46.1	

* Funds identified are to procure common hardware/software only. Total funding will be identified in nodal systems baseline/SARs.

AIR DEFENSE COMMAND AND CONTROL SYSTEM (ADCCS)

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

c. Annual Summary --

Fiscal Year	Qty	FY-88 Base-Year Dollars			Then-Year Dollars			Esc Rate
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
*Appropriation: RDT&E PE 6.47.41 D126 (Non-Additive)								
FY-88	0	0	0	3.4	0	0	4.1	3.1
FY-89	0	0	0	5.6	0	0	6.0	4.0
FY-90	0	0	0	0	0	0	0	3.6
FY-91	0	0	0	0	0	0	0	3.3
FY-92	0	0	0	0	0	0	0	2.8
FY-93	0	0	0	0	0	0	0	2.3
FY-94	0	0	0	0	0	0	0	1.8
FY-95	0	0	0	0	0	0	0	1.8
FY-96	0	0	0	0	0	0	0	1.8
FY-97	0	0	0	0	0	0	0	1.8
FY-98	0	0	0	0	0	0	0	1.8
FY-99	0	0	0	0	0	0	0	1.8
TOTAL	0	0	0	9.0	0	0	10.1	
*Appropriation: Procurement SSN AD5050 (Non-Additive)								
FY-88	92	0	0	0	0	0	0	3.1
FY-89	42	0	0	0	0	0	0	4.0
FY-90	0	0	0	0	0	0	0	3.6
FY-91	324	0	0	5.1	0	0	5.9	3.3
FY-92	358	0	0	5.3	0	0	6.3	2.8
FY-93	510	0	0	7.5	0	0	9.1	2.3
FY-94	762	0	0	11.2	0	0	13.8	1.8
FY-95	278	0	0	10.4	0	0	13.1	1.8
FY-96	0	0	0	0	0	0	0	1.8
FY-97	0	0	0	0	0	0	0	1.8
FY-98	0	0	0	0	0	0	0	1.8
FY-99	0	0	0	0	0	0	0	1.8
TOTAL	2366	0	0	39.5	0	0	48.2	

* Funds identified are to procure common hardware/software only. Total funding will be identified in nodal systems baselines/SARs.

ALL SOURCE ANALYSIS SYSTEM (ASAS)

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

c. Annual Summary --

Fiscal Year	Qty	FY-88 Base-Year Dollars			Then-Year Dollars			Esc Rate
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
*Appropriation: RDT&E PE 6.43.21 D926 (Non-Additive)								
FY-88	6	0	0	0	0	0	0	3.1
FY-89	15	0	0	0	0	0	0	4.0
FY-90	40	0	0	3.5	0	0	3.8	3.6
FY-91	22	0	0	2.8	0	0	3.2	3.3
FY-92	20	0	0	2.7	0	0	3.1	2.8
FY-93	0	0	0	0	0	0	0	2.3
FY-94	0	0	0	0	0	0	0	1.8
FY-95	0	0	0	0	0	0	0	1.8
FY-96	0	0	0	0	0	0	0	1.8
FY-97	0	0	0	0	0	0	0	1.8
FY-98	0	0	0	0	0	0	0	1.8
FY-99	0	0	0	0	0	0	0	1.8
TOTAL	103	0	0	9.0	0	0	10.1	

* Funds identified are to procure common hardware/software only. Total funding will be identified in nodal systems baselines/SARs.

NOTE: FY90/91/92 buy dependent on ASAS development and acreditation.

COMBAT SERVICE SUPPORT CONTROL SYSTEM (CSSCS)

16. Program Funding Summary: (Current Estimate in Million of Dollars)

c. Annual Summary --

Fiscal Year	Qty	FY-88 Base-Year Dollars			Then-Year Dollars			Esc Rate
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
*Appropriation: Procurement SSN W34600 (Non-Additive)								
FY-88	20	0	0	0	0	0	0	3.1
FY-89	40	0	0	0	0	0	0	4.0
FY-90	0	0	0	0	0	0	0	3.6
FY-91	0	0	0	0	0	0	0	3.3
FY-92	137	0	0	6.8	0	0	8.1	2.8
FY-93	161	0	0	8.0	0	0	9.8	2.3
FY-94	229	0	0	11.4	0	0	14.3	1.8
FY-95	285	0	0	14.2	0	0	18.1	1.8
FY-96	284	0	0	14.2	0	0	18.5	1.8
FY-97	260	0	0	13.8	0	0	18.0	1.8
FY-98	0	0	0	0	0	0	0	1.8
FY-99	0	0	0	0	0	0	0	1.8
TOTAL	1416	0	0	68.4	0	0	86.8	

* Funds identified are to procure common hardware/software only. Total funding will be identified in nodal system baselines/SARs.

MANEUVER CONTROL SYSTEM (MCS)

16. Program Funding Summary: (Current Estimate in Million of Dollars)

c. Annual Summary --

Fiscal Year	Qty	FY-88 Base-Year Dollars			Then-Year Dollars			Esc Rate
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
*Appropriation: Procurement SSN BA9300 (Non-Additive)								
FY-88	270	0	0	0	0	0	0	3.1
FY-89	12	0	0	0	0	0	0	4.0
FY-90	0	0	0	0	0	0	0	3.6
FY-91	0	0	0	0	0	0	0	3.3
FY-92	595	0	0	26.5	0	0	31.6	2.8
FY-93	705	0	0	31.4	0	0	38.1	2.3
FY-94	884	0	0	38.9	0	0	48.0	1.8
FY-95	550	0	0	24.7	0	0	31.1	1.8
FY-96	0	0	0	0	0	0	0	1.8
FY-97	0	0	0	0	0	0	0	1.8
FY-98	0	0	0	0	0	0	0	1.8
FY-99	0	0	0	0	0	0	0	1.8
TOTAL	3016	0	0	121.5	0	0	148.8	

* Funds identified are to procure common hardware/software only. Total funding will be identified in nodal systems baselines/SARs.

A-24. SADARM

SAR-88-093

[redacted]

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: SENSE AND DESTROY ARMOR (SADARM)

(b)(1)

AS OF DATE: December 31, 1988

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1. (U) Designation/Nomenclature (Popular Name): Sense and Destroy Armor (SADARM)

Projectile, 155mm, XM898
Rocket, Multiple Launch Rocket System, XM29

[redacted]

2. (U) DOD Component: Department of the Army

3. (U) Responsible Office and Telephone Number:

Sense and Destroy Armor Product Manager
Armament Research, Development and Engineering Center
Picatinny Arsenal, New Jersey

PM: LTC William J. Ervin
Assigned: 21 July 1987
Autovon: 880-2926
Commercial: (201) 724-2926

4. (U) Program Elements/Procurement Line Items:

RDTE: 64802D369
64802D644 (Shared Funding)
64814D644 (Beginning in FY90)

Procurement: MLRS Rocket APPN 2032 ICN C67900
155mm Projectile APPN 2034 ICN E66300

[redacted]

5. (U) Related Programs: M270 Launcher; M109 Howitzer; M198 Howitzer; M109A3/E2 (HIP)

OASD(PA) DFOISR 89-T-0624

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(b)(1)

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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 for the 155mm Howitzer and MLRS applications.

b. (U) Significant Developments Since Last Report -- In order to align the program with DAB guidance, contract changes for the submunition and integration efforts were required. Proposals for the submunition modifications have been received and award is expected in March 1989. A contract for MLRS integration was awarded to LTV in September 1988. Technically, four captive flight test series have been conducted in various environments, over 80 submunition lethal mechanism tests have been conducted, and the MLRS warhead and 155mm thin wall concepts have been verified through test.

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 no breaches. A formal Acquisition Decision Memorandum was signed in May 1988.

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9. (U) Schedule:

a. (U) Milestones --

	Planning Estimate	Approved Program	Current Estimate/ Dev Estimate
Generic SADARM Submunition Development Approved by AMC	Nov 84	N/A	Nov 84
Congressional Direction for FSD and Production Plan	Dec 85	N/A	Dec 85
DA Approval - MLRS/155mm SADARM ROC	Mar 86	N/A	Mar 86
DA Approval - 48 Month Acquisition Plan	Apr 86	N/A	Apr 86
DA IPR for Submunition FSD	Sep 86	N/A	Sep 86
Competitive Submunition FSD Contract Awards	Sep 86	N/A	Sep 86
Congressional Restructure to 60 Month Acquisition Plan	Nov 86	N/A	N/A
OSD Addition of 8 Inch FSD Program	Nov 86	N/A	N/A
MLRS Initial Integration Contract Award	Dec 86	N/A	Dec 86
Milestone II ASARC	Nov 87	N/A	Nov 87
Milestone II DAB	Mar 88	N/A	Mar 88
MLRS FSD Contract Award	N/A	N/A	Sep 88
Congressional Demonstration - Start	N/A	N/A	Jan 89
Congressional Demonstration - End	N/A	N/A	Apr 89
Projectile Tech Tests - Start	N/A	N/A	May 90
Projectile IOTE (Start)	N/A	N/A	Jul 91
MLRS Tech Tests - Start	N/A	N/A	Jul 91
Projectile Tech Tests - End	N/A	N/A	Jul 91
Projectile IOTE - End	N/A	N/A	Dec 91
MLRS Tech Tests - End	N/A	N/A	Dec 91
Submunition Design Select	N/A	N/A	Jan 92
Type Classification LP - MLRS	TBD	N/A	Jan 92
Type Classification - Projectiles	TBD	N/A	Jan 92
Milestone III ASARC	TBD	N/A	Jan 92
Milestone III DAB	TBD	N/A	Apr 92
MLRS LRIP Contract Award	TBD	N/A	Apr 92
Submunition and Projectile FSP Award	TBD	N/A	May 92
MLRS IOTE (Start)	N/A	N/A	Nov 92
First Unit Equipped - Projectile	TBD	N/A	Jul 93
MLRS IOTE - End	TBD	N/A	Jul 93
Type Classification - MLRS	TBD	N/A	Sep 93
Milestone Decision Review	TBD	N/A	Sep 93
MLRS FSP Contract Award	TBD	N/A	Apr 94
First Unit Equipped - MLRS	TBD	N/A	May 94

b. (U) Previous Change Explanations -- None.

c. (U) Current Change Explanations -- None.

d. (U) References --

Planning Estimate: Draft DCP, 10 December 1987
FY89 Amended President's Budget

Approved Program: No DAE Baseline has been approved for this program.

Development Estimate: Army approved Program Baseline, February 1989
FY90/91 President's Budget

10. (U) Technical/Operational Characteristics:

	Planning	Approved Program	Demon-strated	Current Estimate/
(b)(1)				

c. (U) Previous Change Explanations -- None.

d. (U) Current Change Explanations -- None.

e. (U) References --

Planning Estimate: SADARM ROC, March 1986.

Approved Program: No DAE Baseline has been approved for this program.

Development Estimate: Army Approved Program Baseline, February 1989

11. (U) Program Acquisition Cost:

	Planning Estimate	Approved Program	Development Est/ Current Estimate
a. (U) Cost --			
Development (RDT&E) FY88$	$623.5		
Adjustment to FY89$	23.7 1/		
Development (RDT&E)	$647.2	N/A	$654.1
Procurement	TBD	N/A	951.6
MLRS Rocket Total	-	N/A	703.6
Flyaway	-	N/A	699.2
Other Wpn Sys Cost	-	N/A	4.4
155mm Projectile Total	-	N/A	248.0
Flyaway	-	N/A	248.0
Total FY 89 Base-Year $	647.2	N/A	1605.7
Escalation			
Development	21.4 2/	N/A	19.1
Procurement	-	N/A	162.0
MLRS Rocket	-	N/A	120.8
155mm Projectile	-	N/A	41.2
Total Then-Year $	668.6	N/A	1786.8
b. (U) Quantities --			
Development (RDT&E)		N/A	
MLRS Rocket	208	N/A	260
155mm Projectile	1990	N/A	652
Procurement		N/A	
MLRS Rocket	-	N/A	TBD
155mm Projectile	-	N/A	10156
Total			
MLRS Rocket	208	N/A	260
155mm Projectile	1990	N/A	10808

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

1/ Conversion factor used to convert FY88 $ to FY89 $ was 1.038.

2/ Planning Estimate escalation for RDTE was $45.1M in FY1988 $.

e. References --

Planning Estimate: FY89 Amended President's Budget

Approved Program: No DAE Baseline has been approved for this program.

Development Estimate: FY90/91 President's Budget

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions)

	Current Estimate (Dec 88 SAR)	CURRENT YEAR UCR Baseline (Dec 88 SAR)	BUDGET YEAR UCR Baseline (Dec 88 SAR)
a. (U) Program Acquisition --			
(1) (U) Cost			
MLRS Rocket	1257.5	1257.5	1257.5
155mm Projectile	529.3	529.3	529.3
(2) (U) Quantity			
MLRS Rocket	TBD	TBD	TBD
155mm Projectile	10808	10808	10808
(3) (U) Unit Cost			
MLRS Rocket	TBD	TBD	TBD
155mm Projectile	.049	.049	.049
b. (U) Current Procurement --	(FY 1989)	(FY1989 APPN)	(FY 1990)
(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
Planning Estimate	668.6	-	-	668.6
Previous Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+4.6	-	-	+4.6
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+4.6	-	-	+4.6
Total Changes	+4.6	-	-	+4.6
Baseline Adjustment	-	+1113.6	-	+1113.6
Current Estimate	673.2	1113.6	-	1786.8

(FY 1988Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	623.5	-	-	623.5
Previous Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes:				
Economic	0.0	-	-	0.0
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+6.9	-	-	+6.9
Other	-	-	-	
Support	-	-	-	-
Subtotal	+6.9	-	-	+6.9
Total Changes	+6.9	-	-	+6.9
Current Estimate FY88$	630.4		-	630.4
Change from FY88$ to FY89$	+23.7		-	+23.7
Baseline Adjustment	-	+951.6		+951.6
Current Estimate FY89$	654.1	951.6		1605.7

b. (U) Previous Change Explanations -- N/A

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
RDT&E		
Increased costs due to program restructure to include two sizes of submunitions. (Estimating)	+6.9	+4.6

14. (U) Program Acquisition Unit Cost (PAUC) History: (Millions of then year dollars)

a. (U) Initial SAR Estimate (PE) to Current Estimate --

MLRS Rocket

PAUC (Ping Est)	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC (Current Est)
TBD	-	-	-	-	-	-	-	-	TBD

155mm Projectile

PAUC (Ping Est	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC (Current Est)
TBD	-	-	-	-	-	-	-	-	.049

SADARM, December 31, 1988

15. (U) Contract Information: (Then-Year Dollars Millions)

a. (U) RDTE --

Honeywell, Inc.
DAAA21-86-C-0308, CPIF
Award: Sept 86
Definitized: Sept 86

Initial Contract Price		
Target	Ceiling	Qty
$95.4	N/A	N/A

Current Contract Price*		
Target	Ceiling	Qty
N/A	N/A	N/A

Estimated Price At Completion	
Contractor	Program Manager
$155.8	$168.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances to Date (12/31/88)	$+34.0	$+26.4
Net Change	$+34.0	$+26.4

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. Contract modifications are schedule for negotiations.

Aerojet ElectroSystems
DAAA21-86-C-0309, CPIF
Award: Sept 86
Definitized: Sept 86

Initial Contract Price		
Target	Ceiling	Qty
$87.2	N/A	N/A

Current Contract Price*		
Target	Ceiling	Qty
N/A	N/A	N/A

Estimated Price At Completion	
Contractor	Program Manager
$164.4	$168.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances to Date (12/31/88)	$+42.0	$+35.2
Net Change	$+42.0	$+35.2

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. Contract modifications are schedule for negotiations.

* Current Contract Price will be determined at upcoming negotiations.

LTV Missiles and Electronics
DAAH01-8, CPIF
Award: Sept 88
Definitized: Sept 88

Initial Contract Price

Target	Ceiling	Qty
$70.7	N/A	N/A

Current Contract Price

Target	Ceiling	Qty
$70.7	N/A	N/A

Estimated Price At Completion

Contractor	Program Manager
$70.7	$88.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances to Date (12/31/88)	$0.0	$0.0
Net Change	$0.0	$0.0

b. (U) Procurement -- Not applicable.

c. (U) MILCON -- Not applicable.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status --

(1) (U) Percent Program Complete: 4/9 = 44.4%
(Years Funds Appropriated/Total Program Years)

(2) (U) Percent Program Cost Appropriated: ($354.7/$1786.8) = 19.9%
(Funds Appropriated to Date in Millions/Total Program Funding in Millions)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current + Prior Yrs (FY86-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-94)	Total
RDT&E	354.7	155.0	104.5	59.0	673.2
Procurement					
MLRS Rocket	0.0	0.0	0.0	824.4	824.4
155mm Projectile	0.0	0.0	0.0	289.2	289.2
Total	354.7	155.0	104.5	1172.6	1786.8

C. Annual Summary --

Fiscal Year	Qty	Flyaway FY89 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
	MLRS/ 155MM	Appropriation: RDT&E (MLRS & 155MM)						
FY86				38.6	35.8	34.2	34.1	2.8
FY87				75.5	72.0	71.9	65.3	2.7
FY88				102.7	101.3	101.1	40.5	3.1
FY89				142.5	145.6	8.0	0.1	4.0
FY90				147.0	155.0			3.6
FY91				96.1	104.5			3.3
FY92				23.8	26.5			2.8
FY93				6.9	7.8			2.3
FY94				21.3	24.7			1.8
Subtotal	260/562			654.1	673.2			
		Approrpiation: Procurement MLRS						
FY92	TBD		74.4	135.6	155.3			2.8
FY93	TBD		193.3	262.9	306.7			2.3
FY94	TBD		226.1	305.1	362.4			1.8
TOC	TBD		TBD	TBD	TBD			
Subtotal	TBD		493.8	703.6	824.4			
		Appropriation: Procurement 155MM						
FY92	560	500	16.7	31.0	35.2			2.8
FY93	3356		60.2	84.2	97.5			2.3
FY94	6240		95.4	132.8	156.5			1.8
TOC	TBD		TBD	TBD	TBD			
Subtotal	10156		172.3	248.0	289.2			
		Appropriation: Procurement (MLRS & 155MM) Total						
FY92			91.1	166.6	190.5			2.8
FY93			253.5	347.1	404.2			2.3
FY94			321.5	437.9	518.9			1.8
TOC			TBD	TBD	TBD			
Subtotal			666.1	951.6	1113.6			
Total			666.1	1605.7	1786.8			

The Army will procure the maximum number of supportable systems consistent with the dollars appropriated.

17. (U) Production Rate Data:

a. (U) Annual Production Rates --

MLRS Rockets: TBD

155mm Projectile

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1992	560		560	
1993	3356		3356	
1994	6240		6240	
TOC	TBD		TBD	

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 $)			1123.0		
(TY $)			1257.5		
PAUC (89 $)			TBD		
(TY $)			TBD		

155mm Projectiles

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost (89 $)			482.7		
(TY $)			529.3		
PAUC (89 $)			.045		
(TY $)			.049		

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)			TBD		
Duration (in Months)			TBD		
End Date (Mo/Yr)			TBD		

155mm Projectiles

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Estimate
Start Date (Mo/Yr)			4/92		
Duration (in Months)			TBD		
End Date (Mo/Yr)			TBD		

d. (U) Deliveries (Plan/Actual) --

	To Date
RDTE	
MLRS Rockets	0/0
155mm Projectiles	0/0
Procurement	
MLRS ROCKETS	0/0
155mm Projectiles	0/0

e. (U) Approved Design-to-Cost Goal -- N/A

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.

b. (U) Costs (FY1989 Constant (Base-Year) Dollars in Millions) -- TBD

c. (U) Contractor Support Costs -- TBD

SAR-88-007

This Page is Unclassified

N-3 AN/BSY-2

SELECTED ACQUISITION REPORT (RCS DD-COMP) (Q)B23 (7700)
PROGRAM: AN/BSY-2 SUBMARINE COMBAT SYSTEM
AS OF DATE: December 31, 1988

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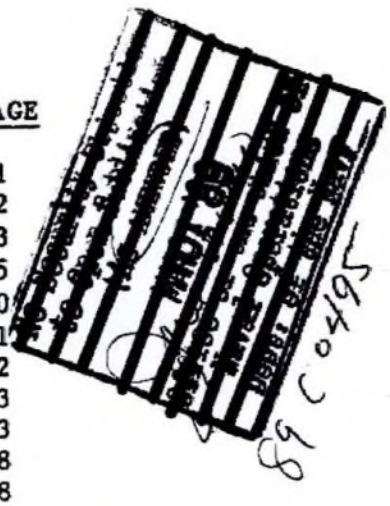

1. (U) Designation/Nomenclature (Popular Name): AN/BSY-2 Submarine Combat System (AN/BSY-2 SCS) and Passive Sonar Receiving Set (AN/BQG-5)

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 Ronald L. Koontz, USN
Assigned: November 8, 1988
Area Code 202/746-0056
AUTOVON 286-0056

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)

OPN:
BA2 PE 24281N, Line Item 332217
BA7 PE 84731N, Line Item 338026
BA8 PE 77731N

O&M,N:
BA8 PE 78017N, LINE ITEM P2PU

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DEPARTMENT OF DEFENSE

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OASD(PA) DFOISR 89-T-0537

5. (U) Related Programs:

PE0604562N-SO236 - Submarine Tactical Warfare Systems
PE0603367N - Anti-Submarine Warface Standoff Weapon
PE0604675N - Mk 48 Advanced Capabilities Torpedo
PE0604367N - TOMAHAWK
PE0604601N - Submarine Launched Mobile Mine
PE0604503N - Submarine Sonar Development
PE0604047N - Enhanced Modular Signal Processor
PE0604514N - Navigation Systems
PE0604515N - Submarine Surveillance Equipment
PE0603530N - Over-the-Horizon Targeting
PE0603560N - Submarine Hull Array Development
PE0604502N - Submarine Communications
PE0604524N - AN/BSY-1 Submarine Combat System
PE0604309N - SEALANCE
PE0708017N - 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 (C^3); 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 will be provided for SSN 688 class ships authorized in fiscal year 1989 and later. 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 (C^3I) functions to facilitate the decision process.

(b)(1)

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.

b. Significant highlights subsequent to the last Selected Acquisition Report dated 30 June 1988 include: 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. The AN/BSY-2 Submarine Combat System will meet all the mission requirements.

c. Changes since "as of" date: None

8. (U) Threshold Breaches:

(U) There are currently no DAE baseline breaches, DCP (dated 10 September 1987) breaches, or ADM (dated 9 March 1988) threshold breaches.

(b)(1)

(b)(1)

b. (U) Previous Change Explanation:

- o The Defense Acquisition Board Milestone II was delayed three months to complete source selection prior to the Milestone II decision.
- o The FSD option was delayed two month to allow DOD Milestone II decision.

c. (U) Current Change Explanation: Chg 1; Shipbuilding schedule change.

d. (U) References:

(U) Planning Estimate: SDDM dated October 9, 1986, subject "Fiscal Year 1989 Submarine Combat System Milestone I Decision Memorandum"

(U) Approved Program: DAE Baseline dated 7 March 1988.

(b)(1)

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(U) Notes for Technical/Operational Characteristics (Cont'd)

and speed ± 2 kts. Measurement of the threshold begins with tracker initialization and ends when the required solution accuracy is achieved.

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. Planning Estimate: The Attack Submarine Effectiveness Analysis Input Parameters Data Book, Volume B of 17 AUG 84; Naval Intelligence Support Center (NISC) System Threat Assessment Report (STAR), Submarine Systems, Volume 1, NISC TA 006-85 with update NISC ltr Ser 21/51233 of 24 June 1985.

B. 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, and the AN/BSY-2 Program Baseline, dated 9 February 1988 as approved by DAE 7 March 1988 as the development baseline.

f. (U) Approved Progam: DAE baseline dated February 1988.

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars)

AS OF DATE: 31 December 1988
BASE YEAR: FY1988

	Development Estimate	Approved Program	Current Estimate
a. Cost —			
Development (RDT&E)	$ 1642.6	1748.8	$ 1748.8
Procurement			
Support System Costs (including LBES, Trainers, Trainer Unique Equipment, MS/RFs, IMAs, I&C Spares and MAMs)	893.9	797.7	797.7
	(893.9)	(797.7)	(797.7)
Construction (MILCON)	-	-	-
Total FY88 Base Year $	2536.5*	2546.5	2546.5
Escalation	319.3	318.3	318.3
Development (RDT&E)	(120.3)	(145.9)	(145.9)
Procurement	(199.0)	(172.4)	(172.4)
Construction (MILCON)	-		-
Total Then Year $	2855.8	2864.8	2864.8
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: FY90/91 President's Budget.

*Rebaseline SAR (6/30/88) used weighted vice raw inflation rate (1.065) to rebaseline from 86 to 88 base year dollars. This is corrected in this Annual SAR.

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 88 SAR	June 88 SAR	Dec 88 SAR
(1) Cost	2864.8	2855.8	2864.8
(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	RDT&E	PROC	MILCON	TOTAL
Estimate	1762.9	1092.9	-	2855.8
Previous Changes:				
Economic	-	-		-
Quantity	-	-		-
Schedule	-	-		-
Engineering	-	-		-
Estimating	-	-		-
Other	-	-		-
Support	-	-		-
Subtotal	-	-		-
Current 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
Total Changes	+131.8	-122.8		+9.0
Current Estimate	1894.7	970.1	-	2864.8

(FY 1988 Constant Dollars in Millions)

* Development	RDT&E	PROC	MILCON	TOTAL
Estimate	1642.6	893.9	-	2536.5
Previous Changes:				
Economic	-	-		-
Quantity	-	-		-
Schedule	-	-		-
Engineering	-	-		-
Estimating	-	-		-
Other	-	-		-
Support	-	-		-
Subtotal	-	-		
Current 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
Total Changes	+106.2	-96.2		+10.0
Current Estimate	1748.8	797.7	-	2546.5

*Rebaseline SAR (6/30/88) used weighted vice raw inflation rate (1.065) to rebaseline from 86 to 88 base year dollars. This is corrected in ths Annual SAR.

13. (U) Cost Variance Analysis: (Cont'd)

b. Previous Change Explanations -- N/A Due to being rebaselined in June 1988.

c. Current Change Explanations --

(1) RDT&E	(Dollars in Millions) Base-Year	Then-Year
o Revised Dec 88 escalation rates (economic)	-	+5.6
o Block Upgrade Program added (engineering)	+72.5	+86.9
o Reduced lab tasking (estimating)	-14.6	-15.3
o AN/BSY-2 Team Trainer Tactical Equipment reprogrammed from FY91 OPN BA-2; LSA conversion reprogrammed from FY91 O&M,N (support)	+48.3	+54.6
(2) Procurement		
o Revised Dec 88 escalation rates (economic)	-	-9.8
o Deleted 2 AN/BQG-5 Team Trainers (quantity)	-13.9	-16.7
o Reduced LBES configuration and upgrades; reduced TUE for FY93 and FY94 AN/BSY-2 Team Trainers (estimating)	-36.3	-42.8
o FY91 AN/BSY-2 Team Trainer reprogrammed to RDT&E (support)	-46.0	-53.5

14. (U) 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. (U) Contract Information: (Then Year Dollars in Millions)

a. RDT&E --

AN/BSY-2:	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 (FSD option exercised March 31, 1988)
Definitized: December 11, 1987 (FSD option definitized March 31, 1988)

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$974.0*	$1107.5	2 EDMs	$1009.9	$1009.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0**	$0.0**
Cumulative Variances To Date (09/25/88)	$+1.1	$-7.1
Net Change	$+1.1	$-7.1

Explanation of Change: An internal schedule change for delivery of Software Requirements Specifications after work packages were opened primarily caused the unfavorable schedule variance. Late billings from CSC to GE ESD mainly contributed to the favorable cost variance. The Program Manager's Estimated Price At Completion reflects the Current Contract Target Price plus incentive fee available.

b. Procurement —

AN/BSY-2:	Initial Contract Price Target	Ceiling	Qty
General Electric Co., Syracuse, NY	$45.1	$45.1	N/A

N00024-88-C-6150, FPIF
Award: December 11, 1987 (Long Lead option exercised March 31, 1988)
Definitized: December 23, 1988

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$216.6*	$220.5	1 AN/BSY-2 2 AN/BQG-5	$216.6	$216.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (09/25/88)	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: N/A

c. MILCON — N/A

* 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 respective Current Contract Target Price.
**Data based on first CPR submission in which "actuals only" were reported.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status —

(1) Percent Program Completed:* 45.0% (9 yrs/20 yrs)
(2) Percent Program Cost Appropriated: 25.0% (715.0/2864.8)

16. (U) Program Funding Summary: (Cont'd)

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	715.0	336.5	387.0	456.2	1894.7
Procurement	-	150.4	141.9	677.8	970.1
MILCON	-	-	-	-	-
Total	715.0	486.9	528.9	1134.0	2864.8

* 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		39.8		39.8	38.2	38.2	36.8	2.8
1987		95.2		95.2	94.1	94.0	86.0	2.7
1988		182.5		182.5	186.8	181.7	85.1	3.1
1989		267.4		267.4	284.0	70.0	0.1	4.0
1990		306.5		306.5	336.5	-	-	3.6
1991		342.2		342.2	387.0	-	-	3.3
1992		183.0		183.0	212.1	-	-	2.8
1993		103.6		103.6	122.6	-	-	2.3
1994		80.6		80.6	97.1	-	-	1.8
1995		19.9		19.9	24.4	-	-	1.8
Subtotal		1748.8		1748.8	1894.7	495.8	319.7	-

Fiscal Year	Qty	Sailaway FY88 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: OPN*								
1990			132.5	132.5	150.4	-	-	3.6
1991			122.1	122.1	141.9	-	-	3.3
1992			43.1	43.1	51.2	-	-	2.8
1993			180.9	180.8	218.7	-	-	2.3
1994			73.2	73.2	90.1	-	-	1.8
1995			32.7	32.7	41.0	-	-	1.8
1996			95.4	95.4	121.6	-	-	1.8
1997			17.7	17.7	23.0	-	-	1.8
1998			97.3	97.3	128.3	-	-	1.8
1999			1.3	1.3	1.8	-	-	1.8
2000			1.3	1.3	1.8	-	-	1.8
Subtotal			797.7	797.7	970.1	-	-	-
Total		1745.3	797.7	2543.0	2861.0	-	-	-

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*								
1988	0	0.0	0.0	0.0	0.0	-	-	3.1
1989	1	25.1	174.0	199.1	204.7	146.0	1.4	4.0
1990	0	0.0	0.0	0.0	0.0	-	-	3.6
1991	2	31.8	307.6	339.4	369.6	-	-	3.3
1992	3	33.9	311.8	345.7	531.5	-	-	2.8
1993	3	37.2	476.0	513.2	536.9	-	-	2.3
1994	3	33.2	462.7	496.0	545.0	-	-	1.8
1995	4	44.2	631.1	675.3	707.3	-	-	1.8
1996	4	39.9	592.4	632.4	723.4	-	-	1.8
1997	3	34.2	495.8	530.0	567.8	-	-	1.8
1998	3	34.1	467.8	501.8	576.2	-	-	1.8
1999	4	45.2	687.5	732.7	782.8	-	-	1.8
Subtotal	30	370.7	4606.7	4965.6	5545.2	146.0	1.4	
Appropriation: SCN for SSN 688*								
1988	0	0.0	0.0	0.0	0.0	-	-	3.7
1989	2	14.1	70.3	84.4	84.7	69.5	6.4	3.8
1990	2	9.2	70.7	79.8	80.4	-	-	3.6
Subtotal	4	19.4	141.0	164.2	165.1	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	130.1	146.2
Then-Year FY92 $	163.5	163.5	183.7

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. Other direct 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	2.0	Cost Not Available
O&S Consumables	0.0	
Direct Depot Maint	2.6	
Sustaining Invest	2.4	
Other Direct Costs	.5	
Indirect Costs	0.0	
Total	7.5	

NOTE: Program cost estimating is in FY86 dollars.

c. Contractor Support Costs — N/A

A-15 FMTV

SAR-88-091

UNCLASSIFIED

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A) 823)
PROGRAM: FAMILY OF MEDIUM TACTICAL VEHICLES (FMTV)

AS OF DATE: December 31, 1988

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1. Designation and Nomenclature (Popular Name): Family of Medium Tactical Vehicles (FMTV)

2. DOD Component: Department of the Army

3. Responsible Office and Telephone Number:

PM, Medium Tactical Vehicles
AMCPM-TVM
U.S. Army Tank-Automotive Command
Warren, MI 48397-5000

PM: COL Lawrence W. Day
Assigned: 21 Jan 89
AV: 786-8665
Comm: (313) 574-8665

4. Program Elements/Procurement Line Items:
RDT&E: PE 64604 Project DH07

PROCUREMENT: APPN 2035 SSN: D15500
DA035A

MILCON: N/A

5. Related Programs: None.

[redacted]

[redacted]

[redacted]

(UNCLASSIFIED)

OASD(PA) DFOISR 89-T-0499

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 ten (10) different configurations (cargo, ambulance, 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 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 5T truck to initially fill 5T 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 is currently conducting a 2-1/2 T Truck Feasibility Study to validate the requirement for a 2-1/2 T truck variant. This is the initial SAR.

b. Significant Developments Since Last Report-- None.

The FMTV system is expected to satisfy the mission requirement.

c. Changes Since "As Of" Date-- None.

8. Threshold Breaches: There are currently no DAE baseline breaches. (Mar 1989).

9. Schedule:

a. Milestones--	Development Estimate	Approved Program	Current Estimate
Milestone I (ASARC I/II)	Aug 87	Aug 87	Aug 87
JSOR Approval	Nov 87	Nov 87	Nov 87
Milestone II (DAB Review)	May 88	May 88	May 88
Prototype Contract Award	Oct 88	Oct 88	Oct 88
First Prototype Delivery	Dec 89	Dec 89	Dec 89
FSD DT Testing			
Start	Dec 89	Dec 89	Dec 89
Complete	Oct 90	Oct 90	Oct 90
IOT&E Testing			
Start	May 90	May 90	May 90
Complete	Oct 90	Oct 90	Oct 90
ASARC III	Jan 91	Jan 91	Jan 91
Milestone III (DAB Review)	Jan 91	Jan 91	Jan 91
Production Contract Award	Jan 91	Jan 91	Jan 91
First Production Delivery	Mar 92	Mar 92	Mar 92
Initial Production Test			
Start	Mar 92	Mar 92	Mar 92
Complete	Oct 92	Oct 92	Oct 92
First Unit Equipped (FUE)/ Initial Operational Capability (IOC)	Dec 92	Dec 92	Dec 92
FUE/IOC (LMTV)	Dec 93	Dec 93	Dec 93

b. Previous Change Explanations-- None.

c. Current Change Explanations-- None.

d. References--

Development Estimate: DAE Program Baseline, Mar 1989; SDDM decision, 7 Oct 1988.

Approved Program: DAE Program Baseline, Mar 1989; SDDM decision 7 Oct 1988.

FMTV, December 31, 1988

10. Technical/Operational Characteristics:

a. Technical--	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
Hwy Sp on 2% Grade at GVW	55 MPH	55 MPH[1/]	TBD	55 MPH
Hwy Sp on 3% Grade at GVW	45 MPH	45 MPH		45 MPH
Hwy Sp on 2% Grade at GCW	40 MPH	40 MPH		40 MPH
Hwy Sp on 3% Grade at GCW	30 MPH	30 MPH		30 MPH
b. Operational--				
LMTV Payload	2-1/2 Ton	2-1/2 Ton[1/]	TBD	2-1/2 Ton
MTV Payload	5 Ton	5 Ton		5 Ton
LMTV Towed Load	7,500 Lbs	7,500		7,500 Lbs
MTV Towed Load	20,000 Lbs	20,000		20,000 Lbs
Longitudinal Grade Op	60%	60%		60%
Side Slope Op	30%	30%		30%
Fording Without Kit	30 Inches	30 Inches		30 Inches
Fording With Kit	60 Inches	60 Inches		60 Inches
Operating Range on Integral Fuel at GCW	300 Miles	300 Miles		300 Miles

RELIABILITY
MMBHMF/MMBOMF

TRUCK, CARGO (LMTV)	2140/1605	2140/1605[1/]	TBD	2140/1605
TRUCK, CARGO (MTV)	1600/1200	1600/1200		1600/1200
TRACTOR	3300/2500	3300/2500		3300/2500
WRECKER	2300/1900	2300/1900		2300/1900
TRAILER (LMTV)	2800/2100	2800/2100		2800/2100
TRAILER (MTV)	2600/1900	2600/1900		2600/1900

ACRONYMS
GVW = Gross Vehicle Weight
GCW = Gross Combined Weight
MMBHMF = Mean Miles Between Hardware Mission Failure
MMBOMF = Mean Miles Between Operational Mission Failure

[1/] Goal/Threshold values are the same.

10. Technical/Operational Characteristics (Cont'd):

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
MAINTENANCE RATIO MAINTENANCE MANHOURS/OPERATING MILE				
TRUCK, CARGO (LMTV)	.011/.011	.011/.011[1/]	TBD	.011/.011
TRUCK, CARGO (MTV)	.012/.012	.012/.012		.012/.012
TRACTOR	.0135/.0135	.0135/.0135		.0135/.0135
WRECKER	.017/.017	.017/.017		.017/.017
TRAILER (LMTV)	.004/.002	.004/.002		.004/.002
TRAILER (MTV)	.004/.002	.004.002		.004/.002
TRANSPORTABILITY				
SURFACE TRANPORTATION HIGHWAY, SHIP & RAIL (HSR)	HSR	HSR[/1]	HSR	HSR
AIR TRANSPORTATION	C-141	C-141	C-141	C-141
MOBILITY				
VEHICLE CONE INDEX				
TRUCK, CARGO	25	25	TBD	25
TRUCK & TRAILER COMBINATION	35	35	TBD	25

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: DAE Program Baseline, Mar 1989; SDDM decision 7 Oct 1988.

1/ Goal/Threshold values are the same.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost--	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	$ 57.9	$ 57.9	$ 57.9
Procurement	6567.4	6567.4	6567.4
Recurring Production	(6048.7)	(6048.7)	(6048.7)
Nonrecurring Production	(40.3)	(40.3)	(40.3)
Total Rollaway	(6089.0)	(6089.0)	(6089.0)
Other Weapon Sys Costs	(239.3)	(239.3)	(239.3)
Initial Spares	(239.1)	(239.1)	(239.1)
Construction (MILCON)	0.0	0.0	0.0
Total FY89 Base-Year $	$ 6625.3	$ 6625.3	$ 6625.3
Escalation	$ 1943.3	$ 1943.3	$ 1943.3
Development (RDT&E)	(2.0)	(2.0)	(2.0)
Procurement	(1941.3)	(1943.3)	(1941.3)
Construction (MILCON)	0.0	0.0	0.0
Total Then-Year $	$ 8568.6	$ 8568.6	$ 8568.6
b. Quantities--			
Development (RDT&E)	60	60	60
Procurement	118935	118935	118935

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:
FY 1990-1991 President's Budget.

12. Program Acquisition/Current Procurement Unit Cost Summary: (Current [Then-Year] Dollars in Millions).

a. Program Acquisition*

	Current Estimate (Dec 88 SAR)	Current Year UCR Baseline (Dec 88 SAR)	Budget Year UCR Baseline (Dec 88 SAR)
(1) Cost	8568.6	8568.6	8568.6
(2) Quantity	118995	118995	118995
(3) Unit Cost	.072	.072	.072

b. Current Procurement-- None.

*Costs represent a composite unit cost for 12 different truck variants (ranging in unit hardware cost [FY89 Base Year $] from $49.7K to $180.8K) and 2 trailer variants (ranging in unit cost from $14.3K to $16.9K).

FMTV, December 31, 1988

13. Cost Variance Analysis:

A. Summary -- [Current (Then-Year) Dollars in Millions]

Development Estimate	RDT&E	PROC	MILCON	TOTAL
	$59.9	$8508.7	$0	$8568.6
Previous Changes: Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Current Changes: Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Total Changes				
Current Estimate	$59.9	$8508.7	$0	$8568.6

FY 19 Constant Dollars (Base-Year) in Millions]

Development Estimate	RDT&E	PROC	MILCON	TOTAL
	$57.9	$6567.4	$0	$6625.3
Previous Changes: Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Current Changes: Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Total Changes				
Current Estimate	$57.9	$6567.4	$0	$6625.3

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

Initial SAR Estimate to Current Baseline Estimate--

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	TOTAL	
.072									.072

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E--

Stewart & Stevenson
DAAE07-89-C-R004 FFP
Award (Prototype): 21 Oct 88

Initial Contract Price		
Target	Ceiling	Qty
17.2	N/A	20

Current Contract Price		
Target	Ceiling	Qty
17.2	N/A	20

Estimated Price at Completion	
Contractor	Program Manager
17.2	17.2

Tactical Truck Corporation
DAAE07-89-C-R002 FFP
Award (Prototype): 21 Oct 88

Initial Contract Price		
Target	Ceiling	Qty
14.5	N/A	20

Current Contract Price		
Target	Ceiling	Qty
14.5	N/A	20

Estimated Price at Completion	
Contractor	Program Manager
14.5	14.5

Teledyne Continental Motors
DAAE07-89-C-R001 FFP
Award (Prototype): 21 Oct 88

Initial Contract Price		
Target	Ceiling	Qty
13.5	N/A	20

Current Contract Price		
Target	Ceiling	Qty
13.5	N/A	20

Estimated Price at Completion	
Contractor	Program Manager
13.5	13.5

For Firm Fixed Price (FFP) contracts, cost variance and schedule variance information is not required.

b. Procurement-- None.

c. MILCON-- None.

FMTV, December 31,1988

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status--

(1) Percent Program Completed: 11% (2 yrs/18 yrs).
(Years Funds Appropriated/Total Program Years)

(2) Percentage Program Cost Appropriated: .4% ($34.6/8568.6)
(Funds Appropriated to Date in Millions/Total Program Funding in Millions)

b. Appropriation Summary--

Appropriation	Prior Yrs (FY88-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-05)	Total
RDT&E	34.6	18.4	6.9	-	59.9
Procurement	-	-	81.1	8427.6	8508.7
MILCON	-	-	-	-	-
TOTAL	34.6	18.4	88.0	8427.6	8568.6

c. Annual Summary--

Fiscal Year	Qty	Rollaway FY89 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E (Million $)								
FY88				9.9	9.8	9.2		3.1
FY89				24.3	24.8	24.0		4.0
FY90				17.4	18.4	0		3.6
FY91				6.3	6.9	0		3.3
SUB-TOTAL	60			57.9	59.9	33.2		

FMTV, December 31, 1988

Fiscal Year	Qty	Rollaway FY89 Dollars		Total Base Year$	Total Then-Year $			Escl Rate
		Nonrec	Rec		Program	Obli-gated	Ex-pended	%
Appropriation: Procurement (Million $)								
FY91	1235	7.8	54.1	72.2	81.1			3.3
FY92	4850	2.8	210.0	232.0	265.8			2.8
FY93	8443	1.3	378.3	404.3	471.7			2.3
FY94	9772	1.3	498.0	531.2	630.9			1.8
FY95	7679	1.3	429.2	465.0	562.2			1.8
FY96	4735	7.9	231.3	262.8	323.5			1.8
FY97	9834	1.4	530.5	572.8	717.7			1.8
FY98	9838	1.2	566.9	614.5	783.8			1.8
FY99	9867	1.2	568.6	617.1	801.2			1.8
FY00	9843	1.2	485.0	522.3	690.4			1.8
FY01	4734	7.9	221.4	251.7	338.7			1.8
FY02	9827	1.4	491.1	529.3	725.0			1.8
FY03	9833	1.2	491.2	529.4	738.2			1.8
FY04	9537	1.2	469.0	505.3	717.3			1.8
FY05	8908	1.2	424.1	457.5	661.2			1.8
SUB	118935	40.3	6048.7	6567.4	8508.7			
TOTAL	118995	40.3	6048.7	6625.3	8568.6	33.2		

17. Production Rate Data:

a. Annualized Production Rates-- (NOTE: The annualized production rates differ from the annual funded buy quantities because the funded delivery period is 7 months for FY91, 96 & 01 and 17 months for FY95, 00 & 05).

Production Rates (Quantity/Year)

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
FY91	2117	N/A	2117	N/A
FY92	4850		4850	
FY93	8443		8443	
FY94	9772		9772	
FY95	5420		5420	
FY96	8117		8117	
FY97	9834		9834	
FY98	9838		9838	
FY99	9867		9867	
FY00	6948		6948	
FY01	8115		8115	
FY02	9827		9827	
FY03	9833		9833	
FY04	9537		9537	
FY05	6288		6288	

b. Cost Variance-- N/A

c. Schedule Variance-- N/A

d. Deliveries (Plan/Actual)--

RDT&E	0/0
Procurement	0/0

18. Operating and Support Costs:

a. Assumptions and Ground Rules--

(1) Average miles/vehicle/year

LMTV Trucks - 8,206 miles
MTV Trucks - 6,052 miles
LMTV Trailers - 10,400 miles
MTV Trailers - 6,000 miles

(2) Theatre Distribution - 50% of vehicles in CONUS and 50% in Europe.

(3) Average Years of Operation (Useful Life) - 20 years.

(4) Dedicated Crew/Vehicle/Year

LMTV Trucks - .1 manyears/vehicle/year
MTV Trucks - .25 manyears/vehicle/year
Trailers - 0 manyears/vehicle/year

b. Costs--

(FY89 Constant [Base-Year] Dollars in Thousands)

Cost Element	Avg Annual Cost Per LMTV	Avg Annual Cost Per MTV	Avg Annual Cost Per LMTVTR	Avg Annual Cost Per MTVTR
Personnel	7.292	13.259	1.546	2.672
O&S Consumables	5.196	5.796	.520	.360
Direct Depot Maint	.520	.765	.000	.000
Sustaining Investment	.057	.074	.014	.017
Other Direct Costs	.067	.046	.000	.000
Indirect costs	.576	1.087	.108	.163
Total	13.708	21.027	2.188	3.212

c. Contractor Support Costs-- NA.

A-14 FHTV

UNCLASSIFIED

SAR-88-092

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A) 823)
PROGRAM: PALLETIZED LOAD SYSTEM (PLS)

AS OF DATE: December 31, 1988

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1. Designation and Nomenclature (Popular Name): Family of Heavy Tactical Vehicles(FHTV)/ Palletized Load System (PLS).

2. DOD Component: Department of the Army

3. Responsible Office and Telephone Number:

PM, Heavy Tactical Vehicles
AMCPM-TVH
U.S. Army Tank-Automotive Command
Warren, MI 48397-5000

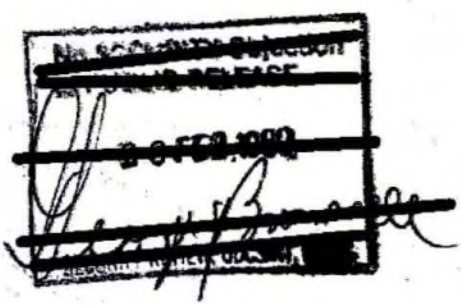
PM: COL Walter B. Heggie, Jr.
Assigned: 4 Mar 86
AV: 786-5800
Comm: (313) 574-5800

4. Program Elements/Procurement Line Items:
RDT&E: PE 64622 Project D659

PROCUREMENT: APPN 2035 SSN: D16500
DA035A

MILCON: N/A

5. Related Programs: None.



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(UNCLASSIFIED)
OASD(PA) DFOISR 89-T- 0488

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 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 major 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 received 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. This is the initial SAR.

b. Significant Developments Since Last Report-- None.

The PLS system is expected to satisfy the mission requirement.

c. Changes Since "As Of" Date-- 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.

8. Threshold Breaches: There are currently no _ DAE baseline breaches, (May 1989).

PLS, December 31, 1988

9. Schedule:

a. Milestones--	Development Estimate	Approved Program	Current Estimate
Milestone I (ASARC I/II)	May 87	May 87	May 87
ROC Approval	Nov 87	Nov 87	Nov 87
Milestone II (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	Jan 90
IOT&E Testing			
Start	Dec 89	Dec 89	Dec 89
Complete	Feb 90	Feb 90	Feb 90
ASARC III	Apr 90	Apr 90	Apr 90
Milestone III (DAB Review)	Apr 90	Apr 90	Apr 90
Production Contract Award	Apr 90	Apr 90	Apr 90
First Production Delivery	Jan 91	Jan 91	Jan 91
Initial Production Test			
Start	Jan 91	Jan 91	Jan 91
Complete	Aug 91	Aug 91	Aug 91
First Unit Equipped/ Initial Operational Capability	Jan 92	Jan 92	Jan 92

b. Previous Change Explanations-- None.

c. Current Change Explanations-- None.

d. References--

Development Estimate: DAE Program Baseline, Mar 1989; SDDM decision 7 Oct 1988.

Approved Program: DAE Program Baseline, Mar 1989.

PLS, December 31, 1988

10. Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
a. Technical--				
Hwy Sp on 2% Grade at GVW	50 MPH	50 MPH[1/]	TBD	50 MPH
Hwy Sp on 2% Grade at GCW	35 MPH	35 MPH		35 MPH
Longitudinal Grade Op	30%	30%		30%
Side Slope Op	30%	30%		30%
b. Operational--				
PLS Truck Payload	16.5T	16.5T[1/]	TBD	16.5 Tons
PLS Trailer Payload	16.5T	16.5T		16.5 Tons
Fording Capability	30 IN	30 IN		30 IN
Operating Range on Integral Fuel at GCW	225 MI	225 MI		225 MI
Reliability				
MMBHMF/MMBOMF				
Truck	1600/1200	1600/1200[1/]	TBD	1600/1200
Trailer	2280/1900	2280/1900		2280/1900
MHBHMF Material Handling Crane	225/150	225/150		225/150
Maintenance Ratio				
Truck	.016/.018	.016/.018	TBD	.016/.018
Trailer	.004/.005	.004/.005		.004/.005
MHC (MMH/OH)	.083/.100	.083/.100		.083/.100
Transportability				
Surface Transportation Highway, Ship & Rail (HSR)	HSR	HSR	TBD	HSR
Air Transportation	C-141	C-141		C-141
Mobility				
Vehicle Cone Index				
Truck w/MHC	39	39	TBD	39
Truck wo/MHC	37	37		37
Truck & Trailer Combination	43	43		43

ACRONYMS
GVW = Gross Vehicle Weight
GCW = Gross Combined Weight
MMBHMF = Mean Miles Between Hardware Mission Failure
MMBOMF = Mean Miles Between Operational Mission Failure
MMBHMF = Mean Hours Between Hardware Mission Failure
MMH/OH = Maintenance Manhour/Operating Hour

[1/] Goal/Threshold values are the same.

PLS, December 31, 1988

10. Technical/Operational Characteristics (Cont'd):

c. Previous Change Explanations-- None.
d. Current Change Explanations-- None.

e. References--

Development Estimates: DAE Program Baseline, Mar 1989; SDDM decision 7 Oct 1988.

Approved Program: DAE Program Baseline, Mar 1989; SDDM decision 7 Oct 1988.

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	$ 38.2
Procurement	1666.1	1666.1	1666.1
Recurring Production	(1517.3)	(1517.3)	(1517.3)
Nonrecurring Production	(9.7)	(9.7)	(9.7)
Total Rollaway	(1527.0)	(1527.0)	(1527.0)
Other Weapon Sys Costs	(77.3)	(77.3)	(77.3)
Initial Spares	(61.8)	(61.8)	(61.8)
Construction (MILCON)	0.0	0.0	0.0
Total FY89 Base-Year $	$ 1704.3	$ 1704.3	$ 1704.3
Escalation	$ 292.6	$ 292.6	$ 292.6
Development (RDT&E)	(0.8)	(0.8)	(0.8)
Procurement	(291.8)	(291.8)	(291.8)
Construction (MILCON)	0.0	0.0	0.0
Total Then-Year $	$ 1996.9	$ 1996.9	$ 1996.9
b. Quantities--			
Development (RDT&E)			
Trucks	27	27	27
Trailers	18	18	18
Flatracks	90	90	90
Procurement			
Trucks	4333	4333	4333
Trailers	1915	1915	1915
Flatracks	103000	103000	103000

c. Foreign Military Sales-- None.
d. Nuclear Costs-- None.

PLS, December 31, 1988

11. Program Acquisition Cost (Cont'd):

e. References--

Development Estimate: DAE Program Baseline, Mar 1989; SDDM decision, 7 Oct 1988.

Approved Program:
FY 1990-91 President's Budget.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current [Then-Year] Dollars in Millions)

	Current Estimate	Current Year UCR Baseline	Budget Year UCR Baseline
	(Dec 88 SAR)	(Dec 88 SAR)	(Dec 88 SAR)
a. Program Acquisition - Trucks			
(1) Cost	$1321.7	$1321.7	$1321.7
(2) Quantity	4360	4360	4360
(3) Unit Cost	0.303	0.303	0.303
Program Acquisition - Trailers			
(1) Cost	40.6	40.6	40.6
(2) Quantity	1933	1933	1933
(3) Unit Cost	.021	.021	.021
Program Acquisition - Flatracks			
(1) Cost	634.6	634.6	634.6
(2) Quantity	103090	103090	103090
(3) Unit Cost	.006	.006	.006
b. Current Procurement--	(FY89)	(FY89 APPN)	(FY90) Trk/Trl/FR
(1) Cost	N/A	N/A	41.5/1.7/3.2
Less CY Adv Proc	N/A	N/A	0
Plus FY Adv Proc	N/A	N/A	0
Net Total	N/A	N/A	41.5/1.7/3.2
(2) Quantity	N/A	N/A	105/83/565
(3) Unit Cost	N/A	N/A	.395/.020/.006

PLS, December 31, 1988

13. Cost Variance Analysis:

A. Summary -- [Current (Then-Year) Dollars in Millions]

Development Estimate	RDT&E	PROC	MILCON	TOTAL
	$39.0	$1957.9	$0	$1996.9
Previous Changes: Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Current Changes: Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Total Changes				
Current Estimate	$39.0	$1957.9	$0	$1996.9

FY 1989 Constant Dollars (Base-Year) in Millions]

Development Estimate	RDT&E	PROC	MILCON	TOTAL
	$38.2	$1666.1	$0	$1704.3
Previous Changes: Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Current Changes: Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Total Changes				
Current Estimate	$38.2	$1666.1	$0	$1704.3

PLS, December 31, 1988

13. Cost Variance Analysis (Cont'd):

b. Previous Change Explanations-- None.

c. Current Change Explanations--

(Dollars in Millions)

	Base-Year	Then-Year

(1) RDT&E - None.

(2) Procurement - None.

(3) MILCON - None.

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

Initial SAR Estimate to Current Baseline Estimate--

PLS TRUCK

PAUC (DEV ESTIMATE)	Changes								PAUC CURRENT EST
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
0.303	-	-	-	-	-	-	-	-	0.303

PLS TRAILER

PAUC (DEV ESTIMATE)	Changes								PAUC CURRENT EST
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
0.021	-	-	-	-	-	-	-	-	0.021

PLS FLATRACK

PAUC (DEV ESTIMATE)	Changes								PAUC CURRENT EST
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
0.006	-	-	-	-	-	-	-	-	0.006

PLS, December 31, 1988

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E-- None.

b. Procurement--None.

c. MILCON-- None.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status--

(1) Percent Program Completed: 22% (2 yrs/9 yrs).
(Years Funds Appropriated/Total Program Years)

(2) Percentage Program Cost Appropriated: 1.7% ($33.6/$1996.9)
(Funds Appropriated to Date in Millions/Total Program Funding in Millions)

b. Appropriation Summary--

Appropriation	Prior Yrs (FY88-89)	Budget Year (FY90)	Budget Year (FY91)	Balance To Complete (FY92-96)	Total
RDT&E	33.6	5.4	0.0	0.0	39.0
Procurement	0.0	46.4	253.0	1658.5	1957.9
MILCON	0.0	0.0	0.0	0.0	0.0
TOTAL	33.6	51.8	253.0	1658.5	1996.9

PLS, December 31, 1988

c. Annual Summary--

FISCAL YEAR	QTY Trk/Trl/FR	Rollaway FY89 Dollars Nonrec	Rollaway FY89 Dollars Rec	Total Base Year$	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: RDT&E								
1988				5.0	4.9			3.1
1989	27/18/90			28.1	28.7			4.0
1990				5.1	5.4			3.6
Subtotal	27/18/90			38.2	39.0			

FISCAL YEAR	QTY Trk/Trl/FR	Rollaway FY89 Dollars Nonrec	Rollaway FY89 Dollars Rec	Total Base Year$	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: Procurement								
1990	105/83/565	4.2	27.5	42.3	46.4			3.6
1991	784/342/3379	1.1	196.4	225.4	253.0			3.3
1992	967/386/4076	1.1	241.3	273.7	313.5			2.8
1993	948/378/3992	1.1	236.4	263.9	307.9			2.3
1994	922/368/22148	1.1	323.4	350.5	416.3			1.8
1995	607/358/34420	1.1	316.3	334.3	404.2			1.8
1996	0/0/34420	0.0	176.0	176.0	216.6			1.8
SUB	4333/1915/103000	9.7	1517.3	1666.1	1957.9			
TOTAL	4360/1933/103090	9.7	1517.3	1704.3	1996.9			

PLS, December 31, 1988

FISCAL YEAR	QTY TRUCK	Rollaway FY89 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: Procurement								
1990	105	4.1	23.2	37.8	41.5			3.6
1991	784	1.1	173.4	202.1	226.8			3.3
1992	967	1.1	213.9	245.9	281.7			2.8
1993	948	1.1	209.7	236.8	276.3			2.3
1994	922	1.1	203.9	230.6	274.0			1.8
1995	607	1.1	134.3	151.9	183.7			1.8
1996	0	0.0	0.0	0.0	0.0			1.8
TOTAL	4333	9.6	958.4	1105.1	1284.0			

FISCAL YEAR	QTY TRAILERS	Rollaway FY89 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: Procurement								
1990	83	0.1	1.4	1.6	1.7			3.6
1991	342	0.0	5.7	6.0	6.8			3.3
1992	386	0.0	6.5	6.9	7.9			2.8
1993	378	0.0	6.3	6.7	7.8			2.3
1994	368	0.0	6.2	6.6	7.8			1.8
1995	358	0.0	6.0	6.4	7.7			1.8
1996	0	0.0	0.0	0.0	0.0			1.8
TOTAL	1915	0.1	32.2	34.2	39.7			

PLS, December 31, 1988

FISCAL YEAR	QTY FLATRACK	Rollaway FY89 Dollars		Total Base Year$	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obli-gated	Ex-pended	
Appropriation: Procurement								
1990	565	0.0	2.9	2.9	3.2			3.6
1991	3379	0.0	17.3	17.3	19.4			3.3
1992	4076	0.0	20.9	20.9	23.9			2.8
1993	3992	0.0	20.4	20.4	23.8			2.3
1994	22148	0.0	113.3	113.3	134.5			1.8
1995	34420	0.0	176.0	176.0	212.8			1.8
1996	34420	0.0	176.0	176.0	216.6			1.8
TOTAL	103000	0.0	526.8	526.8	634.2			

17. Production Rate Data:

a. Annualized Production Rates-- (NOTE: The annualized production rates differ from the annual funded buy quantities because the funded delivery period is 9 months for FY90 and 15 months for FY95).

Production Rates (Quantity/Year)

Fiscal Year	Development Estimate		Production Estimate	Current Estimate	Maximum Economic
FY90	Trucks	140	N/A	140	N/A
	Trlrs	111		111	
	FR	753		753	
FY91	Trucks	784		784	
	Trlrs	342		342	
	FR	3379		3379	

PLS, December 31, 1988

Production Rates (Quantity/Year)

Fiscal Year	Development Estimate		Production Estimate	Current Estimate	Maximum Economic
FY92	Trucks	967		967	
	Trlrs	386		386	
	FR	4076		4076	
FY93	Trucks	948		948	
	Trlrs	378		378	
	FR	3992		3992	
FY94	Trucks	922		922	
	Trlrs	368		368	
	FR	22148		22148	
FY95	Trucks	487		487	
	Trlrs	286		286	
	FR	34420		34420	
FY96	FR	34420		34420	

b. Cost Variance -- Dollars in Millions-- None.

c. Schedule Variance-- None.

d. Deliveries (Plan/Actual)--

	To Date
RDT&E	0/0
Procurement	0/0

PLS, December 31, 1988

18. Operating and Support Costs:

a. Assumptions and Ground Rules--

(1) Average miles/vehicle year

PLS with crane with winch	3,000 miles
PLS with crane without winch	3,000 miles
PLS without crane without winch	4,900 miles
Trailer	4,900 miles

(2) Theatre Distribution - 50% of vehicles in CONUS and 50% in Europe.

(3) Average Years of Operation (Useful Life) - 20 years.

(4) Dedicated Crew/Vehicle/Year

PLS Trucks - 1 manyear/vehicle/year

b. Costs--

(FY89 Constant [Base-Year] Dollars in Millions)

Cost Element	Avg Annual Cost Per Truck	Avg Annual Cost Per Trailer	Avg Annual Cost Per Flatrack
Personnel	42.459	4.576	N/A
O&S Consumables	6.799	.573	
Direct Depot Maint	.335	0	
Sustaining Investment	.194	.016	
Other Direct Costs	.313	0	
Indirect costs	2.923	.367	
Total	53.023	5.532	

c. Contractor Support Costs-- NA.

(2).

SAR-88-035

N-31 · NATO AAWS

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 1988

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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 0603790D
PE 0603319N (Shared Funding)

5. Related Programs: The following activities are closely coordinated to prevent duplication of effort. Program Element 0604567N NFR-90 International Program; Program Element 0603609N, (Conventional Fuze/Warhead Package); Program Element 0604354N, (AIM/RIM-7M Product Improvement Program); Program Element 0604358N, (Close-In Weapon System(PHALANX)); Program Element

CLEARED FOR OPEN PUBLICATION
MAR 03 1989

OASD(PA) DFOISR 88-T-0581

0604361N), (NATO SEASPARROW); Program Element 0604508N, (5 Inch Rolling Airframe Missile(RAM)); Program Element 0604508N,(Radar Surveillance Equipment); Program Element 0604608N,(Infrared Search and Target Designation).

6. Mission and Description: 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. This MOU and supporting requirements document (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 Phase. The character of the D&V phase will be fully defined following the assessment of the results of the Concept Exploration Studies. Accordingly, this SAR does not project beyond the currently in place direction.

NAAWS is a top-down system engineering development encompassing detection through engagement sub-systems, optimized to meet the short range anti-ship cruise missile threat of the year 2000. This approach is built upon an AEGIS foundation and is capturing emerging technologies to synthesize the next generation AAW architecture. Results thus far validate the feasibility of incorporating forward looking concepts within a flexible embedded doctrinal logic providing 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 the NFR-90 class and other frigate sized and larger ships. The Ships Characteristics Improvement Board is reviewing U.S. ship classes for backfit; the DD-963 class is now being reviewed and twelve other classes are potential candidates. This system is also under review as a secondary battery for AEGIS ships.

Program Highlights:

a. Significant Historical Developments -- The collaborative development of the AAW System for the NFR-90 (Local Area Missile and Multi-function Radar) was instituted by NATO Project Group 33 (PG/33). This NATO group, which became dormant, was unable to accommodate the diverse and competing interests in program conceptualization. This NATO 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 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 Concept Exploration phase MOU on 17 October 1987. NAAWS was upgraded to major program status, PMS-419, by COMNAVSEASYSCOM on 1 MAR 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. In early 1989 participating national laboratories will deliver final reports regarding seventy three Government Program of Work Task assignments, including the results of studies, analyses and critical experiments. This comprehensive government effort will provide a solid foundation for evaluation of the international consortia Concept Exploration reports. The NATO AAWS program expects to meet its mission requirements.

b. Significant Developments Since Last Report. None. This is the initial report.

8. Threshold Breaches: None. SCP or DCP are not yet appropriate to this pre-milestone I program. An SCP is in preparation for a Milestone I review which will be timed to coincide with the availability of Concept Exploration results in 4Q/FY89. DAE Baseline has not been established.

9. Schedule: (a) Milestones --	Planning Estimate	Approved Program	Current Estimate
Milestone 0	Oct 87	NA	Oct 87
CE Contract award	June 88	NA	May 88
Milestone I (DAB)	4QFY89	NA	Sep 89
Milestone II (DAB)	Note 1	TBD	TBD
FSD Contract Award	TBD	TBD	TBD
Preliminary Design Review	"	"	"
Critical Design Review	"	"	"
Milestone III(a)	"	"	"
Low Rate Production	"	"	"
First Production Delivery	"	"	"
Milestone III(b)	"	"	"
Full Production	"	"	"
Full Rate Prod Capability	"	"	"
IOC	TBD	TBD	TBD

Note 1. Each phase of this International Program will be governed by a phase specific MOU. MOU negotiations are now ongoing for this Demonstration and Validation phase. The availability of development estimates are contingent upon finalization of the approved program within the Demonstration and Validation MOU. DAE baseline has not been established.

b. Previous Change Explanations - - No previous changes, this is the initial SAR.

c. Current Change Explanations - - No changes.

(d). References - -

Planning Estimate: DAE baseline has not been established.
FY90/91 President's Budget.

Approved Program: N/A

10. Technical/Operational Characteristics:

	Dev Est	Approved Program Goal/Threshold	Demonstrated Perf	Current Estimate
(a). Technical - - Note 1	TBD	TBD	TBD	TBD
(b). Operational Note 1	TBD	TBD	TBD	TBD

(c). Previous Change Explanations - - This is the initial SAR.

(d). Current Change Explanations - - None.

(e). References - -

Planning Estimate: DAE baseline has not been established.
FY90/91 President's Budget.

Approved Program: N/A

Note 1. NAAWS program Planning Estimate (PE), SAR baseline, DAE approved baseline, ADM, SCP or DCP will be prepared upon definition of subsequent phase direction and in response to U.S. acquisition requirements. An SCP for DAB approval will be provided for Milestone I, anticipated in 4Q/FY89.

11. (U) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

		Planning Estimate	Approved Program	Current Estimate
a. (U)	Cost --			
	Development (RDT&E,N)	83.2	83.2	83.2
	Procurement (OPN)	TBD	TBD	TBD
	Construction (MILCON)	TBD	TBD	TBD
	Total FY88 Base-Year	83.2	83.2	83.2
	Escalation	10.9	10.9	10.9
	Development (RDT&E,N)	(10.9)	(10.9)	(10.9)
	Procurement (OPN)	N/A	N/A	N/A
	Construction (MILCON)	N/A	N/A	N/A
	Total Then-Year	94.1	94.1	94.1
b. (U)	Quantities --			
	Development (RDT&E,N)	TBD	TBD	TBD
	Procurement (OPN)	TBD	TBD	TBD
	Total	TBD	TBD	TBD

c. (U) Foreign Military Sales -- TBD

d. (U) Nuclear Costs -- None

e. (U) References --

Planning Estimate: FY 1990/91 Presidents Budget. ~~DAE Baseline has not been established.~~

Approved Program: FY 1990-91 President's Budget.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: N/A (RDT&E,N program only).

13. (U) Cost Variance Analysis:

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
PLANNING ESTIMATE	94.1	0	0	94.1
Previous Changes				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Total Changes	-	-	-	-
Current Estimate	94.1	0	0	94.1

13. (U) Cost Variance Analysis (Cont'd):

(FY 1988 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	83.2	0	0	83.2
Previous Changes				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering (1)	-	-	-	-
Estimating (2)	-	-	-	-
Other	-	-	-	-
Support (3)	-	-	-	-
Subtotal	-	-	-	-
Total Changes	-	-	-	-
Current Estimate	83.2	0	0	83.2

b. (U) Previous Change Explanations --
None. First report.

13. (b) Previous Change Explanations -- None. First SAR.
(c) Current Change Explanations -- None.

14. Program Acquisition Unit Cost (PAUC) History:
None. R&D SAR only.

15. Contract Information: (Then Year Dollars in Millions):

a. RDT&E

Concept Exploration	Initial Contract Price Target	Ceiling	Qty
RCA/GE	$3.0	$3.0	1
Contract N00024-88-C-3095			
UNISAMS	$3.0	$3.0	1
Contract N00024-88-C-5199			

Both Cost Sharing Type Contracts, No fee/profit awarded 26 may 1988

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager	Cost Variance	Schedule Variance
$3.0	$3.0	1	$3.0	$3.0	None	None
$3.0	$3.0	1	$3.0	$3.0	None	None

b. Procurement-- N/A

c. Milcon-- N/A

16. (U) Program Funding Summary (Cont'd):

Appropriation	Prior Years (FY84-89)	Budget Year (FY90)	Budget Year (FY91)	Budget Year (FY92)	Beyond FYDP (FY93-TBD)	TOTAL
RDT&E,N	16.5	13.6	16.7	47.3	TBD	94.1

c. (U) Annual Summary --

Fiscal Year	Qty	Flyaway FY88 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1987				4.9	4.9			2.7
1988				4.1	5.0			3.1
1989				6.2	6.6			4.0
1990				12.4	13.6			3.6
1991				14.8	16.7			3.3
1992				40.8	47.3			2.8
1993				TBD	TBD			2.3
1994				TBD	TBD			1.8
Subtotal				83.2	94.1			

Note: MOU II, which is currently being negotiated by the international participants, will specify the total program costs for the Demonstration and Validation phase and each country's share of these costs. Following a review and assessment by DOD of equitable cost sharing during phase I, the U.S. funded 47% of the program cost.

17. (U) Production Rate Data: N/A

18. (U) Operating and Support (O&S) Costs:

a. (U) Assumptions and Ground Rules -- N/A

b. (U) Costs -- N/A

c. (U) Contractor Support Costs -- N/A

SAR-88-077

AF-29 TACIT RAINBOW

[redacted]

(b)(1)

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

(U) PROGRAM: AGM-136A (Tacit Rainbow)

AS OF DATE: December 31, 1988

(U) INDEX

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SAF/PAS
#2

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 W.E. Newman
Assigned: September 1, 1987
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 1507
MILCON: PE 0207316F

5. (U) Related Programs: None

[redacted] CLEARED [redacted] FEB [redacted]

[redacted] CLASSIFIED BY: TACIT RAINBOW SCG, REV 1, 31 OCT 86
[redacted] DECLASSIFY ON: OADR

DASD(PA) DFOISR 88-T-0292

SECRET

6. (U) Mission and Description:

(U) The TR system is a low cost, programmable before launch, loitering, attack missile system capable of searching out and attacking enemy radar targets in mission areas such as Defense Suppression, Counter Air, Interdiction and Close Air Support/Battlefield Air Interdiction. The TR vehicle will be 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 II) 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. During CDT, the contractor has flown three jettison and one captive carry missions off the B-52, and flown five captive carry and three CDT free flights (one of the three was successful) off the A-6. CDT testing will be followed by a combined Development Test and Evaluation/Initial Operational Test and Evaluation test 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.

b. (U) Significant Developments Since Last Report -

(1) (U) After the 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. The test program was restarted in March 1988. The contractor flew two more of the remaining three free flights. One was successful. The contractor completed Phase II Airworthiness testing.

(2) (U) The SPO awarded contracts for a weapons trades study in March 1988 to three contractor teams to study the feasibility and approaches to second sourcing of the air launch version, to do tradeoffs on the design of a ground launch version, to study maximizing commonality between the air and ground launch variants, and 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 while the Phase II down selection will start in early CY1989.

(3) (U) 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 is being rebaselined to take into account slips in the FSD program. The SPO expects to receive a revised PMD incorporating the DAB approved changes in early 1989.

(4) (U) As a result of delays in FSD, the FY89 production buy was restructured. The FY89 Amended President's Budget had a low rate initial production (LRIP) buy of 318 vehicles in FY89; however, delays in the program slipped LRIP until FY91. The DAB approved a preproduction verification buy of 90 test missiles for FY89 to proof the new production facility and provide vehicles for the follow-on-test program. As a result of the FY89 quantity change with procurement dollars appropriated remaining constant, the FY89 current procurement unit cost will show a large increase in this one year and the 25% unit cost threshold will be breached.

(5) (U) The Missile Procurement funding reflects the impact of economic production rates in the buy strategy.

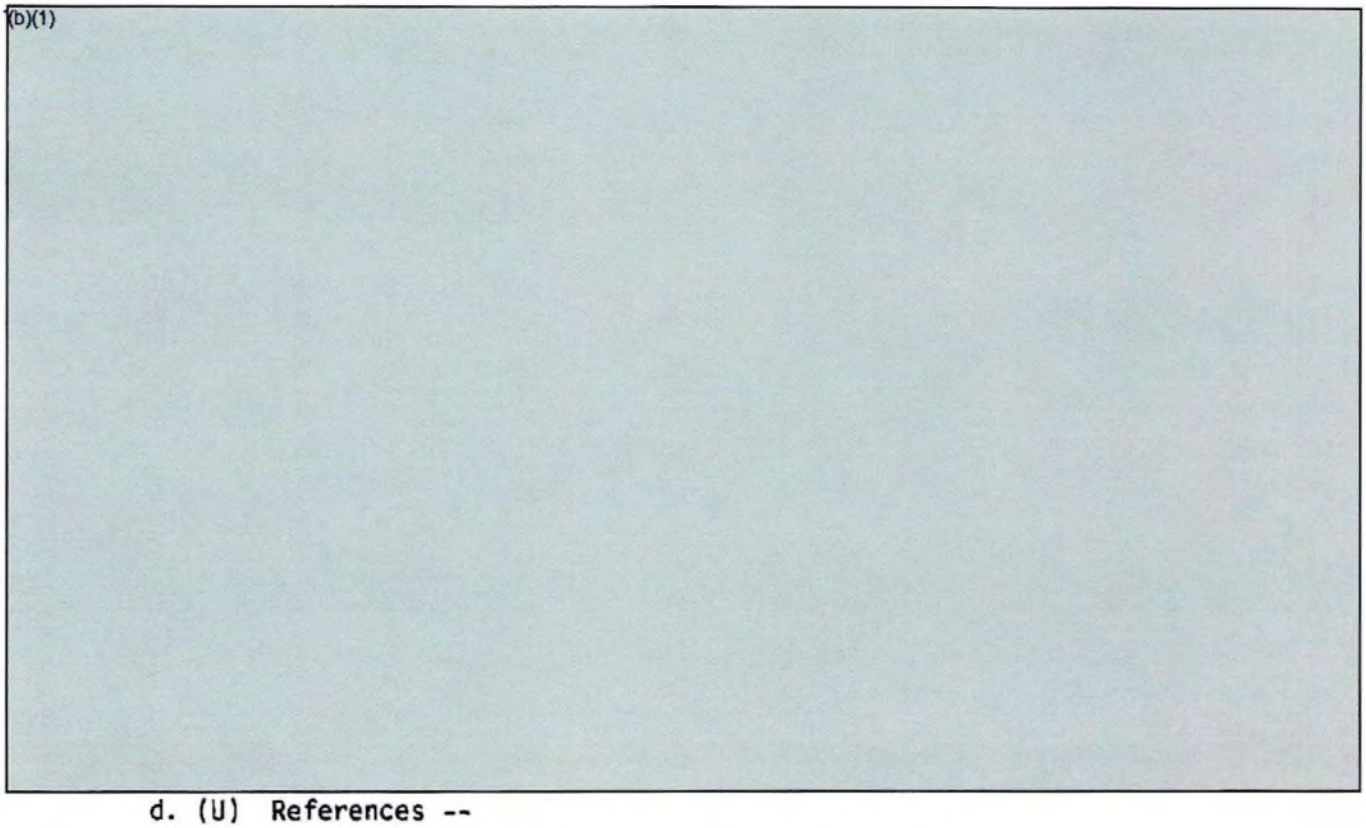
(6) (U) The AGM-136A system is expected to satisfy mission requirements.

c. (U) Changes Since "As Of" Date - CDT #4 flight test occurred on 10 January 1989. The launch sequence and terminal phases were successful. An anomaly occurred during the flight phase which resulted in taking manual control of the vehicle from the ground. The anomaly was a result of an incorrect input into the navigation system and has been corrected.

8. (U) **Threshold Breaches:** The DAE baseline dated February 1988 has been breached for the schedule milestone "DAB II."

(b)(1)

(b)(1)



d. (U) References --

Development Estimate: FY88/89 President's Budget

Approved Program: DAE baseline dated February 1988.

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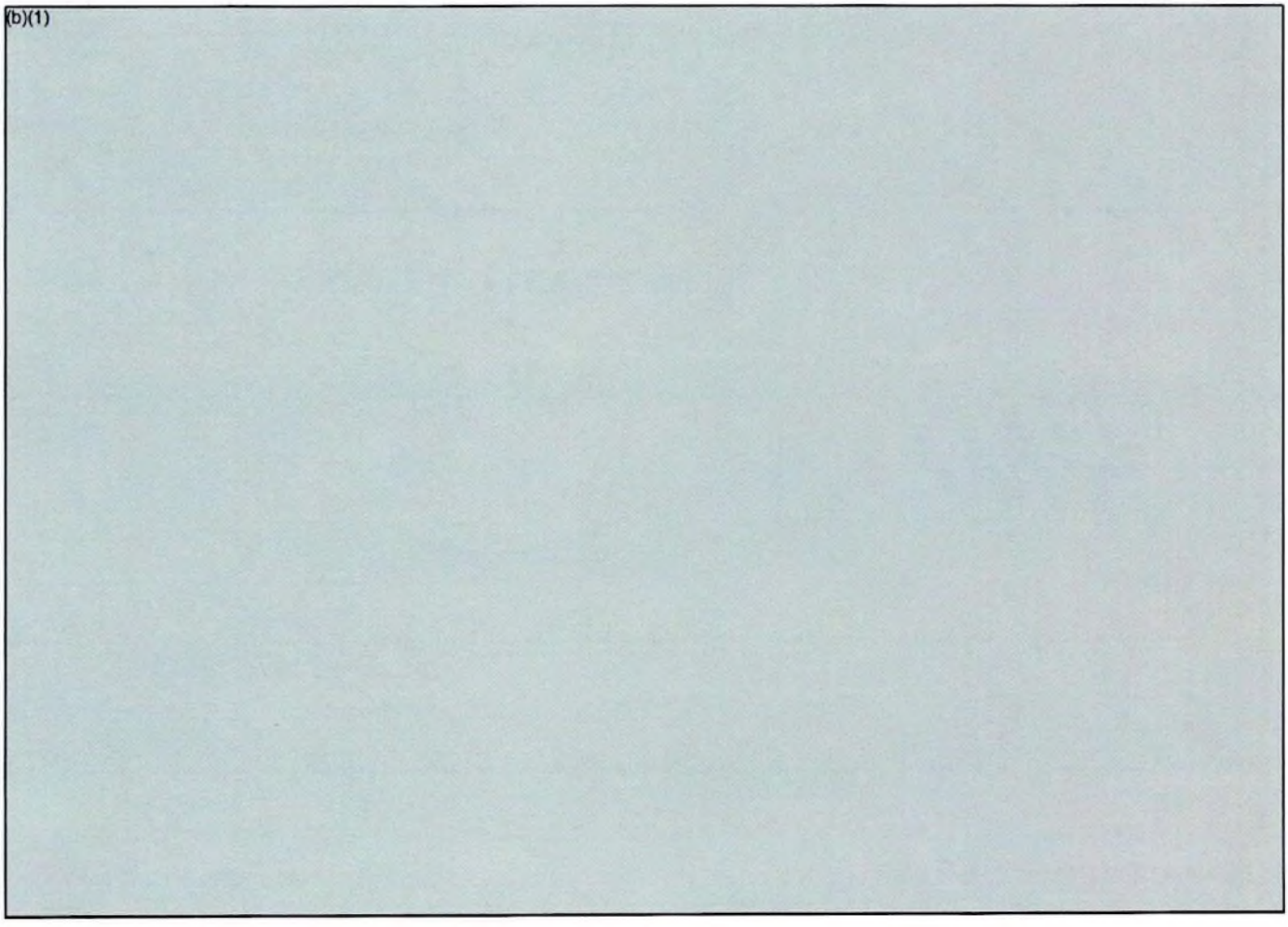

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13. (U) Cost Variance Analysis:

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	-0.4	+27.3	-	+26.9
Quantity	-	-	-	-
Schedule	-	-10.8	-	-10.8
Engineering	-	-	-	-
Estimating	+5.6	+68.1	+1.2	+74.9
Other	-	-	-	-
Support	-	-19.9	-	-19.9
Subtotal	+5.2	+64.7	+1.2	+71.1
Current Changes:				
Economic	+0.2	-32.8	-	-32.6
Quantity	-	+117.0	-	+117.0
Schedule	-	+293.9	+0.1	+294.0
Engineering	-	+231.9	-	+231.9
Estimating	+19.2	+208.3	+21.9	+249.4
Other	-	-	-	-
Support	-	-209.6	-	-209.6
Subtotal	+19.4	+608.7	+22.0	+650.1
Total Changes	+24.6	+673.4	+23.2	+721.2
Current Estimate	169.1	4175.6	30.5	4375.2

*Includes 3010 and 3020 appropriations

13. (U) Cost Variance Analysis (Cont'd):

(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	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+4.7	+47.8	+1.0	+53.5
Other	-	-	-	-
Support	-	-27.9	-	-27.9
Subtotal	+4.7	+19.9	+1.0	+25.6
Current Changes:				
Quantity	-	+93.2	-	+93.2
Schedule	-	+55.5	-	+55.5
Engineering	-	+168.4	-	+168.4
Estimating	+15.8	+181.7	+16.8	+214.3
Other	-	-	-	-
Support	-	-165.0	-	-165.0
Subtotal	+15.8	+333.8	+16.8	+366.4
Total Changes	+20.5	+353.7	+17.8	+392.0
Current Estimate	147.2	3007.4	23.9	3178.5

*Includes 3010 and 3020 appropriations

b. (U) Previous Change Explanations --

RDT&E
Economic: Revised escalation indices
Estimating: Increased IOT&E requirement

Procurement
Economic: Revised escalation indices
Schedule: One year production delay due to second sourcing and contractor development testing problems
Estimating: Revised 3020 nonrecurring estimate to support prime contractor and facilitization for second sourcing
Support: One year production delay due to second sourcing and refinement of spares, peculiar support, and launcher nonrecurring estimates.

MILCON
Estimating: Revised storage facility upgrade costs

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13. (U) Cost Variance Analysis (Cont'd):

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(U) Procurement		
Additional product acceptance testing/ component testing to increase reliability (Engineering)	+73.9	+101.7
Adjustment for current & prior year escalation (Estimating)	- 0.9	-1.2
Revised missile flyaway estimate due to directed second sourcing	-143.1	-197.0
- Revised missile recurring flyaway estimate due to competition (Estimating)	(-217.0)	(-300.7)
- Revised missile nonrecurring estimate due to additional tooling and special test equipment required for second source (Estimating)	(+73.9)	(+103.7)
Revised recurring air vehicle estimate due to change from GFE to CFE components (Estimating)	+146.2	+182.2
Estimating refinement of recurring air vehicle for ILS and SE/PM additions (Estimating)	+61.7	+76.8
Refined warranty estimate to reflect further definition in the scope of the warranty and additional cost data (Estimating)	+118.3	+147.5
Revised peculiar support estimate to reflect changes in the scope of the warranty and additional cost data (Support)	-103.4	-125.7
Revised spares estimate to reflect changes in the scope of the warranty additional cost data (Support)	-49.6	-68.3
Refinement of launcher flyaway estimate (Support)	-12.0	-16.4
(3) (U) MILCON		
Delayed USAF storage facility construction to coincide with missile delivery schedule (Schedule)	-	+0.1

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15. (U) Contract Information (Cont'd):*

c. (U) MILCON -- N/A

* Full contract funding information is not available due to program transition from Special Access Required (SAR) management.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars):

a. (U) Program Status --

(1) (U) Percent Program Completed: 15.4% (2 yrs/13 yrs)

(2) (U) Percent Program Cost Appropriated: 8.7% ($378.5/$4375.2)

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	133.5	24.9	9.8	0.9	169.1
Aircraft Procurement	24.4	7.0	18.9	10.9	61.2
Missile Procurement	215.0	1.0	192.2	3706.2	4114.4
MILCON	5.6	2.5	3.0	19.4	30.5
Total	378.5	35.4	223.9	3737.4	4375.2

16. (~~S~~) Program Funding Summary--COMBINED (Cont'd): (Current Estimate in Millions of Dollars)

c. (~~S~~) Annual Summary --

Fiscal Year	(~~S~~) Qty	Flyaway FY85 Dollars		Total Base Year $	Total Then-Year $			Escl Rate (%)
		Nonrec	Rec		Program	Obligated	Expended	
Appropriation: RDT&E								
1988	-	-	-	79.1	88.6	79.3	22.6	3.1
1989	-	-	-	38.7	44.9	5.9	.2	4.0
1990	-	-	-	20.8	24.9	-	-	3.6
1991	-	-	-	7.9	9.8	-	-	3.3
1992	-	-	-	0.7	0.9	-	-	2.8
Subtotal	40	-	-	147.2	169.1	85.2	22.8	
Appropriation: Aircraft Procurement								
1989	-	16.4	3.9	20.4	24.4	-	-	4.0
1990	-	-	3.8	5.7	7.0	-	-	3.6
1991	-	-	13.8	15.0	18.9	-	-	3.3
1992	-	-	7.8	8.4	10.9	-	-	2.8
Subtotal	(31)*	(16.4)*	(29.3)*	49.5	61.2	-	-	

* Non-add launchers for B-52 carriage

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18. (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	.005
O&S Consumables	.020
Direct Depot Maintenance	.369
Sustaining Investment	.391
Other Direct Costs	.230
Indirect Costs	N/A
Total	1.015

c. Contractor Support Cost - N/A

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N-27 LSD-41 CV [redacted]

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SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)

PROGRAM: LSD 41 CLASS (CARGO VARIANT)

AS OF DATE: December 31, 1988

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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 20362-1501

PM: Mr. E. E. Shoults
Assigned: April 29, 1985
AV: 222-8511; COMM: (202) 692-8511

4. (U) Program Elements/Procurement Line Items:

RDT&E: PE 0603564N Project 00408 (Shared)
PE 0604567N Project 01803 (Shared)

PROCUREMENT: APPN 1611N ICN 3045
MILCON: PE 0204796N (Shared)

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5. (U) Related Programs: LCAC, LSD 41

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8. (U) Threshold Breaches: There are currently no DAE baseline breaches or NDCP (dated December 1987) threshold breaches.

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LSD 41 CLASS (CV), December 31, 1988

	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
(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"

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	Dev Est	Approved Program Goal/Threshold	Demon-strated Perf	Current Estimate
(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"

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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 Feb 1989.

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1. (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	17.1
Procurement (SCN)	1335.3	1361.8	1361.8
(Sailaway)	(1233.4)	(1253.4)	(1253.4)
(Ship System)	(4.6)	(4.5)	(4.5)
(Initial Spares)	(0.0)	(0.0)	(0.0)
(Outfitting/Post Delivery)	(97.3)	(103.9)	(103.9)
Construction (Milcon)	0.0	3.4	3.4
Total FY88 Base-Year $	1350.7	1382.3	1382.3
Escalation	233.3	258.4	258.4
Development (RDT&E)	(-0.2)	(0.2)	(0.2)
Procurement	(233.5)	(257.8)	(257.8)
Construction (Milcon)	(0.0)	(0.4)	(0.4)
Total Then-Year $	1584.0	1640.7	1640.7
b. Quantities			
Development (RDT&E)	0	0	0
Procurement	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: FY 1990-91 President's Budget.

17(U) Program Acquisition/Current Procurement Unit Cost Summary:

(Current (Then-Year) Dollars in Millions)

	Current Est	UCR Baseline	UCR Baseline
a. Program Acquisition --			
(1) Cost	1640.7	1584.0	1640.7
(2) Quantity	6	5	6
(3) Unit Cost	273.4	316.8	273.5

	Current Year		Budget Year
b. Current Procurement --	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	0.0	0.0	229.3
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	0.0	0.0	229.3
(2) Quantity	0	0	1
(3) Unit Cost	0.0	0.0	229.3

13(U)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	0.0	0.0	0.0
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	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	0.0	0.0	0.0	0.0
Current 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
Total Changes	2.1	50.8	3.8	56.7
Current Estimate	17.3	1619.6	3.8	1640.7

13(U)Cost Variance Analysis (Continued):

a. Summary -- (FY 1988 (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	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	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	0.0	0.0	0.0	0.0
Current 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
Total Changes	1.7	26.5	3.4	31.6
Current Estimate	17.1	1361.8	3.4	1382.3

13. (U) Cost Variance Analysis (Cont'd):

b. Previous Change Explanations -- None.

13. Cost Variance Analysis (Continued):

c. Current Change Explanations

	(Dollars in Millions) Base-Year $	Then-Year $
1) RDT&E		
ESTIMATING		
REVISED EST TO COMPLETE CONT. DES. FOR FY93	1.7	2.1
2) Procurement		
ECONOMIC		
REVISED JAN 89 ECONOMIC ESCALATION RATES	0.0	-1.6
QUANTITY		
ADDITION OF (1) SHIP IN FY 94	214.9	268.9
SCHEDULE		
SCHEDULE IMPACT OF SLIPPING FY 92 SHIP TO FY 93	31.9	39.3
ESTIMATING	-225.9	-264.6
REVISED PROGRAM ESTIMATES	(-2.2)	(1.6)
ESC. SAVINGS	(-8.0)	(-9.7)
REVISED EST BASED ON CONTRACT OPTION PRICES	(-207.3)	(-246.3)
TRANSFER OF CAS TO INHOUSE	(-8.4)	(-10.2)
SUPPORT	5.6	8.8
INCR IN OUTFITTING FOR ADD'L SHIP IN FY 94	(3.7)	(4.7)
INCR IN POST DELIVERY FOR ADD'L SHIP IN FY 94	(11.2)	(14.3)
REDUCTION OF OUTFITTING BASED ON LSD 44 ACT. COST	(-4.5)	(-4.9)
REDUCTION OF POST DELIVERY REQUIREMENTS	(-4.8)	(-5.3)
3) Milcon		
ESTIMATING		
TO MEET REQUIREMENT FOR THE EXTENSION OF BERTHING PIER	3.4	3.8

14(U)Program Acquisition Unit Cost (PAUC) History:

(Millions of Then-Year dollars)

a. Initial SAR Estimate to Development Estimate

PAUC (Planning Estimate)	Changes								PAUC (Development Est)
	Econ	Qty	Sch	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

14(U)Program Acquisition Unit Cost (PAUC) History:

(Millions of Then-Year dollars)

b. Development Baseline Estimate to Current Estimate

PAUC (DE Estimate)	Changes								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
316.8	-0.3	-8.1	6.6	0.0	-43.1	0.0	1.5	-43.4	273.4

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E -- N/A

b. (U) Procurement --

	Initial Target	Contract Ceiling	Price Qty
LSD 49 Avondale Industries, Inc. New Orleans, La N00024-88-C-2048, FPI Award: June 17, 1988 Definitized: June 17, 1988	$147.0	$173.9	1

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$147.0	$173.9	1	$156.7	$161.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances to Date (11/30/88)	$-0.7	$ 0.0
Net Change	$-0.7	$ 0.0

Explanation of Change: The majority of the unfavorable cost variance is due to engineering with growth occurring in labor and overhead. The Program Manager's assessment takes into consideration the above variances.

c. (U) Milcon -- N/A

16(U)Program Funding Summary: (Current Estimate in Millions)

a. Program Status --

(1) Percent Program Completed: 7/17 = 41.2%
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 270.5/ 1640.7 = 16.5%
(Funds Appropriated To Date/Total Program Funding in Millions)

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	4.3	0.5	17.3
Procurement	258.0	229.3	232.7	899.6	1619.6
Milcon	0.0	3.8	0.0	0.0	3.8
Total	270.5	233.1	237.0	900.1	1640.7

16. (U) Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY88 Dollars Nonrec.	Sailaway FY88 Dollars Rec.	Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate %
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	0.6	0.6	0.7	0.7	2.80
1987	0	0.0	0.0	7.1	7.0	6.9	6.5	2.70
1988	0	0.0	0.0	1.1	1.1	1.0	0.5	3.10
1989	0	0.0	0.0	0.0	0.0	0.0	0.0	4.00
990	0	0.0	0.0	0.0	0.0	0.0	0.0	3.60
1991	0	0.0	0.0	3.8	4.3	0.0	0.0	3.30
1992	0	0.0	0.0	0.4	0.5	0.0	0.0	2.80
Subtotal	0	0.0	0.0	17.1	17.3	12.4	11.4	--

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY88 Dollars Nonrec.	Sailaway FY88 Dollars Rec.	Base Year $	Total Then-Year $ Program	Obligated	Expended	Escl Rate %
APPROPRIATION: Procurement								
1987	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
1988	1	39.2	191.0	234.7	258.0	185.9	1.1	2.60
1990	1	0.0	197.8	197.8	229.3	0.0	0.0	3.60
1991	1	0.0	196.5	196.5	232.7	0.0	0.0	3.30
1992	1	0.0	194.8	197.2	237.8	0.0	0.0	2.80
1993	1	0.0	223.3	228.8	280.9	0.0	0.0	2.30
1994	1	0.0	210.8	254.4	315.8	0.0	0.0	1.80
995	0	0.0	0.0	16.0	19.4	0.0	0.0	1.80
1996	0	0.0	0.0	12.5	15.4	0.0	0.0	1.80
1997	0	0.0	0.0	6.4	8.0	0.0	0.0	1.80
1998	0	0.0	0.0	17.5	22.3	0.0	0.0	1.80
1999	0	0.0	0.0	0.0	0.0	0.0	0.0	1.80
Subtotal	6	39.2	1214.2	1361.8	1619.6	185.9	1.1	--

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	Sailaway FY88 Dollars Nonrec.	Sailaway FY88 Dollars Rec.	Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate %
APPROPRIATION: Milcon								
1988	0	0.0	0.0	0.0	0.0	0.0	0.0	3.10
1989	0	0.0	0.0	0.0	0.0	0.0	0.0	4.00
1990	0	0.0	0.0	3.4	3.8	0.0	0.0	3.60
1991	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
1992	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Subtotal	0	0.0	0.0	3.4	3.8	0.0	0.0	--
Total	6	39.2	1318.1	1382.3	1640.7	198.3	12.5	--

17(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 and 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.

b. Costs --

(FY1988 Constant (Base-yr) Dollars in Millions)

Cost Element	Avg Annual Cost Per LSD 41(CV)	Avg Annual Cost Per LSD 36 (Antecedent)
Direct Personnel	6.9	6.5
Direct Operations	5.7	5.3
Direct Maintenance	9.2	6.2
Indirect Costs	0.4	0.3
Total	22.2	18.3

c. Contractor Support Costs -- N/A.

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: MINE COUNTERMEASURES (MCM) PROGRAM

AS OF DATE: December 31, 1988

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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: Mr. Wm. R. Boyd
Naval Sea Systems Command Assigned: May 10, 1988
Washington D.C. 20362 AV 222-6481; COMM (202) 692-6481

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 10-14), AN/SQQ-30 Minehunting Sonar (MCMs 1-9), AN/SLQ-48 Mine Neutralization System, and AN/SSN-2 Navigation System

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OASD(PA) DFOISR 88-T- 0585

. 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 1-9) (AN/SQQ-32 Advanced Minehunting Sonar for hulls 10-14), AN/WQN-1(V) Channel Finder and various other standard inservice 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 rimary, the other secondary, were selected to participate in the ship esign effort. The Navy selected the primary SSDS contractor, Peterson uilders, Inc. of Sturgeon Bay, WI 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 follow yard and awarded MCM 2 in May 1983. The program entails the construction and delivery of fourteen MCMs, ten of which are currently under contract. Exercise of the option for procurement of the last three ships of the class is planned for FY 1990. MCM 1 was delivered to the Navy on August 28, 1987.

b. Significant Developments Since Last Report -- This is the initial SAR report submission.

c. Changes Since "As Of" Date -- MCMs 9, 10, and 11 were awarded to Peterson Builders, Inc. on 14 Febraury 1989.

8. Threshold Breaches: This is the initial SAR report--there are no current threshold breaches.

9. Schedule:

a. Milestones --	Production Estimate/ Approved Program	Current Estimate
Milestone I (*)	Apr 79/N/A	Apr 79
CEB Approval of Tradeoff Analysis	Mar 80/N/A	Mar 80
Milestone II (**)	Aug 81/N/A	Aug 81
Leadship Award	Jun 82/N/A	Jun 82
Followyard Leadship Award	May 83/N/A	May 83
Milestone III (***)	Jul 83/N/A	Jul 83
Leadship Delivery	Aug 87/N/A	Aug 87
Followyard Leadship Dlv	Nov 89/N/A	Nov 89

(*) 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 --

None

d. References --

Production Estimate: FY 1990/91 President's Budget.

Approved Program: DAE baseline pending.

(b)(1)

. 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	1445.1
(Basic Ship Cost)	(838.3)	(838.3)	(838.3)
(Gov't Furn. Equip)	(490.2)	(490.2)	(490.2)
(Other)	(29.3)	(29.3)	(29.3)
(Outfit/Post Deliv)	(87.3)	(87.3)	(87.3)
Construction-MILCON	N/A	N/A	N/A
	1466.3	1466.3	1466.3
Escalation			
Development (RDT&E)	0.0	0.0	0.0
Procurement	271.1	271.1	271.1
Construction-MILCON	N/A	N/A	N/A
Total Then-Year $	1737.4	1737.4	1737.4
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/Approved Program: FY 1990/1991 President's Biennial Budget.

12. Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions)

	Current Year (FY89) Current Est (Dec 88 SAR)	Current Year (FY89) UCR Baseline (Dec 88 SAR)	Budget Year (FY90) UCR Baseline (Dec 88 SAR)
a. Program Acquisition			
(1) Cost	1737.4	1737.4	1737.4
(2) Quantity	14	14	14
(3) Unit Cost	124.1	124.1	124.1
b. Current Procurement	(FY 1989)	(FY 1989)	(FY 1990)
(1) Cost	13.8	13.8	358.3
Less CY Adv Proc	N/A	N/A	N/A
Plus PY Adv Proc	N/A	N/A	N/A
Less OF/PD	(13.8)	(13.8)	(16.8)
Net Total	0.0	0.0	341.5
(2) Quantity	0	0	3
(3) Unit Cost	0.0	0.0	113.8

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:			
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	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
Total Changes	0.0	0.0	0.0
Current Estimate	21.2	1716.2	1737.4

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	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
Total Changes	0.0	0.0	0.0
Current Estimate	21.2	1445.1	1466.3

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	0.0	0.0
(2) Procurement	0.0	0.0

14. Program Acquisition Unit Cost (PAUC) History:

(Millions of then-year dollars)

a. Initial SAR Estimate (PdE) to Current Estimate. (First Report).

PAUC (Production Estimate)	Changes (Then Year Dollars in Millions)								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
124.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	124.1

(b)(1)

(b)(1)

(b)(1)

(b)(1)

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 Nonrec	Sailaway FY 82 Dollars Rec	Total Base Year $	Total Then-Year $ Program	Total Then-Year $ Obligated	Total Then-Year $ Expended	Escl Rate (%)
Appropriation: SCN								
1982	1		115.3	115.3	125.5	106.2	100.9	7.5
1983	1		117.2	117.2	129.6	120.3	116.5	3.8
1984	3		325.5	325.5	367.6	334.7	305.0	3.6
1985	4		320.6	320.6	370.2	277.6	188.5	2.1
1986	2		240.4	240.4	286.0	44.6	28.2	1.0
1987	0		6.5	6.5	8.0	5.4	2.6	1.5
1988	0		5.8	5.8	7.3	3.4	1.4	2.6
1989	0		10.6	10.6	13.8	0.0	0.0	4.0
1990	3		267.5	267.5	358.3	0.0	0.0	3.6
1991	0		7.6	7.6	10.4	0.0	0.0	3.3
1992	0		15.9	15.9	22.2	0.0	0.0	2.8
1993	0		11.9	11.9	16.9	0.0	0.0	2.3
1994	0		0.3	0.3	0.4	0.0	0.0	1.8
SUBTOT	14		1445.1	1445.1	1716.2	892.2	743.1	-
TOTAL	14		1466.3	1466.3	1737.4	913.4	764.2	-

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

(63) AF-2 ATARS

SAR-88-063

(b)(1)

ATARS, 31 December 1988

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)

PROGRAM: ATARS

AS OF DATE: December 31, 1988

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SAF/PAS 89-0036-T #18

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 27217F (Shared funding)

PROCUREMENT: NONE

[redacted]

5. Related Programs: USN Mid-Range Unmanned Air Vehicle (MRUAV).
Joint Services Imagery Processing System (JSIPS).
Navy F/A-18, F/A-18C(RC), F/A-18D(RC) and F-14 ATARS Sensor Suites.

OASD(PA) DFOISR 89-T-0093

[redacted] (b)(1) [redacted]

6. Mission Description: The ATARS program is designed to meet the needs of the 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 the above 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.

a. Under the Tactical Air Reconnaissance System (TARS) project the Air Force will develop a reconnaissance suite for the RF-4C, USN manned aircraft (F-14 and F/A-18, F/A-18C(RC), and F/A-18D(RC)) and a Follow-on Tactical Reconnaissance (FOTR) pod for carriage on the RF-16. TARS has future potential FMS applications.

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 USN under the Mid-Range Unmanned Air Vehicle (MRUAV) Program and will be provided to the Air Force as Government Furnished Equipment. OSD is providing funding for the unmanned effort.

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.

b. Significant Developments Since Last Report -- 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.

DT&E and OT&E will begin in FY91.

7. (U) Program Highlights (cont'd):

TARS procurement funding was zeroed out in the FY 1990-91 President's Budget, and the UARS funding was transferred to the Joint Unmanned Vehicle program (UAV), under OSD auspices. The program is below SAR program dollar thresholds and is anticipated to be removed from the major Defense Acquisition List; therefore, this SAR constitutes final submission.

c. Changes Since "As Of" Date -- None.

8. (U) Threshold Breaches: The program does not have a Decision Coordinating Paper (DCP). There are currently no threshold breaches to the 30 Mar 1987 Acquisition Decision Milestone.

(b)(1)

b. (U) Previous Change Explanations -- None.

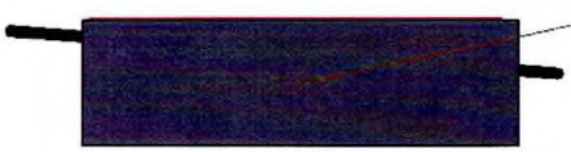
c. (U) Current Change Explanations -- None.

d. (U) References --

Development Estimate: Program Management Directive 5063 (5)/27217F/27213F/27435F/3132BF/63239F, 15 Apr 87.

Approved Program: No DAE baseline has been approved for this program.

(b)(1)



(b)(1)

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11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)
System: ATARS (Summary)

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	163.8	260.7	260.7
Procurement	811.0	0.0	0.0
Total Flyaway	(697.6)	(0.0)	(0.0)
Other Wpn Sys Cost	(73.3)	(0.0)	(0.0)
Initial Spares	(40.1)	(0.0)	(0.0)
Construction (MILCON)	0.0	0.0	0.0
Total FY 85 Base-Year $	974.8	260.7	260.7
Escalation	317.7	51.6	51.6
Development (RDT&E)	(30.1)	(51.6)	(51.6)
Procurement	(287.6)	(0.0)	(0.0)
Construction (MILCON)	0.0	(0.0)	(0.0)
Total Then-Year $	1292.5	312.3	312.3
b. Quantities --			
Development (RDT&E)	9	12	12
Procurement	560	0	0
Total	569	12	12

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: FY90/91 President's Budget

11. Program Acquisition Cost (Con't): Current Estimate in Millions of Dollars)
System: TARS (Sensor Suites)

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	142.7	260.5	260.5
Procurement	498.1	0.0	0.0
Total Flyaway	(417.6)	(0.0)	(0.0)
Other Wpn Sys Cost	(57.0)	(0.0)	(0.0)
Initial Spares	(23.5)	(0.0)	(0.0)
Construction (MILCON)	0.0	0.0	0.0
Total FY 85 Base-Year $	640.8	260.5	260.5
Escalation	197.1	51.6	51.6
Development (RDT&E)	(25.2)	(51.6)	(51.6)
Procurement	(171.9)	(0.0)	(0.0)
Construction (MILCON)	0.0	(0.0)	(0.0)
Total Then-Year $	837.9	312.1	312.1
b. Quantities --			
Development (RDT&E)	6	12	12
Procurement	300	0	0
Total	306	12	12

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: FY90/91 President's Budget

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)
System: UARS

a. Cost --	Development Estimate	Approved Program	Current Estimate
Development (RDT&E)	21.1	.2	.2
Procurement	312.9	N/A	N/A
Total Flyaway	(280.0)	N/A	N/A
Other Wpn Sys Cost	(16.3)	N/A	N/A
Initial Spares	(16.6)	N/A	N/A
Construction (MILCON)	0.0	N/A	N/A
Total FY 85 Base-Year $	334.0	.2	.2
Escalation	120.6	-	-
Development (RDT&E)	(4.9)	-	-
Procurement	(115.7)	-	-
Construction (MILCON)	0.0	-	-
Total Then-Year $	454.6	.2	.2
b. Quantities --			
Development (RDT&E)	3	N/A	N/A
Procurement	260	N/A	N/A
Total	263	N/A	N/A

c. Foreign Military Sales -- N/A

d. Nuclear Costs -- N/A

e. References --

Development Estimate: Program Management Directive 5063(5)27217F/27213F/27435F/31328F/63239F, 15 Apr 87.

Approved Program: FY90/91 President's Budget

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

System: TARS

	Current Year		Budget Year
	Current Est Dec 88 SAR	UCR Baseline Dec 87 SAR	UCR Baseline Dec 88 SAR
a. Program Acquisition --			
(1) Cost	312.1	837.9	312.1
(2) Quantity	N/A	306	N/A
(3) Unit Cost	N/A	2.738	N/A
b. Current Procurement -- N/A			

NOTE: TARS production funds have been be zeroed out in the FY90/91 President's Budget.

System: UARS

	Current Year		Budget Year
	Current Est Dec 88 SAR	UCR Baseline Dec 87 SAR	UCR Baseline Dec 88 SAR
a. Program Acquisition --			
(1) Cost	.2	454.6	.2
(2) Quantity	N/A	263	N/A
(3) Unit Cost	N/A	1.729	N/A
b. Current Procurement -- N/A			

NOTE: UARS development and procurement funding have been transferred to the Joint UAV Program.

13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

ATARS (Summary)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	193.9	1098.6	0.0	1292.5
Previous Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0.0	0.0	0.0	0.0
Current Changes:				
Economic	+.2	-17.3		-17.1
Quantity		-1081.3		-1081.3
Schedule				
Engineering	+121.4			+121.4
Estimating	+13.2			+13.2
Other	-16.4			-16.4
Support				
Subtotal	+118.4	-1098.6	0.0	-980.2
Total Changes	+118.4	-1098.6	0.0	-980.2
Current Estimate	312.3	0.0	0.0	312.3

13. Cost Variance Analysis (Con't):

ATARS (Summary) (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				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0.0	0.0	0.0	0.0
Current Changes:				
Quantity		-811.0		-811.0
Schedule				
Engineering	98.2			
Estimating	+10.6			+108.8
Other	-11.9			-11.9
Support				
Subtotal	+96.9	-811.0	0.0	-714.1
Total Changes	+96.9	-811.0	0.0	-714.1
Current Estimate	260.7	0.0	0.0	260.7

13. Cost Variance Analysis (Con't):

a. Summary -- (Current (Then-Year) Dollars in Millions)

TARS

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	167.9	670.0	0.0	837.9
Previous Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0.0	0.0	0.0	0.0
Current Changes:				
Economic	+.2	-10.5		-10.3
Quantity		-659.5		-659.5
Schedule				
Engineering	+121.4			+121.4
Estimating	+22.6			+22.6
Other				
Support				
Subtotal	+144.2	-670.0	0.0	-525.8
Total Changes	+144.2	-670.0	0.0	-525.8
Current Estimate	312.1	0.0	0.0	312.1

13. Cost Variance Analysis (Con't):

TARS (FY 1985 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	142.7	498.1	0.0	640.8
Previous Changes:				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0.0	0.0	0.0	0.0
Current Changes:				
Quantity		-498.1		-498.1
Schedule				
Engineering	+98.2			+98.2
Estimating	+19.6			+19.6
Other				
Support				
Subtotal	+117.8	-498.1	0.0	-380.3
Total Changes	+117.8	-498.1	0.0	-380.3
Current Estimate	260.5	0.0	0.0	260.5

b. Previous Change Explanations -- None.

c. Current Change Explanation --

(1) RDT&E	(Dollars in Millions) Base-Year $	Then-Year $
Revised escalation indices. (Economic)	N/A	+.2
Adjustment for Current and Prior Year Inflation. (Estimating)	-.2	-.2
Addition of dual sourcing. (Estimating)	+7.8	+9.3
Three common sensor suites moved to TARS (formerly under UARS, but directed by PMD to be under TARS). (Estimating)	+9.0	+9.6
Funds for RF-16 multi-national pod. (Engineering)	+98.2	+121.4
Funds for additional RF-16 planning in FY94. (Estimating)	+3.0	+3.9

13. Cost Variance Analysis (Con't):

(2) Production		
Revised escalation indices.		
(Economic)	N/A	-10.5
Production funding not approved.		
(Qty)	-498.1	-659.5

a. Summary -- (Current (Then-Year) Dollars in Millions)

UARS

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	26.0	428.6	0.0	454.6
Previous Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0.0	0.0	0.0	0.0
Current Changes:				
Economic	0.0	-6.8		-6.8
Quantity		-421.8		-421.8
Schedule				
Engineering				
Estimating	-9.4			-9.4
Other	-16.4			-16.4
Support				
Subtotal	-25.8	-428.6	0.0	-454.4
Total Changes	-25.8	-428.6	0.0	-454.4
Current Estimate	0.2	0.0	0.0	0.2

13. Cost Variance Analysis (Con't):

UARS (FY 1985 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	21.1	312.9	0.0	334.0
Previous Changes:				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0.0	0.0	0.0	0.0
Current Changes:				
Quantity		-312.9		-312.9
Schedule				
Engineering				
Estimating	-9.0			-9.0
Other	-11.9			-11.9
Support				
Subtotal	-20.9	-312.9	0.0	-333.8
Total Changes	-20.9	-312.9	0.0	-333.8
Current Estimate	0.2	0.0	0.0	0.2

b. Previous Change Explanations -- None.

c. Current Change Explanation --

	(Dollars in Millions) Base-Year $	Then-Year $
(1) RDT&E		
Revised escalation indices. (Economic)	N/A	0.0
Three common sensors moved to TARS (directed by PMD). (Estimating)	-9.0	-9.4
Funding for UARS effort transferred to Joint UAV Program (Other)	-11.9	-16.4
(2) PRODUCTION		
Revised escalation indices. (Economic)	N/A	-6.8
Funding for UARS effort transferred to Joint UAV Program. (Quantity)	-312.9	-421.8

14. Program Acquisition Unit Cost (PAUC) History:
(Millions of then-year dollars)

Initial SAR Estimate to Current Baseline Estimate --

TARS

PAUC (Initial SAR Est)	Changes								PAUC (Current EST)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
2.738	-	-	-	-	-	-	-	-	N/A

UARS

PAUC (Initial SAR Est)	Changes								PAUC (Current EST)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1.729	-	-	-	-	-	-	-	-	N/A

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, FFP
AWARD: May 16, 1988
Definitized: May 16, 1988

Initial Contract Price		
Target	Ceiling	Qty
$118.6	N/A	9

Current Contract Price		
Target	Ceiling	Qty
$121.8	N/A	9

Estimated Price At Completion	
Contractor	Program Manager
$121.8	$121.8

b. Procurement -- None.

c. MILCON -- None.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

System: ATARS (Summary)

a. Program Status --

(1) Percent Program Completed: 50.0% (5yrs/10yrs)

(2) Percent Program Cost Appropriated: 29.6% (92.3/312.3)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY85-89)	Budget Year (FY90)	Budget Year (FY91)	Balance at Completion (FY92-94)	Total
RDT&E	92.3	91.0	79.5	49.5	312.3
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	91.0	79.5	49.5	312.3

16. Program Funding Summary (Con't):

System: ATARS (Summary)

c. Annual Summary --

Fiscal Year	QTY	FY 85 Base-Year Dollars			Total Then-Year Dollars			Escl Rate (%)
		Flyaway*		Total	Program	Obli-gated	Ex-pended	
		Nonrec	Rec					
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	3.9	2.7
1988				29.0	32.5	32.5	5.8	3.1
1989				39.5	45.9	24.4	.1	4.0
1990				75.8	91.0	0.0	0.0	3.6
1991				64.4	79.5	0.0	0.0	3.3
1992				27.4	34.7	0.0	0.0	2.8
1993				8.4	10.9	0.0	0.0	2.3
1994				3.0	3.9	0.0	0.0	1.8
SUBTOTAL	12			260.7	312.3	70.8	14.8	

*Not Available

16. Program Funding Summary (Con't) (Current Estimate in Millions of Dollars)

System: TARS

a. Program Status --

(1) Percent Program Completed: 50.0% (5yrs/10yrs)

(2) Percent Program Cost Appropriated: 29.5% (92.1/312.1)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY85-89)	Budget Year (FY90)	Budget Year (FY91)	Balance at Completion (FY92-94)	Total
RDT&E	92.1	91.0	79.5	49.5	312.1
Procurement (3010)	0.0	0.0	0.0	0.0	0.0
MILCON	0.0	0.0	0.0	0.0	0.0
Total	92.1	91.0	79.5	49.5	312.1

16. Program Funding Summary (Con't):

System: TARS

c. Annual Summary --

Fiscal Year	QTY	FY 85 Base-Year Dollars			Total Then-Year Dollars			Escl Rate (%)
		Flyaway*		Total	Program	Obligated	Expended	
		Nonrec	Rec					
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				8.1	8.7	8.7	3.7	2.7
1988				29.0	32.5	32.5	5.8	3.1
1989				39.5	45.9	24.4	.1	4.0
1990				75.8	91.0	0.0	0.0	3.6
1991				64.4	79.5	0.0	0.0	3.3
1992				27.4	34.7	0.0	0.0	2.8
1993				8.4	10.9	0.0	0.0	2.3
1994				3.0	3.9	0.0	0.0	1.8
SUBTOTAL	12			260.5	312.1	70.6	14.6	

*Not Available

NOTE:

1. RDT&E funds are under a shared Program Element between TARS & JSIPS. Above funds reflect the TARS development funds only.

16. Program Funding Summary (Con't): (Current Estimate in Millions of Dollars)

System: UARS

a. Program Status --

(1) Percent Program Completed: N/A

(2) Percent Program Cost Appropriated: N/A

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY85-89)	Budget Year (FY90)	Budget Year (FY91)	Balance at Completion (FY92-94)	Total
RDT&E	.2	0.0	0.0	0.0	.2
Procurement (3010)	0.0	0.0	0.0	0.0	0.0
MILCON	0.0	0.0	0.0	0.0	0.0
Total	.2	0.0	0.0	0.0	.2

16. Program Funding Summary (Con't):

System: UARS

c. Annual Summary --

Fiscal Year	QTY	FY 85 Base-Year Dollars			Total Then-Year Dollars			Escl Rate (%)
		Flyaway*		Total	Program	Obligated	Expended	
		Nonrec	Rec					
Appropriation: RDT&E								
1987				.2	.2	.2	.2	2.7
1988				0.0	0.0	0.0	0.0	3.1
1989				0.0	0.0	0.0	0.0	4.0
1990				0.0	0.0	0.0	0.0	3.6
1991				0.0	0.0	0.0	0.0	3.3
1992				0.0	0.0	0.0	0.0	2.8
SUBTOTAL	12			.2	.2	.2	.2	

*Not Available

17. **Production Rate Data:** System: TARS

a. Annual Production Rates --

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

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	260.5	-	N/A
TY $	N/A	N/A	312.1	-	N/A
PAUC BY $	N/A	N/A	N/A	-	N/A
TY $	N/A	N/A	N/A	-	N/A

* Program Acquisition Cost

c. Schedule Variance - Dollars in millions --

	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
Duration (Mo)	N/A	N/A	N/A	-	N/A
End (Mo/Yr)	N/A	N/A	N/A	-	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
Production	0/0

e. Approved Design-to-Cost Goal -- N/A

7. Production Rate Data (Con't): System : UARS

a. Annual Production Rates --

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
TY $	N/A	N/A	N/A	-	N/A
PAUC BY $	N/A	N/A	N/A	-	N/A
TY $	N/A	N/A	N/A	-	N/A

* Program Acquisition Cost

c. Schedule Variance - Dollars in millions --

	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
Duration (Mo)	N/A	N/A	N/A	-	N/A
End (Mo/Yr)	N/A	N/A	N/A	-	N/A

d. Deliveries (Plan/Actual) -- N/A

e. Approved Design-to-Cost Goal -- N/A

18. Operating and Support Costs:

a. 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 Costs - N/A

AF-25 RAIL GARRISON

(b)(1)

SAR-88-073

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823) (U)

Program: Peacekeeper Rail Garrison (U)

AS OF DATE: December 31, 1988

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[redacted]

(U) Designation and Nomenclature (Popular Name): Peacekeeper Rail Garrison (PRG)

2. (U) DoD Component: U.S. Air Force

3. (U) Responsible Office and Telephone Number:

Vice Commander
and Rail Garrison Program Director
Ballistic Missile Office
Norton AFB, CA 92409-6468

Col Roger A. McClain
Assigned: Apr 87
AV 876-6014; COMM (714) 382-6014

4. (U) Program Elements/Procurement Line Items:

RDT&E: PE 64312F (Shared Funding)

PROCUREMENT: APPN 3020 PE 11215F (Shared Funding)

MILCON: PE 11215F (Shared Funding)

SAF/PAS
89-0036-T

[redacted]

OASD(PA) DFOISR 89-T-# 6306

(b)(1)

(U) Related Programs: Peacekeeper in Minuteman Silo, Small ICBM

6. (U) Mission and Description: The mission of Peacekeeper Rail Garrison is to enhance the deterrent posture of the US strategic forces by 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 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.

(U) The Peacekeeper Rail Garrison System is a force of 50 Peacekeeper missiles deployed on trains. The trains are parked inside train alert shelters (TAS) 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 Peacekeeper 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 Peacekeeper missile. Peacekeeper Rail Garrison does not replace an existing system.

7. (U) Program Highlights:

a. (U) Significant Historical Developments - On 19 Dec 86, the President selected Rail [redacted]rison as the basing mode for the second 50 Peacekeeper missiles. A 7 Jan 87 message [redacted]dment to Program Management Directive 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. Final bases selected will be identified in late February after the Record of Decision is filed. The Main Operating Base will be at F.E. Warren AFB, WY, as directed. The site-specific Environmental Impact Statement (EIS) for the final garrison sites will be submitted in Jan 89.

Rail Garrison development is 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. 'Program funding and quantities reflect the President's Budget, except as adjusted for FY88 congressional direction and FY89 amended budget decisions.'

b. (U) Significant developments since last report:

(1) (U) The Peacekeeper Rail Garrison Milestone II Acquisition Decision Memorandum was signed by the Secretary of Defense as a result of the Defense Acquisition Board. This memorandum authorized the Secretary of the Air Force to proceed with Full Scale Development of the Rail Garrison basing system.

(2) (U) The MLC and LCS contracts were awarded in May 88 to Westinghouse Electric Corporation and Rockwell International, respectively.

(3) (U) The Peacekeeper Rail Garrison System Design Review (SDR) was completed in 88.

(U) Program Highlights (Cont'd):

(4) (U) With the submittal of the President's Budget in Jan 89, the Initial Operational Capability (IOC) and Full Operational Capability (FOC) dates have been extended to Jun 92 and Jun 94, respectively, to accommodate budget constraints.

(U) The Peacekeeper Rail Garrison system is expected to satisfy the mission requirement.

(U) This SAR is rebaselined from a Planning Estimate to a Development Estimate.

c. (U) Changes since as of date - None

8. (U) Threshold Breaches: There were no ADM (dated 13 May 88) threshold breaches. The program has breached the DAE baseline (May 1988) milestones for IOC and FOC.

9. (U) Schedule:

a. (U) Milestones --

	Planning Estimate/ Approved Program	Development Estimate/ Current Estimate
Full-Scale Development (FSD)	Oct 87/May 88	May 88 (CH-1)
System Design Review (SDR)	TBD/Aug 88	Aug 88
Critical Design Review (CDR)	TBD/Mar 90	Mar 90
DAB III (CH-2)	TBD/Apr 90	Apr 90
IOT&E (CH-2)	TBD/Feb 92	Mar 92
Initial Operational Capability (IOC)[1]	Dec 91/Dec 91	Jun 92 (CH-3)
Full Operational Capability (FOC)[2]	Jun 93/Jun 93	Jun 94 (CH-3)

(1) (U) IOC is defined as two missiles (one train) on alert and one training train available to SAC.
(2) (U) FOC is defined as 50 missiles deployed.
(3) (U) Not earlier than.

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.

c. (U) Current Change Explanations --

(CH-1) FSD authorized by OSD acquisition defense memorandum.
(CH-2) Incorporation of DAE Baseline Milestones into SAR.
(CH-3) Reflects FY 90-91 PB (see Para 7).

d. (U) References--

Planning Estimate: Program Management Directive (PMD) amendment dated 7 Jan 87 amended by DEPSECDEF Memo dated 5 May 87.

Approved Program: DAE baseline dated May 1988.

Development Estimate: Peacekeeper Rail Garrison Milestone II Acquisition Decision Memorandum, 13 May 88, as amended by FY 90-91 President's budget.

(b)(1)

(U) Program Acquisition Cost (Current Estimate in Millions of Dollars): 1/

a. (U) Cost --

	Planning Estimate	Approved Program	Development/ Current Estimate
Development (RDT&E) 2/	$2487.5	$1945.4	$1945.4
Procurement	3253.2	2235.5	2235.5
Other Weapon System Costs	(2834.5)	(2010.8)	(2010.8)
Initial Spares	(418.7)	(224.7)	(224.7)
Construction (MILCON)	587.8	497.3	497.3
Total FY 82 Base-Year $	6328.5	4678.2	4678.2
Escalation	2778.3	2148.6	2148.6
Development (RDT&E)	(797.7)	(660.1)	(660.1)
Procurement	(1743.0)	(1285.1)	(1285.1)
Construction (MILCON)	(237.6)	(203.4)	(203.4)
Total Then-Year $	9106.8	6826.8	6826.8

b. (U) Quantities -- (Basing Units) 3/

Development (RDT&E)	0	0	0
Procurement	50	50	50
Total	50	50	50

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References --

Planning Estimate: FY 1988-89 President's Budget, January 1987

Approved Program: FY 1990-91 President's Budget

Development Estimate: FY 1990-91 President's Budget

1/ (U) Production missile costs for Rail Garrison program are excluded and are included in the Peacekeeper Selected Acquisition Report.

2/ (U) Includes the cost of five Peacekeeper missiles to support the basing verification.

3/ (U) One Rail Garrison basing unit is defined as one Peacekeeper rail launch car and all associated support equipment.

Peacekeeper Rail Garrison, December 31, 1988

(U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

			Current Estimate (Dec 88 SAR)	Current Year UCR Baseline (Dec 87 SAR)	Budget Year UCR Baseline (Dec 88 SAR)
a.	(U)	Program Acquisition --			
	(1) (U)	Cost	6826.8	8451.5	6826.8
	(2) (U)	Quantity	50	50	50
	(3) (U)	Unit Cost	136.536	169.030	136.536
b.	(U)	Current Procurement --	(FY 1989)	(FY 1989)	(FY 1990)
	(1) (U)	Cost	N/A	N/A	222.6
		Less CY Adv Proc	N/A	N/A	-163.6
		Plus PY Adv Proc	N/A	N/A	0.0
		Net Total	N/A	N/A	59.0 1/
	(2) (U)	Quantity	N/A	N/A	N/A
	(3) (U)	Unit Cost	N/A	N/A	N/A

1/ Indicates amount for initial spares only.

13. (U) Cost Variance Analysis: 1/

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	3285.2	4996.2	825.4	9106.8
Previous Changes:				
Economic	-0.8	+49.4	+3.7	+52.3
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating	-657.9	+8.0	-0.3	-650.2
Other				0.0
Support		-57.4		-57.4
Subtotal	-658.7	0.0	+3.4	-655.3
Current Changes:				
Economic	+1.5	+2.5	-4.5	-0.5
Quantity				0.0
Schedule		+88.8		+88.8
Engineering				0.0
Estimating	-22.5	-1333.2	-123.6	-1479.3
Other				0.0
Support		-233.7		-233.7
Subtotal	-21.0	-1475.6	-128.1	-1624.7
Total Changes	-679.7	-1475.6	-124.7	-2280.0
Dev/Current Estimate	2605.5	3520.6	700.7	6826.8

(FY 1982 Current (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	2487.5	3253.2	587.8	6328.5
Previous Changes:				
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating	-510.9	+11.2		-499.7
Other				0.0
Support		-43.1		-43.1
Subtotal	-510.9	-31.9	0.0	-542.8
Current Changes:				
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating	-31.2	-834.9	-90.5	-956.6
Other				0.0
Support		-150.9		-150.9
Subtotal	-31.2	-985.8	-90.5	-1107.5
Total Changes	-542.1	-1017.7	-90.5	-1650.3
Dev/Current Estimate	1945.4	2235.5	497.3	4678.2

1/ (U) Production missile costs for Rail Garrison program are excluded and are included in th. Peacekeeper Selected Acquisition Report (SAR).

(U) Cost Variance Analysis (Cont'd):

b. (U) Previous Change Explanations --

(1) (U) RDT&E

Economic: Revised escalation indices.

Estimating: Adjustment for current and prior year escalation; adjustment for FY 89 and beyond escalation; refinements to estimate and congressional funding cuts.

(2) (U) Procurement

Economic: Revised escalation indices.

Estimating: Adjustment for FY 90 and beyond escalation; adjustment between other weapon system and initial spares.

Support: Adjustment for FY 90 and beyond escalation; adjustment between other weapon system and initial spares.

(3) (U) MILCON

Economic: Revised escalation indices.

Estimating: Adjustment for FY 90 and beyond escalation; design costs added to FY 88 budget.

13. (U) Cost Variance Analysis (Cont'd):

c. (U) Current Change Explanations -

		(Dollars in Million) Base-Year	Then-Year
(1) RDT&E			
Revised Dec 88 escalation indices (Economic)		-	+1.5
Adjustment for current and prior year inflation	(Estimating)	-0.8	-1.1
Refinement of estimate; favorable contract negotiation and Congressional funding cuts	(Estimating)	-30.4	-21.4
(2) Procurement			
Revised Dec 88 escalation indices (Economic)		-	+2.5
IOC/FOC moved from Dec 91/Dec 93 to Jun 92/Jun 94	(Schedule)	-	+88.8
Refinement of estimate as a result of updated Program Office Estimate		-985.8	-1566.9
	(Estimating)	(-834.9)	(-1333.2)
	(Support)	(-150.9)	(-233.7)
(3) MILCON			
Revised Dec 88 escalation indices (Economic)		-	-4.5
Adjustment for current and prior year inflation	(Estimating)	+0.1	+0.2
Refinement of estimate as a result of updated Program Office Estimate	(Estimating)	-90.6	-123.8

14. (U) Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

a. (U) Initial SAR/Planning Estimate to Current Baseline Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev/Cur Estimate)
PE	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
182.136	+1.036	--	+1.776	--	-42.590	--	-5.822	-45.600	136.536

(U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E -

Boeing, Seattle WA
Basing, Test, and Systems Support
F04704-87-C-0108 (CPIF/AF)
Award: September 14, 1987
Definitized: September 14, 1987

Initial Contract Price		
Target	Ceiling	Qty
$235.5	N/A	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$236.5	N/A	N/A	$251.3	$236.5

Previous Cumulative Variances: None
Cumulative Variances to Date: 11/30/88
Net Change: N/A
Explanation of Change: Variance is 1% or under. No program impact.

Cost Variance	Schedule Variance
$+.03	$-0.4

Rockwell (Autonetics Division)
San Bernardino, CA
Rail Garrison Launch Control System
F04704-88-C-0043 (CPIF/FPIF/AF)
Award: May 18, 1988
Definitized: May 18, 1988

Initial Contract Price		
Target	Ceiling	Qty
$161.8	183.5	9

Contract less than 10% complete.

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$161.7	183.5	9	$161.7	$161.7

Westinghouse Electric Corp, Sunnyvale, CA
Missile Launch Car
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

Contract less than 10% complete.

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$167.0	188.8	8	$172.1	$167.1

*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.

(U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

b. (U) Production - None

c. (U) MILCON - None

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status --

(1) (U) Percent Program Completed: 33.3% (3 yrs/9 yrs)

(2) (U) Percent Program Cost Appropriated: 15.2% ($1029.5/$6826.8)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Yrs (FY87-89)	Budget Year (FY90)	Budget Year (FY91)	Balance to Complete (FY92-95)	Total
[redacted]E	1012.8	774.0	544.1	274.6	2605.5
[redacted]urement	0.0	222.6	1293.4	2004.6	3520.6
MILCON	16.7	219.1	317.1	147.8	700.7
Total	1029.5	1215.7	2154.6	2427.0	6826.8

(U) Program Funding Summary (cont'd): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary --

Fiscal Year	Qty	Other Weapon Sys FY 82 Dollars: Nonrec	Rec	Total Base Year $	Total Then-Year $: Program	Obligated	Total Expended	Escl Rate %
Appropriation: RDT&E 1/								
1987				74.1	90.0	88.7	76.7	2.7
1988				256.0	322.8	297.5	121.6	3.1
1989				459.1	600.0	122.6	2.2	4.0
1990				572.9	774.0			3.6
1991				391.2	544.1			3.3
1992				163.6	233.2			2.8
1993				28.5	41.4			2.3
Subtotal	0			1945.4	2605.5	508.8	200.5	
Appropriation: Procurement								
1990			107.8	146.7	222.6			3.6
1991	5	58.6	676.5	833.9	1293.4			3.3
1992	25	26.3	559.8	673.1	1084.8			2.8
1993	20		510.1	510.1	821.8			2.3
1994			53.8	53.8	88.2			1.8
1995			17.9	17.9	29.8			1.8
Subtotal	50	84.9	1925.9	2235.5	3520.6			
Appropriation: MILCON								
1988				2.7	3.5			3.1
1989				9.9	13.2			4.0
1990				158.7	219.1			3.6
1991				223.9	317.1			3.3
1992				101.2	146.5			2.8
1993				0.9	1.3			2.3
Subtotal				497.3	700.7			
Total	50	84.9	1925.9	4685.7	6826.8			

1/ (U) RDT&E Appropriation includes the cost of five missiles to support the Basing Verification Program.

(U) Production Rate Data:

a. (U) 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 91, 13 months for FY 92 and 10 months for FY 93).

Fiscal Year Buy	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1990		N/A		N/A
1991	20.0	N/A	20.0	N/A
1992	23.0	N/A	23.0	N/A
1993	24.0	N/A	24.0	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

(U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules --

The concept of operation is based on the June 1988 Baseline Configuration Document using 50 operational missiles and assumes: (a) 7 garrisons at 7 specific existing SAC bases/4 Minuteman and 3 non-Minuteman bases with the Main Operating Base located at F.E. Warren AFB; (b) 3-level maintenance; (c) a train crew of 42 personnel consisting of 8 member maintenance, 26 member security, 3 member train crew, 4 member combat crew, and 1 train commander; additional personnel capacity to support instructor/evaluator personnel; (d) 3-4 igloos 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 categorized 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 91-95 POM).

ekeeper Rail Garrison, December 31, 1988

18. (U) Operating and Support Costs (Cont'd):

b. Costs -- (FY 82 Constant(Base Year) Dollars in Millions)*

Cost Element	Average Annual Steady State Cost
Personnel	85.2
O&S Consumables	4.5
Direct Depot Maintenance	7.1
Sustaining Investment	11.3
Other Direct Costs	58.1
Indirect Costs	17.6
TOTAL	183.8

* No antecedent

c. Contractor Support Costs - N/A

N-5 AOE-6
(2)

SAR-88-016

UNCLASSIFIED

UNCLASSIFIED

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: AOE 6 FAST COMBAT SUPPORT SHIP

AS OF DATE: December 31, 1988

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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
Acquisition Project Office (PMS383)
Department of the Navy (NAVSEA)
Washington D.C. 20362

PM: CAPT W.C. Pfister
Assigned: 10/30/84
Autovon: 222-3507
Commercial: (202) 692-3507

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 5025

5. **Related Programs:** TAO 187 Class

[redacted]

OASD(PA) DFOISR 87-T-0580

6. **Mission and Description:**

DESCRIPTION: A 156,000 barrel capacity, twin screw, 20+ knots speed, gas turbine driven Fast Combat Support Ship with a 753'8" overall length, a 107' beam, and a 38'3" foot draft. The ship will carry 1800 long tons of ammo, 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 86, followed by a lead ship contract award for detail design and construction on 23 January 87. Production started on the lead ship on 22 June 88 with delivery anticipated in Aug 91. The option for first follow ship (AOE 7) was awarded on 3 November 88. The AOE 6 Class is expected to satisfy the mission requirement.

b. Significant Developments since Last Report - N/A (initial report)

c. Changes Since "As of" Date - None

8. **Threshold Breaches:** None. There are currently no NDCP breaches. No DAE Baseline established.

NDCP Approved Mar 1986 - Lead ship production.
ASN ltr dtd 2 Nov 1988 - Follow ship production.

9. Schedule:

a. Milestones - -	Production Estimate	Approved Program	Current Estimate
Operational Requirement (OR)	Jul 82	N/A	Jul 82
Ship Charac. Improv. Board (SCIB)	Jul 83	N/A	Jul 83
Characteristics Approved	Oct 84	N/A	Oct 84
Production Decision	Mar 86	N/A	Mar 86
Production Contract Award	Jan 87	N/A	Jan 87
Production Started - First Ship	Jun 88	N/A	Jun 88
Follow on Production Decision	Nov 88	N/A	Nov 88
Launch - First Ship	Feb 90	N/A	May 90
Acceptance Trials - First Ship	Mar 91	N/A	Jul 91
Delivery - First Ship	Apr 91	N/A	Aug 91
Initial Operating Capability	Aug 91	N/A	Nov 91
Last AOE Delivery (AOE 12)	Feb 98	N/A	Feb 98

b. Previous Change Explanations - - N/A (initial SAR)

c. Current Change Explanations - - N/A (initial SAR)

d. References -

Production Estimate: NDCP Approved Mar 1986.
ASN ltr dtd 2 Nov 1988.

Approved Program:
DAE Baseline pending.

10. Technical/Operational Characteristics:

a. Technical - -	Product. Estimate	Approved Program Goals/ Thresholds	Demon-strated Perfor-mance	Current Estimate
Length Overall (ft)	753' 8"	N/A	N/A	753' 8"
Beam Max. (ft)	107' 0"	N/A	N/A	107' 0"
Draft Navigational (ft)	37' 9"	N/A	N/A	38' 3"
Displacement (Ltons)	48,500	N/A	N/A	48,998
Propulsion				
(1) Gas Turbines	4	N/A	N/A	4
(2) Shafts	2	N/A	N/A	2
(3) SHP (each)	100,000	N/A	N/A	100,000

PROGRAM: AOE-6 FAST COMBAT SUPPORT SHIP
AS OF DATE: December 31, 1988

Accommodations	667	N/A	N/A	667

b. Operational - -

Speed (kts)	20+	N/A	N/A	20+
Armament:				
NSSMS	1	N/A	N/A	1
CIWS	2	N/A	N/A	2
25mm Guns	2	N/A	N/A	2
.50 Cal Guns	4	N/A	N/A	4
Cargo Fuel Cap. (bbls)	156,000	N/A	N/A	156,000
DFM-JP5-Conv.	30-40-30%	N/A	N/A	30-40-30%
Ordnance Stowage (Ltons)	1,800	N/A	N/A	1,800
Chill & Freeze (Ltons)	400	N/A	N/A	400
Other Cargo (Ltons)	250	N/A	N/A	250
H-46 Helo (UNREP)	2	N/A	N/A	2

c. Previous Change Explanation - - N/A (initial SAR)

d. Current Change Explanation - - N/A (initial SAR)

e. References - -

Production Estimate: NDCP Approved Mar 1986.
ASN ltr dtd 2 Nov 1988.

Approved Program:
DAE Baseline Pending.

PROGRAM: AOE-6 FAST COMBAT SUPPORT SHIP
AS OF DATE: December 31, 1988

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. Cost - -	Production Estimate	Approved Program	Current Estimate
Development (RDT&E)	29.4	29.4	29.4
Procurement	2303.1	2303.1	2303.1
Total Sailaway	(2230.6)	(2230.6)	(2230.6)
Other Weapon System Costs	-	-	-
Initial Spares	-	-	-
Total FY86 Base-Year $	2332.5	2332.5	2332.5
Escalation	502.3	502.3	502.3
Development (RDT&E)	(-0.6)	(-0.6)	(-0.6)
Procurement (SCN)	(+502.9)	(+502.9)	(+502.9)
Total Then-Year $	2834.8	2834.8	2834.8
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 Mar 1986.
ASN ltr dtd 2 Nov 1988.

Approved Program: FY1990-91 Presidents Budget.

PROGRAM: AOE-6 FAST COMBAT SUPPORT SHIP
AS OF DATE: December 31, 1988

12. **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 1988 SAR)	(DEC 1988 SAR)	(DEC 1988 SAR)
(1) Cost	2834.8	2834.8	2834.8
(2) Quantity	7	7	7
(3) Unit Cost	405.0	405.0	405.0
b. Current Procurement	(FY 1989)	(FY 1989 APPN)	(FY 1990)
(1) Cost	363.3	363.3	362.3
Less CY Adv Proc	-	-	-
Less PY Adv Proc	-	-	-
Net Total	363.3	363.3	362.3
(2) Quantity	1	1	1
(3) Unit Cost	363.3	363.3	362.3

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	-	-	-
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	-	-	-
Other	-	-	-
Support	-	-	-
SUBTOTAL	-	-	-
TOTAL CHANGES	-	-	-
CURRENT ESTIMATE	28.8	2806.0	2834.8

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:			
Economic	-	-	-
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	-	-	-
Other	-	-	-
Support	-	-	-
SUBTOTAL	-	-	-
Current Changes:			
Economic	-	-	-
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	-	-	-
Other	-	-	-
Support	-	-	-
SUBTOTAL	-	-	-
TOTAL CHANGES	-	-	-
CURRENT ESTIMATE	29.4	2303.1	2332.5

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	N/A (initial report)	
(2) PROCUREMENT	N/A (initial report)	
(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	-	-	-	-	-	-	-	-	405.0

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

Initial Contract Price		
Target	Ceiling	Qty
281.5	319.9	1

Current Contract Price		
Target	Ceiling	Qty
499.1	563.5	2

Estimated Price At Completion	
Contractor	Program Manager
475.1	522.3

PROGRAM: AOE-6 FAST COMBAT SUPPORT SHIP
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	Cost Variance		Schedule Variance
Previous Cumulative Variance	N/A	(initial report)	N/A
Cumulative Variance to Date	-15.6		-0.7
Net Change	-15.6		-0.7

Explanation of Change: NASSCO's unfavorable 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: 47.1% (8yrs/17yrs)

(2) Percent Program Cost Appropriated: 31.3% ($887.8/$2834.8)

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	27.5	0.8	0.5	-0-	28.8
Procurement	860.3	362.3	365.4	1218.0	2806.0
Total	887.8	363.1	365.9	1218.0	2834.8

PROGRAM: AOE-6 FAST COMBAT SUPPORT SHIP
AS OF DATE: December 31, 1988

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	-	-	-	4.5	4.6	4.6	4.6	2.8
1987	-	-	-	1.5	1.6	1.6	1.6	2.7
1988	-	-	-	0.1	0.1	0.1	0.1	3.1
1989	-	-	-	-	-	-	-	4.0
1990	-	-	-	0.7	0.8	-	-	3.6
1991	-	-	-	0.4	0.5	-	-	3.3
SUBTOTAL	-	-	-	29.4	28.8	27.5	27.5	-

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	-	-	448.3	497.0	423.8	113.4	1.5
1988	-	-	-	-	-	-	-	2.6
1989	1	-	-	308.5	363.3	253.9	1.4	4.0
1990	1	-	-	300.1	362.3	-	-	3.6
1991	1	-	-	296.3	365.4	-	-	3.3
1992	1	-	-	321.5	404.2	-	-	2.8
1993	1	-	-	303.0	387.9		-	2.3
1994	1	-	-	294.2	383.4	-	-	1.8
1995	-	-	-	5.9	7.9	-	-	1.8
1996	-	-	-	10.3	13.9	-	-	1.8
1997	-	-	-	7.6	10.4		-	1.8
1998	-	-	-	7.4	10.3	-	-	1.8
Subtotal	7	-	-	2303.1	2806.0	677.7	114.8	-
Total	7	-	-	2332.5	2834.8	705.2	142.3	-

17. **Production Rate Data:** N/A

18. **Operating and Support Costs:** N/A

A-12 FAADS LOS-R

SAR-88-095

[redacted]

(b)(1)

SELECTED ACQUISITION REPORT (RCS: DD-COMP(O&A)823)

PROGRAM: FORWARD AREA AIR DEFENSE SYSTEM (FAADS)
LINE OF SIGHT-REAR (LOS-R)

AS OF DATE: December 31, 1988

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1. (U) **Designation and Nomenclature (Popular Name):** Forward Area Air Defense System (FAADS) Line of Sight-REAR (LOS-R); Pedestal Mounted STINGER (PMS); Avenger

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/PMS) (Shared Funding)
PROCUREMENT:	APPN 2032	SSN CA0260 Initial Spares
	APPN 2032	SSN C16000 (LOS-R/PMS)
	APPN 2032	SSN C18500 (LOS-R/PMS) (Shared Funding)
MILCON:	None	

5. (U) **Related Programs:** Line of Sight-Forward-Heavy; Non-Line of Sight; Forward Area Air Defense Command, Control, and Intelligence; STINGER Reprogrammable Microprocessor.

[redacted]

(b)(1)

[redacted]

OASD(PA) DFOISR 89-T-0485

6. (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 Pedestal Mounted STINGER (PMS). The PMS 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 low altitude helicopters and fixed-wing aircraft 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 LOS-R 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 the 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) This submission will rebaseline 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 -- None

8. (U) **Threshold Breaches**: There is no DCP for the LOS-R system. There are no breaches to the DAE LOS-R Baseline, dated March 1989.

9. (U) **Schedule**:

a. (U) Milestones --

	Plng Est	Approved Program	Cur Est/ Prod Est
Joint Requirements Mgt Board	NA	Jan 86	Jan 86
Milestone IIIA	NA	Mar 86	Mar 86
Nondevelopment Item Candidate Evaluation (NDICE) Started	NA	Nov 86	Nov 86
Type Classified - Limited Production Urgent (LPU)	NA	Apr 87	Apr 87
[1]NDICE Completed	Mar 87	Jul 87	Jul 87
[2]Initial Production Contract Award Option I	Sep 87	Aug 87	Aug 87
Contract Award - Option II	Nov 87	Mar 88	Mar 88
Force Development Test & Experimentation (FDTE I) Started	NA	May 88	May 88
FDTE I Completed	NA	Jun 88	Jun 88
Test and Evaluation Master Plan (TEMP) approved (Army)	NA	Jul 88	Jul 88
Type Classified - LPU Extension	NA	Sep 88	Sep 88
Initial Prod Deliveries Start	NA	Nov 88	Nov 88
Contract Award Option III (FY89)	Sep 88	Dec 88	Dec 88 (Ch-1)
FDTE II Start	NA	Feb 89	Feb 89
FDTE II Completed	NA	Mar 89	Mar 89
Production Qualification Test (PQT) Start	NA	Mar 89	Mar 89
Initial Operational Test & Evaluation (IOT&E) Start	NA	Apr 89	Apr 89
[3]First Unit Equipped (FUE)-FORSCOM	Mar 89	Apr 89	Apr 89
Option II Deliveries Start	NA	Jul 89	Jul 89
IOT&E Complete	NA	Aug 89	Aug 89
PQT Complete	NA	Sep 89	Sep 89
Type Classified - Standard	NA	Nov 89	Nov 89
[4]Milestone IIIB	Sep 89	Dec 89	Dec 89
Contract Award - Option IV (FY90)	Nov 89	Dec 89	Dec 89
Option III Deliveries Start	NA	Apr 90	Apr 90
Contract Award - Option V (FY91)	Oct 90	Nov 90	Nov 90

1 Previous SAR (Sep 30,1988) titled "End Competitive Test".
2 Previous SAR (Sep 30,1988) titled "Contract Award - Option I".
3 Previous SAR (Sep 30,1988) titled "First Unit Equipped".
4 Previous SAR (Sep 30,1988) titled "Full Rate Production (Option IV)".

9. (U) **Schedule**: (Continued)

	Plng Est	Approved Program	Cur Est/ Prod Est
FUE-USAREUR	NA	Feb 91	Feb 91
Option IV Deliveries Start	NA	Apr 91	Apr 91
Option V Deliveries Start	NA	Mar 92	Mar 92
FUE-EUSA	NA	Jun 92	Jun 92
FUE-WESTCOM	NA	Apr 96	Apr 96
FUE-ARNG	NA	Aug 96	Aug 96

b. (U) Previous Change Explanations --

Full Rate Production (Option IV) changed from Sep 88 to Dec 89; the original Sep 88 date was a typographical error which should have read Sep 89. In addition the option for PMS contract award was delayed due to a four (4) month delay in completion of the competitive test. The Initial Operational Test and Evaluation (IOT&E) will not be completed in time to support a FSP decision. The Contract Options II, III, IV, and V were adjusted accordingly.

c. (U) Current Change Explanations -- (CH-1) Option III Contract Award changed from Nov 88 to Dec 88.

d. (U) References --

Planning Estimate: FAAD ROC, May 20, 1986
Approved Program: FY 1990-1991 President's Budget and DAE LOS-R Baseline, dated March 1989.
Production Estimate: FY 1990-1991 President's Budget and DAE LOS-R Baseline dated March 1989.

10. (U) **Technical/Operational Characteristics**:

a. (U) Technical --

	Plng Est	Approved Program Goal/Threshold	Demo* Perf	Cur Est/ Prod Est
(U) Compatible with MANPADS STINGER, STINGER POST AND STINGER RMP	will meet	NA	NA	NA

(b)(1)

[redacted]

[redacted]

~~LOS-R~~, December 31, 1988

(b)(1)
(b)(1)

10. (U) **Technical/Operational Characteristics**: **(Continued)**



10. (U) **Technical/Operational Characteristics:** (Continued)

(U) 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

(U) 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.

* Performance to be demonstrated during Initial Operational Test and Evaluation (IOT&E).

c. (U) Previous Change Explanations -- None

d. (U) Current Change Explanations -- None

e. (U) References --

Planning Estimate: FAAD ROC, May 20, 1986.
Approved Program: FY 1990-1991 President's Budget and DAE LOS-R Baseline, dated March 1989.
Production Estimate: FY 1990-1991 President's Budget and DAE LOS-R Baseline, dated March 1989.

11. (U) **Program Acquisition Cost**: (Current Estimate in Millions of Dollars)

	Planning Estimate	Approved Baseline	Cur Est/ Prod Est
a. Cost --			
Development (RDT&E)	$ 11.7	$ 12.4	$ 12.4
Procurement	1045.9	1016.3	1016.3
Total Rollaway	(928.2)	(943.7)	(943.7)
Initial Spares	(117.7)	(72.6)	(72.6)
Construction (MILCON)	0.0	0.0	0.0
Total FY 87 Base Year $	1057.6	1028.7	1028.7
*Adjustment in FY87$ to FY89$		74.4	74.4
RDT&E		(0.9)	(0.9)
PROCUREMENT		(73.5)	(73.5)
Total FY89 Base Year		1103.1	1103.1
Escalation	200.0	163.6	163.6
Development (RDT&E)	(0.4)	- (0.5)	- (0.5)
Procurement	(199.6)	(164.1)	(164.1)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Total Then-Year $	$ 1257.6	$ 1266.7	$ 1266.7
b. Quantities (Fire Units) --			
Development (RDT&E)	TBD	0	0
Procurement	TBD	1207	1207
Total	TBD	1207	1207

* Adjustment factor used to rebaseline from FY87 to FY89: 1.0722 (OSD Inflation Indices dated December 23, 1988)

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

e. (U) References --

Planning Estimate: FAAD ROC, May 20, 1986.
Approved Program: FY 1990-1991 President's Budget and DAE LOS-R Baseline, dated March 1989.
Production Estimate: FY 1990-1991 President's Budget and DAE LOS-R Baseline, dated March 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 88 SAR)	(Dec 87 SAR)	(Dec 88 SAR)
(1) Cost	$1,266.7	$1,276.3	$1,266.7
(2) Quantity	1207	1207	1207
(3) Unit Cost	$1.05	$1.06	$1.05
b. Current Procurement --	(FY 89)	(FY 89)	(FY 90)
(1) Cost	$98.3	$98.1	$124.1
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	$98.3	$98.1	$124.1
(2) Quantity	100	100	122
(3) Unit Cost	$0.98	$0.98	$1.02

13. (U) **Cost Variance Analysis**:

a. (U) Summary -- (Current (Then-year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	12.1	1245.5	0.0	1257.6
Previous Changes:				
Economic		+19.6		+19.6
Quantity				
Schedule				
Engineering				
Estimating	-0.9			- 0.9
Other				
Support				
Subtotal	-0.9	+19.6	0.0	+18.7
Current Changes:				
Economic	-0.5	-2.3		- 2.8
Quantity				
Schedule		+24.9		+24.9
Engineering				
Estimating	+0.9	-33.8		-32.9
Other				
Support	+1.2			+1.2
Subtotal	+1.6	-11.2	0.0	- 9.6
Total Changes	+0.7	+8.4	0.0	+9.1
Current Estimate/ Prod Estimate	12.8	1253.9	0.0	1266.7

(FY 87/89 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	11.7	1045.9	0.0	1057.6
Previous Changes:				
Quantity				
Schedule				
Engineering				
Estimating	-0.8	- 0.2		- 1.0
Other				
Support				
Subtotal	-0.8	- 0.2	0.0	- 1.0
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	+0.5	-29.4		-28.9
Other				
Support	+1.0			+1.0
Subtotal	+1.5	-29.4	0.0	-27.9
Total Changes	+0.7	-29.6	0.0	-28.9
Current Estimate/ Prod Estimate (FY87$)	12.4	1016.3	0.0	1028.7
Adjustments from FY87$ to FY89$	+0.9	+73.5	0.0	+74.4
Current Estimate/ Prod Estimate (FY89$)	13.3	1089.8	0.0	1103.1

13. (U) **Cost Variance Analysis**: (Continued)

b. (U) Previous Change Explanations --

(1) RDT&E

Estimating: Below threshold reprogramming

(2) PROCUREMENT

Economic: Revised escalation indices
Estimating: Revised base year estimates

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised escalation indices (Economic)	---	-0.5
Return of below threshold reprogramming (Estimating)	+0.5	+0.9
Increased scope of testings and validation of design and performance requirements. (Support)	+1.0	+1.2
(2) PROCUREMENT		
Revised escalation indices (Economic)	---	-2.3
Stretched out schedule by four years (Schedule)	---	+24.9
Multiyear savings (Estimating)	-29.4	-33.8

14. (U) **Program Acquisition Unit Cost (PAUC) History**: (Millions of Then-Year Dollars)

a. (U) Planning Estimate to Production Estimate --

PAUC *(InitEst Dec 87)	Changes								PAUC (Prod Est/CE)
	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	--	--	--	--	--	--	--	--	1.050

15. (U) **Contract Information**: (Then-Year Dollars in Millions)

a. (U) RDT&E -- None

b. (U) Procurement --

PMS/Avenger:

Boeing Aerospace Company
Huntsville, AL
DAAH01-86-C-A077, FFP[1]
Award: Aug 87 (Option II--Mar 88)
Definitized: Aug 87 (Option II -- Mar 88)

Initial Contract Price		
Target	Ceiling	Qty
$42.6	NA	59

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$93.5	NA	129	$93.5	$93.5

Note: Cost Performance Report (CPR) data is not required on Firm Fixed Price (FFP) contracts.

c. (U) MILCON -- None

1 FY 87/88 production buys

16. (U) **Program Funding Summary**: (Cur Estimate in Millions of Dollars)

a. (U) Program Status --

(1) Percent Program Completed: 33.3% (4/12)

(2) Percent Program Cost Appropriated: 17.1% (216.4/1266.7)

b. (U) 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	203.6	124.1	139.8	786.4	1253.9
MILCON	0.0	0.0	0.0	0.0	0.0
Total	216.4	124.1	139.8	786.4	1266.7

c. (U) Annual Summary --

FISCAL YEAR	QTY*	FY 89 BASE-YEAR DOLLARS ROLLAWAY NONREC	ROLLAWAY REC	TOTAL	THEN-YEAR DOLLARS Program	Obligated	Expended	ESCL RATE %
APPROPRIATION: RDT&E								
1986				4.5	4.2	4.2	3.7	2.8
1987				2.8	2.7	2.7	1.5	2.7
1988				6.0	5.9	2.6	0.1	3.1
SUBTOTAL	0			13.3	12.8	9.5	5.3	
APPROPRIATION: PROCUREMENT								
1987	20		36.5	41.2	41.2	30.5	2.2	2.7
1988	39		43.7	61.9	64.1	32.1	4.1	3.1
1989	100		86.0	92.1	98.3	43.3	0.0	4.0
1990	122		105.5	113.1	124.1			3.6
1991	132		120.9	124.5	139.8			3.3
1992	132		120.9	134.9	154.5			2.8
1993	132		104.3	118.4	138.1			2.3
1994	132		62.6	72.4	86.0			1.8
1995	132		112.4	112.4	135.9			1.8
1996	133		110.4	110.4	135.9			1.8
1997	133		108.5	108.5	136.0			1.8
SUBTOTAL	1207		1011.9	1089.8	1253.9	105.9	6.3	
TOTAL	1207		1011.9	1103.1	1266.7	115.4	11.6	

* Approved program for LOS-R is 1207. The FYDP will be corrected to reflect the approved program.

16. (U) **Program Funding Summary**: (Continued)

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. (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 1987 is 8 months and for Fiscal Year 1989 is 10 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	100	278
1990	N/A	122	122	480
1991	N/A	132	132	390
1992	N/A	132	132	N/A
1993	N/A	132	132	N/A
1994	N/A	132	132	N/A
1995	N/A	132	132	N/A
1996	N/A	133	133	N/A
1997	N/A	133	133	N/A

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 $)	1,103.1	0.0	1,103.1	17.3	1,085.8
(TY $)	1,266.7	0.0	1,266.7	105.9	1,160.8
PAUC (BY $)	0.914	0	0.914	0.014	0.900
(TY $)	1.050	0	1.050	0.088	0.962

c. (U) Schedule Variance --

	Production Estimate	Variance (CE vs. PDE)	Current Estimate	Variance (CE vs. MAX)	Maximum Economic
Start Date (Mo/Yr)	Aug 87	N/A	Aug 87	N/A	Aug 87
Duration (In Months)	140	0	140	72	68
End Date (Mo/Yr)	Apr 99	N/A	Apr 99	N/A	Apr 93

17. (U) **Production Rate Data**: (Continued)

d. (U) Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
Procurement	4/4

e. (U) 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 PMS 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.

b. (U) Costs -- Annual cost per LOS-R Fire Unit is $151K in Fiscal Year 1989 constant dollars.

(FY 1989 Constant (Base-Year) Dollars in Millions)

	per LOS-R Fire Unit
Personnel	0.106
O&S Consumables	0.014
Direct Depot Maintenance	0.018
Sustaining Investment	0.003
Other Direct Costs	0.003
Indireact Costs	0.007
Total	0.151

c. Contractor Support Costs: Not applicable

SAR-88-094

A-13 FAADS NLOS

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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, 1988

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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: 746-8454
Commercial: (205) 876-8454

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	

5. (U) **Related Programs**: Combined Arms; Line of Sight-Forward-Heavy; Line of Sight-Rear; and Forward Area Air Defense Command, Control, and Intelligence.

[redacted]

SECRET

Classified By: FIBER OPTIC GUIDED MISSILE SECURITY CLASSIFICATION GUI[redacted] 7 MAY 1987

Declassify On: OADR

1

OASD(PA) DFOISR 88-T-0496

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 (FAAD) system. 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. 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. 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.

(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. The FOG-M can be launched 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.

b. (U) Significant Developments Since Last Report -- 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 in December 1988. This submission will rebaseline the SAR from a Planning Estimate (PE) to a Development Estimate (DE).

(U) The FAADS, to include the NLOS component, is expected to satisfy mission requirements.

c. (U) Changes Since "As of" Date -- None

8. (U) **Threshold Breaches**: There are currently no Decision Coordinating Paper (DCP), dated July 1, 1988, threshold breaches.

9. (U) **Schedule:**

a. (U) Milestones 1/

		Plng Est	Approved Program	Cur Est/ Dev Est
(U)	RFP Release	TBD	N/A	Nov 87
(U)	Milestone II (DAB)	Jun 87	N/A	Aug 88
(U)	Start Initial Operational Evaluation (IOE)	NA	N/A	Nov 88
(U)	FSD Contract Award	NA	N/A	Dec 88
(U)	End IOE	NA	N/A	Aug 88
(U)	Start Extended User Employment (EUE)	NA	N/A	Sep 89
(U)	Advance Procurement LRIP (LLI)	NA	N/A	May 90
(U)	Start Engineering Development Test-Contractor/Government Operational Analysis (EDT-C/GOA)	NA	N/A	Nov 90
(U)	End EUE	NA	N/A	Sep 91
(U)	End EDT-C/GOA	NA	N/A	Jul 91
(U)	Milestone IIIA (DAB)	TBD	N/A	Jul 91
(U)	Contract Award LRIP	NA	N/A	Jul 91
(U)	First Unit Equipped - Light	TBD	N/A	NA
(U)	First Unit Equipped - Heavy	TBD	N/A	NA
(U)	Start Force Development Test and Experimentation (FDT&E)	NA	N/A	Sep 91
(U)	End FDT&E	NA	N/A	Oct 91
(U)	Start Early User Test and Evaluation (EUT&E)	NA	N/A	Jan 92
(U)	End EUT&E	NA	N/A	Mar 92
(U)	First Unit Equipped (FUE)	NA	N/A	Aug 93
(U)	Start FDT&E II	NA	N/A	Jul 93
(U)	End FDT&E	NA	N/A	Sep 93
(U)	Start Live Fire Vulnerability/ Lethality (VUL/LETH)	NA	N/A	Sep 93
(U)	Start Initial Operational Test & Evaluation (IOT&E)	NA	N/A	Oct 93
(U)	End VUL/LETH	NA	N/A	Nov 93
(U)	End IOT&E	NA	N/A	Dec 93
(U)	Milestone III (DAB) Full Scale Production (FSP)	TBD	N/A	Jan 94
(U)	FSP Contract Award	NA	N/A	Mar 94

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9. (U) **Schedule (Cont.)**:

c. (U) Current Change Explanations -- None

d. (U) References --

Planning Estimate: SDDM dated August 14, 1986, and FY88/89 President's Budget
Approved Program: DAE Baseline has not been approved.

Development Estimate: Draft DAE Baseline, FY90-91 President's Budget.

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[redacted]

(U)	Mean Time Between Unscheduled Maint. Actions (MTBUMA)			
	Heavy Firing Unit (HFU)	NA	N/A	89 hrs
	Light Firing Unit (LFU)	NA	N/A	90 hrs
(U)	Mean Time to Repair - UNIT (MTTR-UNIT)			
	HFU	NA	N/A	2.5 hrs
	LFU	NA	N/A	2.5 hrs
(U)	NLOS Mission	TBD	N/A	NA

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(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 --

ROC approved October 29, 1987 established missile quantity requirements for light fire units as 6 missiles and for heavy fire units as 12-24 missiles

[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).

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10. (U) **Technical/Operational Characteristics (Cont.)**:

d. (U) Current Change Explanations -- None

(CH-1) -- To be consistent with the threshold value in the Draft DAE Baseline dated February 1989 the current estimate was changed from 12-24 to 12.

e. (U) References --

Planning Estimate: SDDM dated August 14, 1986.
Approved Program: DAE baseline has not been approved.

Development Estimate: Draft DAE Baseline, FY90-91 President's Budget.

11. (U) **Program Acquisition Cost**: (Cur Estimate in Millions of Dollars)

	Planning Estimate	Approved Program	Dev Estimate/ Cur Estimate
a. (U) Cost --			
Development (RDT&E)	$485.8	$497.7	$497.7
Procurement	TBD	1850.4	1850.4
Flyaway Cost		(1673.6)	(1673.6)
Other Weapon System Cost		(128.9)	(128.9)
Initial Spares		(47.9)	(47.9)
Construction (MILCON)	TBD	0.0	0.0
Total FY87 Base Year $	485.8	2348.1	2348.1
[1]Adjustment in FY87$ to FY89$		171.6	171.6
Development (RDT&E)		(38.0)	(38.0)
Procurement		(133.6)	(133.6)
Total FY89 Base Year $		2519.7	2519.7
Escalation	46.6	400.7	400.7
Development (RDT&E)	(46.6)	(20.2)	(20.2)
Procurement		(380.5)	(380.5)
Construction (MILCON)		(0.0)	(0.0)
Total Then-Year $	$532.4	$2920.4	$2920.4
b. (U) Quantities -- Fire Units			
Development (RDT&E)	TBD	8	8
Procurement	TBD	403	403
Total	TBD	411	411

c. (U) Foreign Military Sales -- None

d. (U) Nuclear Costs -- None

[1] Adjustment factor used to rebaseline from FY87 to FY89: 1.0722 (OSD Inflation Indices, dated December 23, 1988). Conversion factor applied to rounded total results in a slight variance (2.7) opposed to calculation on a year-by-year basis. 2.1

11. (U) **Program Acquisition Cost (Cont.)**: (Cur Estimate in Millions of Dollars)

e. (U) References --

Planning Estimate: SDDM dated August 14, 1986 and FY88/89 President's Budget.
Approved Program: Draft DAE Baseline, FY90-91 President's Budget.
Development Estimate: Draft DAE Baseline, FY90-91 President's Budget.

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 88 SAR)	(Dec 88 SAR)	(Dec 88 SAR)
(1)	Cost	2920.4	2920.4	2920.4
(2)	Quantity (Fire Units)	411	411	411
(3)	Unit Cost	7.1	7.1	7.1
b. (U)	Current Procurement --	(FY89)	(FY89)	(FY90)
(1)	Cost	N/A	N/A	32.5
	Less CY Adv Proc	N/A	N/A	32.5
	Plus PY Adv Proc	N/A	N/A	0.0
	Net Total	N/A	N/A	0.0
(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	532.4	TBD	TBD	532.4
Previous Changes:				
Economic	+23.3	--	--	+23.3
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	+5.8	--	--	+5.8
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+29.1	--	--	+29.1
Current Changes:				
Economic	-3.4	--	--	-3.4
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-2.2	--	--	-2.2
Other	--	--	--	--
Support	--	--	--	--
Subtotal	-5.6	--	--	-5.6
Total Changes (RDT&E)	+23.5	--	--	+23.5
Baseline Adjustment	--	+2364.5	--	+2364.5
Development Estimate/ Current Estimate	555.9	2364.5	--	2920.4

(FY 87/89 (Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	485.8	TBD	TBD	485.8
Previous Changes:				
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	+5.8	--	--	+5.8
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+5.8	--	--	+5.8
Current Changes:				
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+6.1	--	--	+6.1
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+6.1	--	--	+6.1
Total Changes (RDT&E)	+11.9	--	--	+11.9
Total (RDT&E) Baseyear FY87$	497.7	--	--	497.7
Baseyear Adj to FY89$	+38.0	--	--	+38.0
Baseline Adjustment	--	+1984.0	--	+1984.0
Current Estimate/ Development Estimate FY89$	535.7	1984.0	--	2519.7

13. (U) Cost Variance Analysis (Cont.):

b. (U) Previous Change Explanations --

(1) RDT&E

Economic: Revised escalation indices.

Engineering: Revised ROC necessitates development of high speed, variable speed objective missile with increased range and improved navigation and Block I Technical Risk Reduction; Delete Technology Transfer; Small Business Innovative Research 1987; Development Escalation Resulting from Contractor and Government Engineering delay.

(2) Procurement -- None

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Escalation Indices (Economic)		-3.4
Increase due to efforts associated with Acquisition Strategy changes (i.e. accelerated schedule, Technical Risk Reduction, and EUE); a validated BCE reflects revised cost factors. (Estimating)	+6.1	-2.2

14. (U) Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

a. (U) Development Estimate to Current Estimate --

PAUC (Initial SAR/[1] Dev Est)	Changes								PAUC (Dev/Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
7.11	--	--	--	--	--	--	--	--	7.11

[1] Includes average of 41 missiles per Fire Unit; the December 1988 SAR is the first SAR to report quantities.

15. (U) **Contract Information**: (Then-Year Dollars in Millions) --

a. (U) RDT&E --

Fire Units/Missiles:	Initial Contract Price Target	Ceiling	Qty
[2] Boeing Military Airplane 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:

Current Contract Price Target	Ceiling	Qty	Estimated Cost at Completion Contractor	Program Manager
131.3	NA-Cost Plus	8/40	131.3	131.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date (12/20/88)	$0.0	$0.0
Net Change	$0.0	$0.0

Explanation of Change: Cost variance reporting for this contract has not started.

b. (U) Procurement -- None

c. (U) MILCON -- None

16. (U) **Program Funding Summary**: (Cur Estimate in Millions of Dollars)

a. (U) Program Status --

(1) Percent Program Completed: 27% (3/11) (1987/1997)

(2) Percent Program Cost Appropriated: 9% (264.9/2920.4)

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	$264.9	$139.4	98.3	53.3	$555.9
Procurement	$0.0	$32.5	131.2	2200.8	2364.5
MILCON	0.0	0.0	0.0	0.0	0.0
Total	$264.9	$171.9	229.5	2254.1	$2920.4

[2] Boeing and Hughes are teamed with Boeing as the lead.

16. (U) **Program Funding Summary (Cont.)**: (Cur Estimate in Millions of Dollars)

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 $ Obligated	Total Then Year $ Expended	Escl Rate (%)
Appropriation: RDT&E								
1987				63.2	60.2	60.2	58.6	2.7
1988				61.3	60.4	58.5	40.1	3.1
1989				141.1	144.2	17.0	0.2	4.0
1990				132.0	139.4			3.6
1991				90.4	98.3			3.3
1992				41.9	46.7			2.8
1993				5.8	6.7			2.3
Subtotal	40/8			535.7	555.9	135.7	98.9	
Appropriation: Procurement								
1990			29.6	29.6	32.5			3.6
1991	256/9	1.7	106.9	116.8	131.2			3.3
1992	473/13	3.0	139.5	173.3	198.5			2.8
1993	2112/67	10.3	269.9	352.8	411.8			2.3
1994	3298/102	14.3	339.9	388.5	460.8			1.8
1995	4160/90	14.8	347.3	385.3	465.3			1.8
1996	4228/91	14.4	340.6	368.2	452.5			1.8
1997	2023/31	5.9	156.4	169.5	211.9			1.8
Subtotal	16550/403	64.4	1730.1	1984.0	2364.5	0	0	
Total	16590/411	64.4	1730.1	2519.7	2920.4	135.7	98.9	

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	256	N/A
1992	473	N/A	473	N/A
1993	2112	N/A	2112	N/A
1994	3298	N/A	3298	N/A
1995	4160	N/A	4160	N/A
1996	4228	N/A	4228	N/A
1997	2023	N/A	2023	N/A

[1] Quantities shown are missiles/fire units.

17. (U) **Production Rate Data (Cont.):**

Fire Unit

Fiscal Year	Production Rates (Quantity / Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1991	9	N/A	9	N/A
1992	13	N/A	13	N/A
1993	67	N/A	67	N/A
1994	102	N/A	102	N/A
1995	90	N/A	90	N/A
1996	91	N/A	91	N/A
1997	31	N/A	31	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	2519.7	N/A	N/A
(TY $)	N/A	N/A	2920.4	N/A	N/A
PAUC (Fire Unit)[1] (BY $)	N/A	N/A	6.1	N/A	N/A
(Fire Unit)[1] (TY $)	N/A	N/A	7.1	N/A	N/A

c. (U) Schedule Variance -- (NOTE: Subject to Limitations on production rates above.)

	Production Estimate	Variance (CE vs PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	05/90	N/A	N/A
Duration (in Months)	N/A	N/A	105	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	02/99	N/A	N/A

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

[1] Includes average of 41 missiles per Fire Unit.

17. (U) **Production Rate Data (Cont.)**:

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		
FY 89 Base-Year $	1.705	1.705	1.790
Then-Year $	2.026	2.026	2.127
LFU			
@ Qty 118-@ Peak Rate:	2.5/mo		
FY 89 Base-Year $	.783	.783	.822
Then-Year $	.933	.933	.980
Missiles			
IIR			
@ Qty 5220-@ Peak Rate:	113/mo		
FY 89 Base-Year $	.089	.089	.094
Then-Year $	.106	.106	.111
TV			
@ Qty 11330-@ Peak Rate:	240/mo		
FY 89 Base-Year $	.066	.066	.069
Then-Year $	.079	.079	.083

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.

18. (U) Operating and Support Costs (Cont.):

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